NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

Submitted to:
California Department of Water Resources

Submitted by:
North Coast Resource Partnership

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ACRONYMS

5C	Five Counties Salmonid Conservation Program
AF	acre-feet
ASBS	Area of Special Biological Significance
BLM	USDI Bureau of Land Management
BMPs	Best Management Practices
CARCD	California Association of Resource Conservation Districts
CCA	Critical Coastal Area
CCC	California Coastal Commission
CDF	California Department of Forestry
CDFG	California Department of Fish and Wildlife
CEPA	California Environmental Protection Agency
CSD	Community Services District
DWR	Department of Water Resources
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FS	USDA Forest Service
JPA	Joint Powers Authority
KRBFTF	Klamath River Basin Fisheries Task Force
LAFCO	Local Agency Formation Commission
MG	million gallons
MGD	million gallons per day
MMs	management measures
MMA	Marine Managed Area
MOMU	Memorandum of Mutual Understanding
NCRP	North Coast Resource Partnership
NCIRWMP	North Coast Integrated Regional Water Management Plan
NCRWMG	North Coast Regional Water Management Group
NCWAP	North Coast Watershed Assessment Program
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint sources
NSO	northern spotted owl
NWFP	Northwest Forest Plan
PNAMP	Pacific Northwest Aquatic Monitoring Partnership
POTWs	Publicly Owned Treatment Works
RNSP	Redwood National and State Parks
RWQCB	Regional Water Quality Control Board
RWQCBs	Regional Water Quality Control Boards
RCD	Resource Conservation District
RWQMP	Rangeland Water Quality Management Plan
SCWA	Sonoma County Water Agency
SONCC	Southern Oregon/Northern California Coast
SWAMP	Surface Water Ambient Monitoring Program
SWQPA	Stormwater Quality Protection Area
SWRCB	State Water Resources Control Board
THP	Timber Harvest Plan
TMDL	Total Maximum Daily Load
TPZ	Timber Production Zone
UCCE	University of California Cooperative Extension
USDA	U.S. Department of Agriculture
USGS	U.S. Geologic Survey
USDI	U.S. Department of the Interior
UWMP	Urban Water Management Plan
WDR	Waste Discharge Requirement

REFERENCES, SOURCES, TOOLS

Please refer to Appendix Q ("Technical Sources, Resources, & References) for lists of literature cited and other supporting information.

ACKNOWLEDGMENTS

Special thanks to the Reviewers for all their time and dedication to this project:

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MEMORANDUM OF MUTUAL UNDERSTANDINGS SIGNATORIES

Del Norte Agencies:
County of Del Norte
City of Crescent City
Gasquet Community Service District
Del Norte Resource Conservation District
Big Rock Community Service District

Humboldt County Agencies:
County of Humboldt
City of Eureka
City of Arcata
City of Rio Dell
City of Trinidad
City of Blue Lake
Humboldt Municipal Water District
Humboldt Community Service District
Hydesville Community Water District
McKinleyville Community Service District
Myers Flat Mutual Water System
Fieldbrook Community Service District
Willow Creek Community Service District
Garberville Sanitary District
Redway Community Service District
Orick Community Service District
Humboldt Bay Harbor, Recreation and Conservation District
Westport County Water District
Westhaven Community Service District

Humboldt County Resource Conservation District
Loleta Community Service District
Lake County Agencies:
County of Lake
Lake County Watershed Protection District
Mendocino County Agencies:
County of Mendocino
Mendocino County Water Agency
City of Willits
City of Ukiah
City of Fort Bragg
Covelo Community Service District
Mendocino County Resource Conservation District
Redwood Valley County Water District
Brooktrails Township Community Service District
Gualala River Watershed Council
Noyo Watershed Alliance
Modoc County Agencies:
County of Modoc
Siskiyou County Agencies:
County of Siskiyou
City of Etna
Happy Camp Community Service District
Shasta Valley Resource Conservation District
Sonoma County Agencies:
County of Sonoma
Town of Windsor
City of Cloverdale
City of Rohnert Park
City of Santa Rosa
City of Healdsburg
City of Sebastopol
City of Cotati
Sonoma County Water Agency
Graton Community Service District
Sotoyome Resource Conservation District
Gold Ridge Resource Conservation District
Russian River Watershed Association (group of 10 cities, counties and special districts in Sonoma and Mendocino counties)
Trinity County Agencies:
County of Trinity
Trinity County Resource Conservation District
Weaverville Sanitary District
Weaverville Community Service District
Trinity County Water Works District #1
Salyer Mutual Water District
Tribal Nations:
Yurok Tribe
Hoopa Valley Tribe
Karuk Tribe
Pinoleville Pomo Nation
Hopland Band of Pomo Indians
Wiyot Tribe
Sherwood Valley Band of Pomo Indians
Smith River Rancheria
Redwood Valley Little River Band of Pomo Indian
Cher-Ae Heights Indian Community of the Trinidad Rancheria
Other Entities:
Trout Unlimited
Community Clean Water Institute
The Watershed Research and Training Institute
Russian River Watershed Council
North Coast Resource Conservation and Development Council
Circuit Rider Productions, Inc.
Gualala River Watershed Council
Pacific Coast Fish, Wildlife and Wetlands Restoration Association
LandPaths
Sonoma Ecology Center
California State Parks
Stewards of the Coast and Redwoods
Institute for Fisheries Resources
California Department of Forestry and Fire Protection
Occidental Arts and Ecology Center
California Land Stewardship Institute
E Center
Dutch Bill Creek Watershed Group
Westminster Woods Environmental Education Program
Botanical Dimensions
Mattole Restoration Council
Sebastopol Water Information Group
North Coast Regional Land Trust
The Conservation Fund
Redwood Community Action Agency
Laguna de Santa Rosa Foundation
Redwood Forest Foundation, Inc.
Project Team:
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West Coast Watershed
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ECONorthwest
DowHouse

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PREAMBLE

"The North Coast Integrated Regional Water Management Plan [NCIRWMP] is by design a voluntary, non-regulatory, stakeholder-driven planning framework meant to emphasize shared priorities and local autonomy, authority, knowledge, and approaches to achieving Tribal, state, regional, and local priorities related to North Coast water infrastructure, watersheds, public health, and economic vitality. The NCIRWMP focuses on areas of common interest and concern to North Coast stakeholders and on attracting funding to the North Coast Region, and recognizes unique local solutions in different parts of the Region."

[NCIRWMP Section 1.4.1 "Statement of Purpose"]

SECTION 1 INTRODUCTION & PLANNING APPROACH

1.1 OVERVIEW OF THE NCRP & THE NCIRWM PLAN & PROCESS

The North Coast Resource Partnership (NCRP) is an innovative, stakeholder-driven collaboration among local governments, Tribal governments, watershed groups, and other interested partners focused on integrated resource planning and local project implementation in California's North Coast Region (Map 1 "The North Coast Region").

Initiated in 2005, the NCRP engages in various planning tasks, including the development of the North Coast Integrated Regional Water Management Plan (NCIRWMP). Regularly updated, this document represents the third iteration (Phase III) of the NCIRWMP. The overarching themes that have guided development, implementation, and evaluation of the NCIRWMP are beneficial uses of water, salmonid enhancement, energy independence, climate adaptation/ mitigation, economic vitality, local autonomy, intraregional cooperation, and adaptive management (Section 4 "NCIRWMP Goals & Objectives"). These themes, many of which are interrelated, are revisited throughout this document and are being implemented in the Region via a portfolio of local projects (Section 7 "Project Application, Review & Selection Process").

The NCRP consists of seven North Coast counties (Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma, and Trinity), representatives of North Coast Tribes, and the Sonoma County Water Agency and the Mendocino County Water Agency.. The NCRP adheres to the NCIRWMP Memorandum of Mutual Understandings (MoMU), signed by over 100 agencies, special districts, Tribal organizations, non-governmental organizations, watershed groups, and other stakeholders. The MoMU signifies support by each of these entities for the NCIRWM Plan and process. The NCRP decision-support structure consists of a Policy Review Panel (PRP), which serves as the governing body for the regional NCRP process; an Executive Committee, which provides day-to-day leadership for the NCRP; a Technical Peer Review Committee (TPRC), an advisory body to the PRP that provides scientific and technical expertise to the NCRP; and project staff, consultants, and stakeholders throughout the Region (Section 2 "Governance & Decision-Making").

The NCRP places strong emphasis on local autonomy, allowing each county, Tribal, municipal, or watershed jurisdiction to implement the NCIRWMP and other plans in a way that respects and incorporates local knowledge and preferences. This approach has served the Region well in finding common ground within areas of potential conflict while respecting local control, expertise, and approaches to achieving local, regional, statewide, and federal water resource planning priorities. The North Coast is characterized by substantial socio-economic, cultural, and political diversity and a wide range of perspectives and views on a variety of water related topics. However, common ground is consistently found at the regional scale by focusing on shared values and priorities (Section 5.15 "Social & Cultural Values"). In part because of its proven ability to balance local and regional interests, the NCRP continues to be successful at integrated planning and implementing innovative local projects that benefit the entire Region.

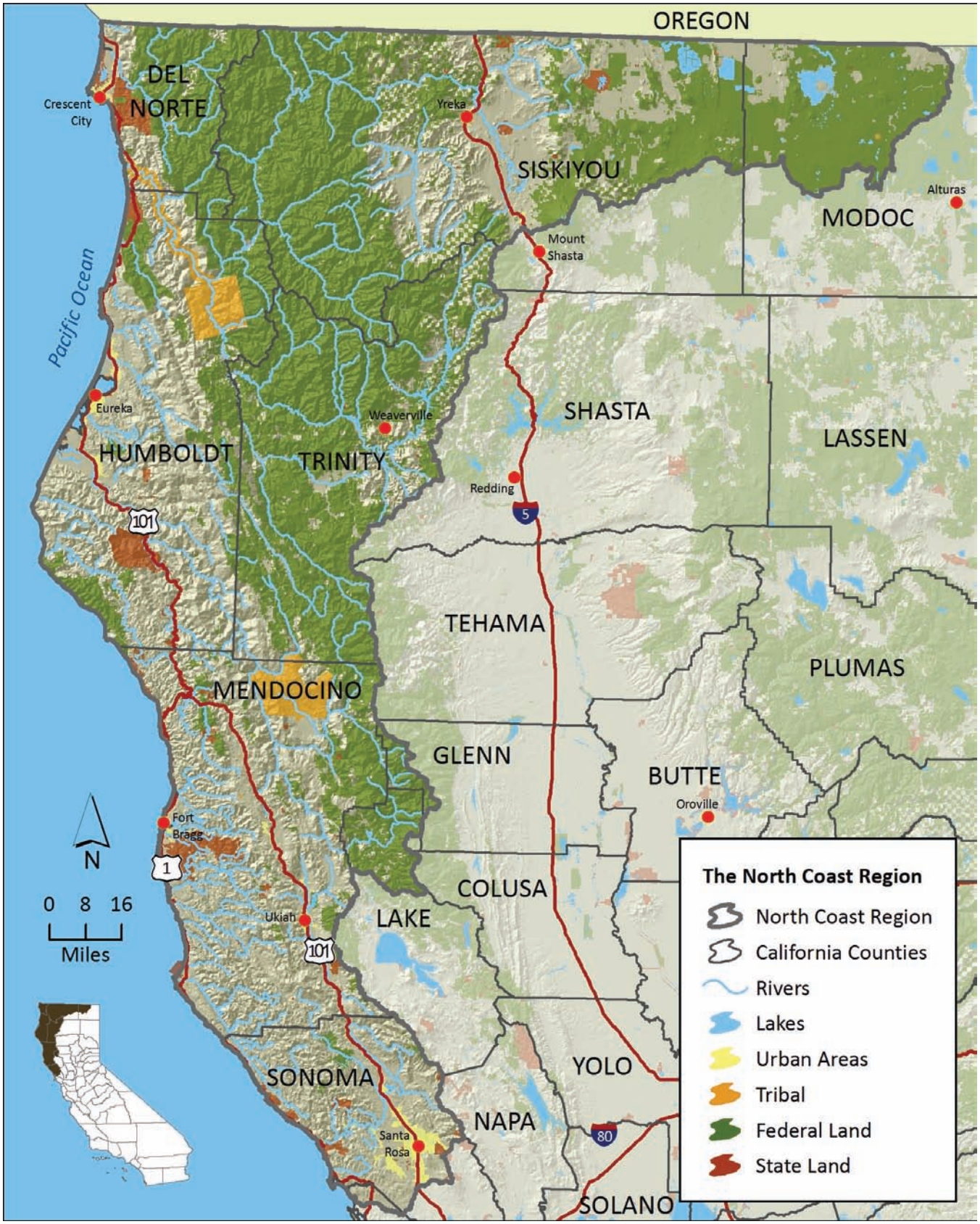
Throughout this NCIRWMP, there is reference to policy and guidance documents (e.g., Project Review and Selection Process Guidelines) available on the NCIRWMP website (http://www.northcoastirwmp.net). Because the NCRP uses an Adaptive Management approach to governance, these policies and planning processes are updated and approved by the NCRP PRP on a regular basis that occurs more frequently than NCIRWM Plan updates. The planning documents available online are considered formal NCIRWM planning documents and are referenced where applicable within this document.

1.2 OVERVIEW OF THE NORTH COAST REGION

The NCRP planning boundary is equivalent to the hydrologic basin delineated by the North Coast Regional Water Quality Control Board (NCRWQCB) as "North Coast Region 1" (Map 1 "The North Coast Region"). The Region encompasses approximately 19,390 square miles (50,220 square km), including approximately 340 miles (547 kilometers) of coastline (NCRWQCB 2005) and abundant wilderness, along with agricultural areas and some urban centers. Coastal, upland, riparian, and aquatic habitats support diverse plant and wildlife populations, including some of the last viable salmon runs in the state. Several designated Stormwater Quality Protection Areas (formerly Areas of Special Biological Significance), Marine Protected Areas, and Critical Coastal Areas occur along the North Coast. The Mediterranean climate varies from moderate and foggy along coasts to hot and dry inland (i.e. regularly in excess of 100 degrees F.).

The Region has abundant surface water and groundwater resources. The North Coast represents only 12% of the state, yet produces about 40% of statewide runoff, replenishing stream flow, reservoirs, and groundwater stores and providing numerous beneficial uses of water to people and ecosystems (NCRWQCB 2011). Annual

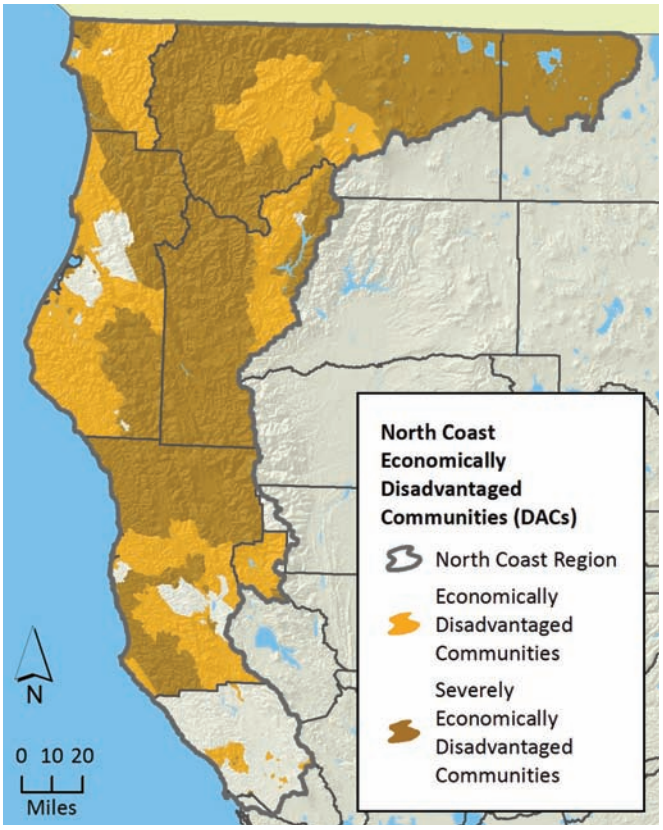
MAP 1 THE NORTH COAST REGION



precipitation is greater in this Region than in any other part of the state and floods are a fairly regular phenomenon. The Region's watersheds drain to the Pacific Ocean from the Oregon border in the north, south to Marin County. The Region is divided into two natural drainage basins, the Klamath River Basin and the North Coastal Basin; six Watershed Management Areas (Eel River, Humboldt Bay, Klamath, North Coast Rivers, Russian River/Bodega Bay and Trinity River Watershed Management Areas); and numerous individual watersheds and groundwater basins. Major groundwater basins have been identified by DWR; many other basins remain unnamed (NCRWQCB 2011).

Overlying the watershed, groundwater, and other physical boundaries are the jurisdictional boundaries of the various North Coast counties, Tribes, municipalities, and special districts. The Region includes all of the counties of Del Norte, Humboldt, Trinity, and Mendocino; major portions of Siskiyou and Sonoma; and small portions of Glenn, Lake, Marin, and Modoc counties. Adjacent IRWM planning regions are the Central Valley Region 5 (including remaining parts to Glenn, Lake, Modoc, and Siskiyou Counties) and the San Francisco Bay Region 2 (including remaining parts of Marin and Sonoma Counties).

The total 2010 population of the North Coast Region was approximately 675,845 (up from 664,000 in 2000; U.S. Dept. Commerce, Census Bureau 2010). Population density remains low relative to other portions of the state: just two percent of California's total population currently resides in the North Coast Region (NCRWQCB 2011), with most inhabitants concentrated along the Pacific Coast and in the inland valleys immediately north of the San Francisco Bay Area (DWR 2009). The largest urban centers are located in the Eureka area of Humboldt County and in the Santa Rosa area of Sonoma County; the latter has experienced the largest population growth of all the counties within the Region (NCRWQCB 2011). Most of the Region (by area), and a significant proportion of its residents, are characterized by the State as "economically disadvantaged communities" (Map 2 "Economically Disadvantaged Communities"). As a result of their rural location and financial challenges, disadvantaged communities (DACs) often experience deteriorated, inadequate, or defunct water supply, treatment, and/or conveyance infrastructure and associated impaired water quality. The lack of quality water and wastewater infrastructure in these disadvantaged communities impacts economic vitality in a number of ways: causing communities to use scarce financial and human resources to temporarily shore up failing infrastructure while not having the resources to comprehensively addressing infrastructure needs; creating situations where small communities are subject to fines and regulatory actions that do not support the correction of the underlying problem; and impacts to water quality (both in drinking water and in stream systems) that affect the ability of these communities to attract the financial benefits associated with recreational tourism.



MAP 2 ECONOMICALLY DISADVANTAGED COMMUNITIES

Tourism/recreation and natural resources-based industries (e.g. logging, timber milling, aggregate mining, fishing, livestock, dairy, vineyards, and wineries) provide the foundation for the Region's monetary economy. While resource-based industry remains a factor in the regional economy, the North Coast is

undergoing economic transition, with an increasing focus on service-based economies. This transition has been and will continue to be difficult for much of the Region, because the economic resources needed to build or update service-based infrastructure are limited.

While the North Coast Region was selected as the scale for overall coordination and synchronization of broad regional water management objectives and priorities, local jurisdictional and physical boundaries exist as the appropriate scales for more detailed planning and implementation. At the scale of North Coast watersheds (and the six WMAs) the NCIRWMP framework allows the North Coast to integrate with other regional, state, and federal planning, implementation, and funding efforts. These include watershed-based efforts already in place with California Department of Fish and Wildlife (CDFW), California State Coastal Conservancy (CCC), State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCB), and the Department of Water Resources (DWR).

Section 5 "North Coast Region Description" and Section 6 "Local & Regional Water-Related Issues" provide details on the Region's populations, jurisdictions, watershed attributes, water quality, water supply, water demand, infrastructure, projected changes, issues, conflicts, values, and more. Appendices provide supplemental information.

1.3 NEED FOR AN IRWM PLAN

The North Coast Region benefits from a cohesive, coordinated, and collaborative framework for addressing critical water-related issues and attaining applicable local, regional, and statewide water resource priorities. With a regional approach to integrated water management planning, the NCIRWMP can provide a framework for melding different spatial scales; ameliorating jurisdictional and project conflicts; and aligning multiple planning methodologies into a cohesive mechanism for efficient attainment of state and local water resource goals and objectives.

Impacts to the Region's salmonids, beneficial uses of water, and other water-related resources may result from individual local land use decisions and actions, but the effects of these impacts are cumulative across the Region. Conversely, decisions regarding resource protection often take place at the statewide level but need to adequately account for local priorities, knowledge, and needs. Thus, effective solutions often require a watershed and, ultimately, a regional approach that can be adopted and implemented by many stakeholders. As noted above, state natural resources agencies are increasingly utilizing watershed-based natural resource planning approaches in the Region. The NCIRWMP also uses a watershed-based framework, in part to ensure consistency with statewide planning efforts and priorities.

Due to limited funding at the county and local levels, all of the jurisdictions within the Region face serious challenges to accomplishing statewide water management goals related to state and federal environmental regulations. Many local planning entities do not have the staff or resources to evaluate or act upon statewide planning goals. Unlike more populous and well-funded parts of California, limited economic resources in the North Coast Region promote collaboration among counties, Tribes and stakeholders to achieve efficiencies in accomplishing common goals. The NCIRWMP acts as an information resource for counties, cities, Tribes, and watershed groups to learn about, understand, and implement statewide objectives within the context of local planning. The NCIRWMP, by operating as a planning and implementation "hub" at the regional scale, also synchronizes local planning with statewide planning efforts, making both stronger and more robust.

Using the NCRP's cooperative, regional association and infrastructure, the NCIRWMP identifies best practices underway throughout the Region; analyzes results achieved based on their success; and develops demonstration models and corresponding metrics and materials to replicate and distribute proven and tested programs region and statewide. Sharing data and successful technology, and developing replicable materials and programs for region-wide dissemination, are proven models for effective implementation of the NCIRWMP. This approach provides North Coast communities with an established framework and the organizational capacity to ensure that those entities that desire these tools, methods, policies, and planning models have access to them.

Other benefits associated with synchronized, regional planning at the North Coast Region scale, as opposed to establishment of myriad uncoordinated local (e.g. county, municipal, or watershed) planning efforts, include:

- Institutionalizes the IRWM planning framework envisioned by the California legislature and California voters, and provides a basis for mutual cooperation among water resource stakeholders in the Region
- Establishes a consistent geographic scope and associated spatial planning data; integrated planning approaches; standardized approach to quantifying project benefits; and education of partners and stakeholders
- Acts as a regional framework for synchronizing statewide planning and priorities with local planning efforts, allowing statewide management

strategies to be effectively understood and applied to multiple local areas, while acknowledging unique local solutions

- Helps to reduce the volume of disjointed, competing requests for funding submitted to state agencies, supports integration of local projects, and increases the number and quality of local planning efforts that fit within already established statewide frameworks
- Incorporates applicable federal, state, regional, county, Tribal, and local water and watershed management plans to synchronize the planning processes of local land use authorities, Tribes, service providers, community groups, landowners, and Tribal, state, and federal agencies
- Tiers off of and helps to achieve shared goals, objectives, and priorities established by the SWRCB, RWQCB, DWR, SGC and the Resources Agency (e.g. via Watershed Management Initiative, the Basin Plan, the California Water Plan, and the North Coast Watershed Assessment Program)
- Identifies and integrates implementation projects at a regional level that contribute specific resource management strategies (RMS) shared by the NCIRWMP, and by Tribal, State, and Federal agencies
- Demonstrates that a large multi-county Region can plan and act in concert on water management issues through a locally based, regionally integrated community and watershed based planning processes
- Demonstrates the effectiveness of a policy and decision-making body composed of elected officials and Tribal leaders from the Region; supported by technical staff and consultants; and guided by a basin-scale IRWMP
- Demonstrates the representative involvement and cooperation of state agencies and boards, Tribal governments, counties, cities, watershed groups, landowner groups, service providers, and the general public at a watershed-scale within the Region

1.4 NORTH COAST IRWMP PLANNING APPROACH

1.4.1 STATEMENT OF PURPOSE

The NCIRWMP is by design a voluntary, non-regulatory, stakeholder-driven planning framework meant to emphasize shared priorities and local autonomy, authority, knowledge, and approaches to achieving Tribal, state, regional, and local priorities related to North Coast water infrastructure, watersheds, public health, and economic vitality. The NCIRWMP focuses on areas of common interest and concern to North Coast stakeholders and on attracting funding to the North Coast Region, and recognizes unique local solutions in different parts of the Region.

1.4.2 TRANSPARENCY & INCLUSION

Since its inception, the North Coast Resource Partnership (NCRP) has maintained a strong commitment to process transparency and stakeholder inclusion. This has been achieved by ensuring that all NCIRWMP meetings are open and welcoming to the public; have been properly noticed; have meeting agendas and summaries on the NCIRWMP website; and that at each meeting there is sufficient time allotted for public comment. Meetings are spatially and temporally rotated throughout the Region to increase opportunities for stakeholder attendance and to provide for equitable local representation across the Region. In November 2011, the NCRP and its partners adopted a revised Memorandum of Mutual Understanding (MoMU; Appendix M "NCRP Governing Documents") agreeing that all NCRP meetings are subject to and carried out in accordance with the Ralph M. Brown Act. The Brown Act embodies the philosophy that public entities exist for the purpose of conducting public business and as such, the public has the right to know how its decisions are being made. By formalizing this provision in the governing documents, the NCIRWMP formally declared its intent to continue to conduct its actions openly and to facilitate continued public participation in its deliberations.

1.4.3 LOCAL AUTONOMY

While the NCIRWMP was developed at the North Coast Region scale, the framework has a strong inherent emphasis on local planning, data gathering,

issues analysis, project identification/ prioritization, and portfolio implementation. The NCRP recognizes that the approaches and priorities of local counties, Tribal lands, municipalities, and watersheds vary throughout the Region: indeed, "one size does not fit all." For example, policy and project priorities for integrated water and energy management in Rohnert Park (Sonoma County in the south) may be very different from those in Etna (Siskiyou County in the north), yet both counties' local communities value functioning watersheds, healthy communities, energy independence, and viable local economies.

To support local autonomy, specific Plan processes have been developed to allow local entities and/ or jurisdictions to "opt-out" of a specific Plan element or elements they may find unacceptable, but in a way that respects statewide IRWM requirements and does not jeopardize NCIRWMP eligibility or project funding opportunities. If a county or Tribe chooses to opt-out of a particular Plan element, this fact will be documented in the NCIRWM Plan and in all relevant funding applications and communications. Additionally, the NCRP attempts to use language in its plans that respects local autonomy and preferences while meeting shared objectives and funding eligibility requirements. Examples might include the use of the term "energy independence" to document strategies and projects that reduce GHG emissions and reliance on foreign oil, while still meeting DWR and state goals and eligibility requirements related to "climate change adaptation and mitigation."

1.4.4 JURISDICTIONAL AUTHORITY

Issues related to the jurisdictional authority of Tribal, local, regional, state, and federal governments often are beyond the scope of this voluntary, non-binding collaboration represented by the NCRP. The focus of the NCRP and the NCIRWMP is on resolving shared challenges facing the economically disadvantaged North Coast Region, including failing infrastructure, public health, energy independence, watershed function, and economic vitality. The NCRP and the NCIRWMP are strongly focused on planning towards project implementation. Decision-making authority for the NCRP project-selection process and the NCIRWM Plan is exercised by the NCRP Policy Review Panel (PRP) as the governing body for the regional NCRP process: individual county and Tribal appointees to the PRP do not determine the projects that move forward from their particular county or Tribal area. However, all projects are subject to relevant local, regional, state, Tribal, and federal laws and policies; may not be in conflict with these laws and policies; and must meet minimum thresholds establishing their adherence to these policies. Additionally, the project selection process includes mechanisms requiring notification of relevant local entities (including counties and Tribes).

The NCRP PRP has developed specific guidelines for project application, evaluation, and selection (Appendix I "NCIRWMP Project Information"), wherein project proposals are reviewed by the Technical Peer Review Committee (TPRC) at the regional scale and evaluated based on technical merit as well as criteria related to public health, a balanced project portfolio (e.g. both built infrastructure and natural infrastructure projects), and regional equity. TPRC-recommended projects then are forwarded to the PRP for consideration and approval. The NCRP explicitly recognizes the jurisdictional authority of private property rights: all projects submitted to the NCRP must have the documented permission of the landowner on whose property the work will take place.[1]

North Coast Tribes are separate and independent sovereign nations within the territorial boundaries of the United States. The sovereignty of Tribes has been acknowledged in the U.S. Constitution. This sovereignty is inherent and flows from the pre-constitutional and extra-constitutional governance of the Tribe. Early federal policy and U.S. Supreme Court case law recognizes that Tribes retain the inherent right to govern within political boundaries (Worcester v. Georgia (1832) and that power to interact with Tribes is vested in the federal government. (Cherokee Nation v. Georgia (1831). This established governmental structure recognizes the sovereign and political independence of Tribal nations and its members. This right is also recognized by the State of California. Pursuant to the Executive Order B-10-11, the State "recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority of their members and territory."

The North Coast is the ancestral territory of North Coast Tribes. The majority of the North Coast Tribes have an inherent responsibility for managing their ancestral territories whether they currently have the

1 This element addressed in the 2012 NCIRWMP Project Application, Review & Selection Process Guidelines http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf

capacity to or not. Therefore, North Coast Tribes' jurisdiction goes beyond the gathering, fishing, and hunting rights, which each individual Tribal member retains. It is the intent of the NCIRWMP to document the fact that each of the North Coast Tribes exerts their jurisdictional authority according to their own traditional policies, laws, mandates, and capacity.

1.4.5 ADAPTIVE MANAGEMENT

The NCIRWMP relies upon an adaptive management approach that relies on ongoing data gathering, planning, design, implementation, evaluation, and data sharing at a variety of scales in a long-term and iterative process. The NCIRWMP adaptive management process provides an efficient framework for ongoing identification of local and regional issues; evaluation (and reevaluation) of water management planning objectives and strategies; identification of opportunities for integration of water and land management; and evaluation of implementation projects, with regular incorporation of new data, findings refining the plan over time.

Challenges associated with the adaptive management approach for the North Coast Region include the difficulty of assessing cumulative impacts across the region, difficulty of assessment on a regional scale and the lack of sufficient data and the system complexity, which make it extremely difficult to integrate research results into a useful model. These limitations can be counteracted by the implementation of adaptive management across the individual projects funded under the NCIRWMP and the ongoing refinement of the NCIRWMP, which is intended to be a "living document" that incorporates new information and monitoring feedback to reprioritize project needs, reanalyze policy, and make other changes to NCRP structure and function as necessary. The NCIRWMP projects will function as models for other projects and as a process for obtaining feedback. The feedback, information and data acquired during this process will be incorporated into geographic information systems that will serve not only the North Coast, but also the State of California and the Pacific Northwest.

The NCRP demonstrates a commitment to an adaptive management approach and flexible decision-support structure as seen, for example, in its ongoing improvement to governance structures and project selection process, refinement of Plan objectives, addition of key initiatives that meet North Coast objectives, and exploration of financing alternatives (Section 2.5 "Decision-Making Process"). The group is currently conducting an initiative focused on assessment of DAC water supply and treatment needs through the "NCIRWMP Regional Strategy for Small Disadvantaged Water and Wastewater Providers[2]" (Appendix O). The NCRP framework and the NCIRWMP planning process have served as a vehicle for the identification of common goals and a forum for discussion of contentious issues as they emerge. With each successful negotiation and milestone achieved, bonds between NCRP participants, and individual commitments to the process, are strengthened; this forges the way for more complex and inter-related future endeavors and increasing the likelihood of their successful negotiation.

1.4.6 INTEGRATION

The "integrated" in Integrated Regional Water Management (IRWM) means that the NCRP processes and NCIRWMP document incorporate a combination of physical, environmental, societal, economic, legal, and jurisdictional aspects of water management into a single flexible program. IRWM Plan standards (DWR 2012) require that the NCIRWMP contain processes, structures, and procedures that foster integration of separate regional elements in order that the Plan may function as a unified effort. There are many types of integration: three pertinent types exhibited by the NCIRWMP are stakeholder/institutional integration (e.g. engaging diverse stakeholders to participate at all levels of the Plan), resource integration (e.g. combining or sharing multiple participant funds, data, protocols, and expertise; considering both built and natural water resources), and project implementation integration (e.g. identifying opportunities to benefit from economies of scale; considering the needs of both specific local and overarching regional interests, encouraging multi-benefit integrated projects).

Local planning efforts in the North Coast Region have historically been segregated into jurisdictional planning and watershed planning. Most jurisdictional planning has been focused on county-based general plans and city-based planning. Although General Plans often have a natural resources element, many do not fully integrate the natural resource-based water management issues in a given area. Watershed planning in the North Coast Region has predominantly focused on natural resources including specific species, habitats, and ecosystem processes, and has largely been directed by federal, state, and Tribal Natural Resources agencies, and implemented by habitat restoration workforces, groups, and Resource Conservation Districts (RCD). However, watershed planning generally does not incorporate local municipal and built infrastructure considerations to the degree that is necessary for effective integrated planning and efficient implementation.

2 For details on water supply and wastewater service providers, survey findings, data gaps, and infrastructure needs, see the NCIRWMP Water & Wastewater Service Provider Outreach & Support Program at http://www.northcoastirwmp.net/Content/10412/preview.html.

To address this disparity, the NCIRWMP integrates long-term planning and high quality project implementation in a flexible, adaptive management framework that fosters coordination and communication among all the diverse water and watershed managers and users in the Region. The Plan acts as a nexus between statewide and local planning efforts. This helps to synchronize the large, complex planning processes, regulations and priorities at the Tribal, state, or regional level with the specific issues, data, concerns, and needs at the local level.

The NCIRWM Plan document demonstrates explicit integration of the NCRP objectives and implementation projects with a suite of federal, state, Tribal, and local priorities (Section 1.5 below). For illustrations of points of integration, see Appendix A "NCIRWMP Objectives X Local Project Priorities & Statewide Priorities," Appendix B "NCIRWMP Objectives X Local Project Goals & Statewide Goals"); and resource management strategies (RMS; Appendix D "NCIRWMP Local Priorities X Resource Management Strategies"). Stakeholder-identified issues (Section 6 "Local & Regional Water-Related Issues") are addressed by the NCIRWMP objectives (Appendix C "NCIRWMP Objectives X Key Issues") and solutions implemented via the NCIRWMP-funded projects. All projects are required to directly address at least one NCIRWMP objective, per the project NCIRWMP Project Application, Review, and Selection Process Guidelines (Section 7 "NCIRWMP Projects & Project Priorities"). A synthesis of local water management and land planning documents and programs (Section 9 "Relation to Local Water & Land Use Planning") identifies multiple linkages between existing/ developing water and land management efforts in the Region, to foster coordination, improve efficiency, and leverage resources.

1.5 NORTH COAST IRWMP PRIORITIES

The NCIRWMP acknowledges and incorporates the unique issues, information, and planning approaches of local watersheds, counties, and Tribes within a regional framework that includes state, and federal planning priorities that align with objectives of the NCIRWMP and IRWM requirements of the DWR. Water and watershed related priorities of North Coast stakeholders, agencies, and local and Tribal governments are incorporated into the NCIRWMP goals/objectives, stakeholder outreach processes, project selection guidelines, and other Plan elements as appropriate. Appendix tables indicate specific points of integration between these priorities and other NCIRWMP elements. For example, linking local project priorities and statewide priorities with NCIRWMP objectives (Appendix A), statewide priorities with local planning efforts (Appendix G), and local project goals with NCIRWMP goals/objectives (Appendix B).

LOCAL PRIORITIES

NCIRWMP priorities at several local scales, including those of individual Plan implementation projects, watersheds, and counties) and are referred to below. Figure 1 ("Opportunities for Integrated Planning") indicates some opportunities identified by local planning entities as supportive of water and/or land management integration, including via the NCRP.

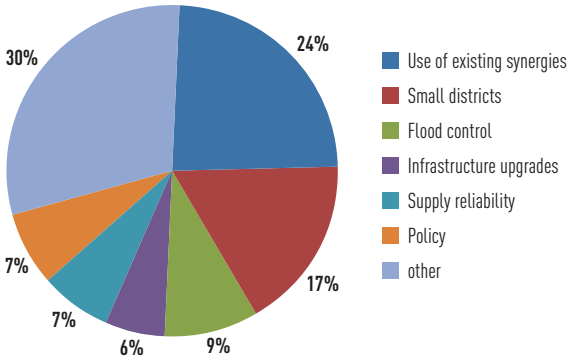


FIGURE 1 OPPORTUNITIES FOR INTEGRATED PLANNING

Projects

The individual projects selected by the NCRP to implement the NCIRWM Plan address a suite of priorities that vary widely across the Region, while retaining core themes that are closely related to the latest (2014) Plan objectives. Project priorities have been organized into the following categories. Project proponents, by design, address these priority areas in a manner that suits local needs and values and facilitates adaptation to new information and changed conditions.

- Economic Benefits
- Energy Independence
- Groundwater Protection
- Public Safety
- Salmonid Habitat Improvement
- Water Quality Improvement
- Water Supply Reliability
- Watershed and Habitat Improvement

Watersheds

The NCIRWMP incorporates a watershed-based approach and scale that supports regional planning, relying on the Watershed Management Areas (WMAs) as a macro-scale watershed planning unit for the Region, with individual watersheds used at the local scale, possibly grouped into the large-scale WMAs. At an individual watershed scale, the NCIRWMP works with local watershed groups and incorporates several Integrated Coastal Watershed Management Plans (ICWMPs). ICWMPs have been

developed for five critical watersheds in the Region: Mattole River, Noyo/Big River, Russian River, Salmon Creek, and Trinidad-Westhaven. ICWMPs are deliberately aligned with and support the NCIRWMP and emphasize the goals and objectives of the NCIRWMP, with a special focus on Areas of Special Biological Significance (a.k.a. Stormwater Quality Protection Areas), Marine Protected Areas, and Critical Coastal Areas (California Water Plan, DWR 2009). The NCIRWMP incorporates and implements the watershed objectives of various Tribal, state, and federal agencies' resource plans.

Counties

NCIRWMP-related priorities of participating North Coast Counties are included in each county's General Plan and various Board-approved plans and policy documents. Priorities of participating counties are being refined from ongoing interviews (est. 2013) with NCRP PRP and TPRC members from county boards, and county staff working in resource and development planning locally. The resource planning priorities of local entities in North Coast counties are in part reflected in each county's library of planning documents produced to date (e.g. Figure 2 "Local Water/Land Use Plans for Counties and Tribes by Plan Subject"); they also may be inferred from the data gaps that are of concern to local planners (e.g. Figure 3 "Data Gaps: Local Planning").

- Local autonomy, jurisdictional authority, and respect for local knowledge
- Widespread need for flood and stormwater management planning and coordination among coastal and inland counties in the North Coast, as the NCRP representatives of participating counties have repeatedly expressed
- General Plan priorities, which are county specific

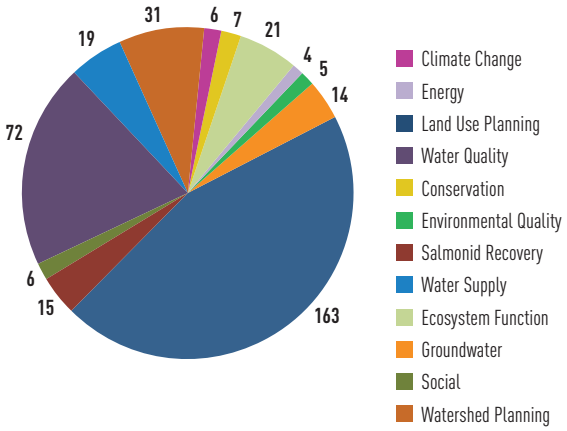


FIGURE 2 LOCAL WATER/LAND USE PLANS FOR COUNTIES AND TRIBES (BY PLAN SUBJECT)

Small Water Service Providers & Customers

NCIRWMP-related priorities of water and wastewater providers, particularly for rural and/ or economically disadvantaged communities, include:

- Repairing and upgrading the failing water and/or wastewater infrastructure to protect drinking water quality
- Restoration and enhancement of natural infrastructure and related natural capital (e.g. streams, watersheds, forests) to ensure that rural communities have a source of clean water, clean air, recreation, open space, functioning ecosystems, and economically viable working landscapes
- Site-specific priorities identified through the ongoing processes established through the NCIRWMP Water Supply and Wastewater Service Provider (WSWSP) Outreach and Support Program[3].

TRIBAL PRIORITIES

North Coast Tribes share the priorities of many counties, municipalities, federal, state, and local agencies, and community groups. This is largely because of the responsibility that Tribes have as governments. Priorities of North Coast Tribes as recorded by the NCRP are are developed in part from conversations among NCRP Tribal leaders (including Tribal PRP and TPRC representatives), and between Tribal communities and the NCRP via Tribal Engagement Consultants and Coordinator. NCRP outreach to 34 Tribal governments in the Region has been formalized via a listserve of Tribal representatives in North Coast Tribal government and Tribal environmental agencies. This process is ongoing and it is inappropriate to generalize across all "Tribes" but for the purposes of NCIRWM planning, several priorities have been articulated:

- Expand meaningful participation of Tribes in the North Coast IRWM planning process
- Implement mechanisms to build the capacity of participating Tribes & provide technical assistance for project submissions
- Identify water related implementation projects Share relevant information between Tribes and governmental/non-governmental agencies
- Respect of Tribal Governmental structures, and the sovereign and political independence of Tribal Nations and its members

3 WSWSP 2014 Survey Summary results may be viewed at http://www.northcoastirwmp.net/docManager/1000009380/DAC_WSWW_survey_summary_update_01%2023%2014.pdf

- Document specific water related issues and priorities in North Coast Tribal areas some of which include:
  - » Water quality and quantity of groundwater and surface water including stream temperatures, impaired water quality
  - » Protect groundwater resources from over-drafting and contamination.
  - » Subsistence harvesting and marine management
  - » Conservation, enhancement, and restoration of watersheds and aquatic ecosystems
  - » Climate change effects
  - » Drought concerns including related water supply reliability and quality

REGIONAL PRIORITIES

Priorities of the North Coast Region are derived from plans and assessments specific to the Region (Appendix E "Relationship of NCIRWMP to Local Water and Land Use Planning"), as well as from statewide, federal, and Tribal plans (see 1.5.3 below) that include regional components. Regional priorities may include:

- North Coast Region objectives, goals, and strategies from the California Water Plan (DWR 2013).
- Water quality objectives, beneficial uses, and/or other priorities of the Water Quality Control Plan for the North Coast Region (a.k.a. Basin Plan; NCRWQCB 2011). Multiple Basin Plans for the state's various regions comprise the California Water Plan referenced above.
- Salmonid recovery priorities recommended for the North Coast Region/ watersheds in the Coho Recovery Plan (CDFW 2004[4]).
- Coho Salmon recovery priorities recommended for North Coast ESUs in the Coho Recovery Plan (NMFS 2012)
- Climate change and energy-related plans of the DWR, CEC, Department of Conservation, and others

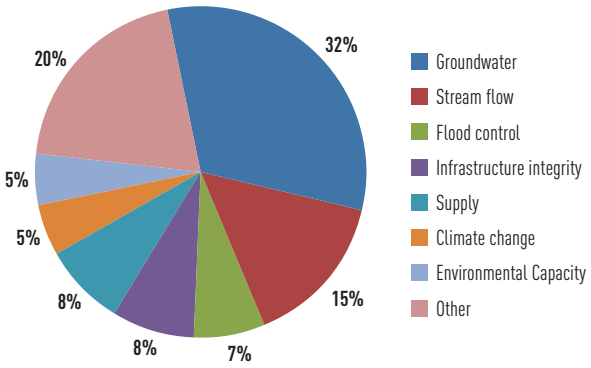


FIGURE 3 DATA GAPS: LOCAL PLANNING

STATEWIDE PRIORITIES

The State of California has developed several guidance documents that present priorities in alignment with the NCIRWMP. These include:

- DWR 2012 IRWM Guidelines[5], including IRWM Priorities[6] and IRWM Program Preferences.[7] These priorities and preferences are related to and addressed by the NCIRWMP goals and objectives, stakeholder outreach processes, project selection guidelines, project implementation, and other Plan processes.
- The State Water Resources Control Board's Watershed Management Initiative (WMI[8]), which emphasizes an integrated watershed-scale approach.
- The Water Quality Control Plan ("Basin Plan") for the North Coast Region (NCRWQCB 2011[9]),

4 CA Dept. Fish & Wildlife Coho Recovery Plan (2004) at http://www.dfg.ca.gov/fish/Resources/Coho/CohoRecovery.asp

5 DWR IRWM Guidelines (November 2012) at http://www.water.ca.gov/irwm/grants/docs/Archives/Prop84/Guidelines_PSPs/GL_2012_FINAL.pdf

6 2012 IRWM Priorities include — but are not limited to — drought preparedness; use and reuse water more efficiently; practice integrated flood management; and protect surface water and groundwater quality. DWR 2014 IRWM Guidelines focus on drought relief per March 2014 legislation intended to "assist drought-affected communities and provide funding to better use local water support projects and programs that provide immediate regional drought preparedness, increase local water supply reliability and the delivery of safe drinking water, assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective, and/or reduce water quality conflicts or ecosystem conflicts created by the drought."

7 IRWM Program Preferences are projects or programs that: include regional projects or programs; effectively integrate water management programs and projects within the Region; effectively resolve significant water-related conflicts within or between regions; contribute to attainment of one or more CALFED Bay-Delta Program objectives; address critical water supply or water quality needs of DACs within the Region; effectively integrate water management with land use planning; control or prevent flooding; and address statewide priorities for the IRWM Grant Program

8 Watershed Management Initiative at http://www.waterboards.ca.gov/water_issues/programs/watershed/

9 Basin Plan for the North Coast Region at http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/basin_plan.shtml

which emphasizes water quality enhancement and protecting beneficial uses of water). The North Coast Basin Plan is subsumed under the California Water Plan (below).

- The DWR's California Water Plan (2009[10]), which emphasizes regional (e.g. IRWM) planning and improved statewide water/ flood management systems
- NPS Pollution Control Program for California (SWRCB and CCC 2000[11]).
- California Department of Fish and Wildlife Recovery Strategy for Coho Salmon (footnote #14). Significant research, planning, and staff expertise has been invested in these guidance documents, which provide technical and jurisdictional direction to the Region.
- California State agency climate change plans and programs[12], which prioritize reduction of GHG emissions and develop climate adaptation strategies, in compliance with and as a means of implementing AB 32 California Global Warming Solutions Act of 2006. E.g. DWR's Climate Action Plan,[13] California Energy Commission AB 32 activities and PIER studies; California Air Resources Board cap-and-trade and other GHG-reduction information to promote environmental health, economic vitality, informed land use and sound management.

FEDERAL PRIORITIES

The NCIRWMP process identifies and incorporates applicable federal priorities, including applicable species recovery plans as outlined by National Oceanic and Atmospheric Administration Fisheries (e.g. NMFS 2012 Coho Recovery Plan, 201214); components of the US Environmental Protection Agency's NPS program (see footnote #5); and other planning information from natural resource-related agencies such as Natural Resources Conservation Service,[15] US Forest Service, and US Geological Survey.[16]

10 California Water Plan (DWR 2009, 2013) at http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v3_northcoast_cwp2009.pdf

11 NPS control program for CA at http://www.waterboards.ca.gov/water_issues/programs/nps/protecting.shtml

12 California Climate Change Portal at http://www.climatechange.ca.gov

13 The DWR Climate Action Plan Phase I: Greenhouse Gas Reduction Plan 2012 at http://www.water.ca.gov/climatechange/CAP.cfm.

14 NOAA Fisheries CCC Coho Recovery Plan at http://www.nmfs.noaa.gov/pr/recovery/plans.htm

15 See http://wmc.ar.nrcs.usda.gov/wps/portal/nrcs/main/national/nwmc

16 See http://water.usgs.gov/wid/html/wtrmgt.html

SECTION 2.0 GOVERNANCE & DECISION-MAKING

The NCIRWMP represents the combined effort of many individuals and groups within the North Coast Region. All phases of Plan development and project implementation have been conducted transparently and broad public involvement has been actively solicited and encouraged in a variety of ways (Section 3 "Stakeholder Involvement"). The governance structure and decision-making processes that have produced the current NCIRWM Plan, and that will guide future integrated water management in the Region, are described below.

2.1 NORTH COAST RESOURCE PARTNERSHIP

The North Coast Resource Partnership (NCRP) is the broad, umbrella name for the collaborative partnership that developed the Phase I, Phase II, and Phase III (current) iterations of NCIRWM Plans and processes. The "NCRP" was designated in 2012 at the request of the Policy Review Panel (PRP) to distinguish the partnering entities and cooperative process (comprising the NCRP) from the document they have collaborated to produce (the NCIRWMP). Thus far the focus of the NCRP has been development and implementation of the NCIRWM Plan and its associated projects, as well as development of targeted plans and project implementation focused on energy independence and climate change adaptation/mitigation. The NCRP has utilized its existing relationships, shared objectives, and combined resources to plan and implement projects that have historically been outside the scope of the IRWM program, including energy independence and climate response projects.

Since 2005, members of the NCRP have collaborated on the NCIRWM Plan and process development, as well as on project identification, review, selection, implementation, and evaluation. The NCRP consists of the PRP, which is the governing and decision-making body for the NCIRWMP; the Executive Committee (EC), which provides day-to-day leadership in matters related to the NCRP; the Technical Peer Review Committee (TPRC), an advisory body that provides broad scientific and technical expertise to inform PRP decision-making; NCRP staff and consultants; MoMU signatories; partnering water agencies; Native American Tribes and diverse stakeholders throughout the North Coast Region.[17] These entities are described below.

See Appendix L (Table 54 "Stakeholders & Participants in NCIRWM Planning Processes") for a listing of past and current members of the NCRP and NCRP governance, decision-making, and coordinating bodies.

2.1.1 POLICY REVIEW PANEL

The oversight, governing, and decision-making group for the NCRP is the Policy Review Panel (PRP). The PRP consists of two Board of Supervisors' appointees and alternates from each of the seven participating North Coast counties (Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma, and Trinity) and three Tribal representatives and their alternates selected by the North Coast Tribes according to the "Tribal Representation Process" developed by North Coast Tribes and defined in the NCIRWMP MoMU. The PRP nominates and elects a Chair and Vice-Chair on an as-needed basis and each position is brought before the PRP for reconsideration and appointment every two years. The PRP provides direction and ultimate oversight to the NCRP and the NCIRWMP planning process. (See Section 2.5 "Decision-Making Process" for examples of process decisions reached by the PRP.) Decision-making is usually by consensus, with each member having one vote. When decisions cannot be reached by consensus, the majority opinion prevails, and dissenting opinions are documented in the NCRP Handbook[18] and reflected in NCRP documents and plans. The PRP is committed to transparency and inclusion, supporting input from stakeholders from throughout the Region, as well as information sharing via the NCRP website, meetings and workshops. NCRP meetings and activities are in compliance with the Brown Act; therefore meetings are noticed in advance, provide for substantial public input, and are summarized on the NCRP website for easy access.

2.1.2 EXECUTIVE COMMITTEE

The NCRP Executive Committee (EC) is a Standing Committee whose actions are subject (like the PRP) to the Brown Act. The EC is composed of the PRP Chair, PRP Vice-Chair, and a third member nominated and approved by the PRP; the PRP reconsiders the third member's appointment every two years. The EC provides day-to-day leadership for the NCRP, including signing letters of support; represents the NCRP to legislators and key agency partners; and makes time-sensitive decisions. Any time sensitive decisions made by the EC on

17 At its June 24, 2010 meeting, the NCRP considered a proposal brought forth by a coalition of Tribal governments and voted to include three Tribal representatives to the PRP and the TPRC. This decision has made the North Coast the Region in California with the most formal Tribal involvement in IRWM governance and implementation project technical review. This change to the governance structure was approved through a revised MoMU that includes the adopted "Tribal Representation Process" (MoMU; Appendix M "Governance & Supporting Documents").

18 North Coast Resource Partnership Handbook at http://www.northcoastirwmp.net/docs.php?oid=1000008824&ogid=1000000850

behalf of the NCRP reflect previous PRP direction and are consistent with PRP approved goals and objectives. EC decisions are reported via email or are provided during updates to the full PRP at regular NCRP meetings.

2.1.3 TECHNICAL PEER REVIEW COMMITTEE

The Technical Peer Review Committee (TPRC) is composed of technical and scientific staff appointed from each county Board of Supervisors and North Coast Tribes. The TPRC has two primary areas of responsibility: (1) provide technical peer review of NCIRWM Plans and other technical documents and (2) review and recommend a prioritized slate of NCIRWMP implementation projects, based on technical considerations and the criteria established by the PRP and funding agency. The TPRC also nominates and submits prospective Co-Chair nominees for PRP selection and approval. Expertise on the TPRC includes, but is not limited to: agriculture, ecology, energy, engineering, traditional knowledge, fisheries, geology, resource management, water infrastructure, and county planning.

2.1.4 AD-HOC COMMITTEES

The NCRP PRP forms ad-hoc committees on an as needed basis to address short duration issues or topics. An ad-hoc committee is not subject to the Brown Act and is disbanded once the topic has been addressed and outcomes or recommendations have been reported to the PRP. NCRP ad-hoc committees consist solely of less than a quorum of the PRP and TPRC and may include members of the PRP and TPRC. Examples of ad-hoc committees formed during NCIRWMP development and update have included committees to solicit and formalize Tribal participation and to select a Tribal Outreach consultant; update and refine the project application, review, and selection process; and an ad hoc committee focused on the Phase III NCIRWMP.

2.1.5 ECONOMICALLY DISADVANTAGED COMMUNITIES & DAC SERVICE PROVIDERS

All seven counties represented in the NCRP are at least in part defined as economically disadvantaged communities (DAC) per the State of California definition. Census data show that 88% of the geographic area is economically disadvantaged; 57% is considered severely economically disadvantaged[19] (see Section 5.14.2 "Socioeconomic Indicators"). Community members and leaders from DACs in the Region have been involved in all aspects of the planning effort from its inception to the present and comprise a significant proportion of PRP and TPRC membership. State-mandated requirements to represent the priorities of DACs in IRWM planning are addressed by the above referenced inclusion of DAC representatives on the PRP and TPRC, as well as during the project review and selection process, via specific DAC-related scoring criteria. Additionally the NCRP conducts deliberate outreach efforts to DACs; provides technical assistance to DACs during the project application process; provides funding to counties and Tribes to develop comprehensive local plans which benefit DACs; and is developing program(s) aimed at supporting DACs water supply and water quality needs (e.g. the "North Coast Regional Strategy for Small Disadvantaged Water & Wastewater Providers," see Appendix O).

2.1.6 NORTH COAST TRIBES

As described above, representatives of North Coast Tribes are active participants in the NCRP governance and technical bodies via designation of Tribal PRP and TPRC members and alternates, per the PRP-approved "Tribal Representation Process." District Coordinators for each of the North, Central, and Southern Districts; and a North Coast Region Tribal Outreach Coordinator (see listing in Acknowledgments) have been retained to ensure the NCRP continues to incorporate the priorities and needs of the North Coast Tribal Nations (Table 70 provides a 2014 listing of 36 Tribal Nations) into the NCIRWMP and implementation projects.

The NCIRWMP website hosts a portal by which information related to Tribes, Tribal governments, and Tribal agencies may be easily accessed for sharing, discussion, and refinement.

2.1.7 NCIRWMP MOMU SIGNATORIES

In addition to the formal relationship of counties and Tribes as PRP and TPRC members, and the substantial,

19 The California Department of Conservation defines a "severely disadvantaged community" as a community with a median household income (MHI) that is less than 60% of the statewide annual MHI. www.conservation.ca.gov/dlrp/wp/grants/Documents/Appendix%20F%20Economically%20Disadvantaged%20Communities.doc

regular and intentional outreach to DACs, the NCIRWMP invites participation from all of the Region's stakeholders. In 2010, the NCRP's PRP revised the MoMU to expand representation on the PRP and TPRC to include Tribal representatives; require the PRP and TPRC's adherence to the Ralph M. Brown Act thereby formalizing an historic practice of open, transparent, and inclusive meetings and deliberations; meet new stormwater, flood management, groundwater, and climate change considerations required by DWR and of interest to stakeholders throughout the North Coast Region; and satisfy requirements for future grant funding applications. As of 2014, over 100 agencies, special districts, Tribal governments, non-governmental organizations, watershed groups, and other stakeholders have signed the MoMU (Appendix M) signifying their support for and participation in the NCIRWMP.

2.1.8 SUPPORTING STAFF & CONSULTANTS

The Sonoma County Water Agency (SCWA) and its consultants are responsible for leading NCRP regional outreach, coordination, technical writing, data gathering, assessments, web content, mapping, technical support to project applicants, funding applications, and plan development activities. Humboldt County staff and consultants are responsible for implementation contract management, and act as the regional administrator for IRWM and other funding (see Section 2.1.10). A listing of NCIRWMP staff and consultants is provided in the Acknowledgments.

2.1.9 MATCHING FUNDS — SONOMA COUNTY WATER AGENCY

Since the inception of the NCRP, the SCWA has provided matching funds and allocation of staff resources (e.g. Section 2.1.8) to support development of the Plan and associated funding applications.

2.1.10 REGIONAL ADMINISTRATOR — HUMBOLDT COUNTY

In 2005, the NCRP authorized Humboldt County to act on its behalf as the regional contract administrator (Regional Administrator) for the NCIRWMP implementation and planning grants. Individual project proponents, under contract with the County of Humboldt, are responsible for project implementation. To date the County of Humboldt has successfully managed over $47 million in grant funding for over 56 North Coast resource planning and implementation projects. The Regional Administrator provides quality assurance and quality control (QA/QC) on all invoices and progress reports submitted by sub-grantees and compiles reports and invoices for the granting agency. The Regional Administrator tracks costs; maintains auditable files; and ensures accurate, current, and complete financial reporting and records. In addition, the Regional Administrator acts as the liaison between the project proponents (sub-grantees, sub-contractors) and the granting agency to streamline communications. Regional contract management has provided efficiencies to the state and has resulted in the development of templates and tools that can be shared region-wide, thereby allowing the North Coast to spend fewer resources on regional administration.

2.2 NORTH COAST REGIONAL WATER MANAGEMENT GROUP

The Regional Water Management Group (RWMG) for the NCIRWMP is the North Coast RWMG (NCRWMG). Formation of an RWMG is a requirement of the DWR for IRWM funding. Per CWC §10539, the NCRWMG must include "three or more local agencies, at least two of which have statutory authority over water supply or water management, as well as other persons…[that] participate by means of a joint powers agreement, Memorandum of Understanding (MOU), or other written agreement, as appropriate, that is approved by the governing bodies of those local agencies." The two local agencies with statutory authority over North Coast water are the Mendocino County Water Agency and the Sonoma County Water Agency (Appendix M "Governing & Supporting Documents" lists NCRWMG members and qualifications per CWC §10539). Although a NCRWMG has been designated for this process, it is the NCRP (not the NCRWMG) that is in practice the governing and decision-making body for the NCIRWMP.

2.3 PUBLIC OUTREACH & STAKEHOLDER INVOLVEMENT

The NCRP has been deeply committed to openness, transparency, and inclusion in its planning efforts since its inception in 2005. The partnership continues to refine and adapt its approach in order to reach the greatest number of stakeholders, knowing this is the best way to address the breadth of water management, biodiversity, infrastructure, and socio-economic issues facing the North Coast Region. Stakeholder groups invited to participate in NCIRWMP planning and implementation have included counties; incorporated municipalities; water and flood control agencies; wastewater treatment facilities; water suppliers; RCDs and other special districts; agriculture interests; local watershed groups, landowners, and environmental groups; non-governmental organizations; universities; natural resources agencies; electrical corporations; industry organizations; and interested citizens; and North Coast Tribes (while recognizing the dual nature of Tribal participation/participants as both stakeholders and government entities) (Appendix L Table 54 "Stakeholders

& Participants in NCIRWM Planning Processes"). This commitment to broad and representative public inclusion in the process is an integral part of the NCIRWMP. Mechanisms to invite stakeholder participation will continue to be reconsidered and revised as water management and communication capabilities evolve and natural resources conditions in the Region change.

Section 3 "Stakeholder Involvement" describes the methodologies used by the NCRP to identify and work with North Coast water-resource stakeholders. These have included:

- Regular meetings of the NCRP governing and technical bodies (PRP and TPRC)
- Public notices, meetings, and workshops
- The NCRP website
- Email listserve
- Targeted local outreach to encourage representative participation
- Interviews and surveys
- Conferences and presentations
- Networking
- Technical assistance to project proponents
- Regular NCIRWM Plan review and input

2.4 COORDINATION

According to the Department of Water Resources, integrated regional water management planning is a cornerstone of the California Water Plan, and "the protection and orderly development of the Region's water resources make it essential that all planning efforts be coordinated (NCRWQCB 2007)." The NCIRWMP has a long history of coordinating efforts, sharing lessons learned, and collaborating on strategies and outcomes within the North Coast Region, as well as with neighboring IRWM regions and throughout the state and nation. Coordination is achieved via the NCRP website, email, and numerous workshops, conferences, one-on-one conversations, and academic collaborations (Section 3 "Stakeholder Involvement"). The NCRP continues to identify new opportunities to share appropriate tools, processes, plans, and strategies with other IRWM programs, agencies, and stakeholders at the local, regional, and statewide level.

The North Coast IRWM Region is bordered by three other IRWM planning efforts: the San Francisco Bay Area IRWMP, the Napa IRWMP, and the Upper Sacramento River IRWMP. In additional to one-on-one meetings and group conference calls with neighboring IRWM regions, members of the NCRP also participate in efforts such as the IRWM Roundtable of Regions in order to share information with other regions and learn from their experience. The SCWA provides a linkage between the San Francisco Bay Area and North Coast IRWMPs, enabling particularly strong information sharing and communication between these two regions. NCRP staff regularly communicates with and share data with IRWM regions as far away as southern California.

Members of the NCRP have established long-term collaborative relationships and working partnerships with various local, state, and federal agencies [e.g. SWRCB, NCRWQCB, DWR, California Department of Fish and Wildlife (CDFW), California Coastal Conservancy (CCC), NOAA Fisheries (formerly NMFS), Natural Resources Conservation Service, and Environmental Protection Agency (EPA)] and have incorporated the specific water and watershed-related priorities of these entities into this Plan (see Section 1.5 "NCIRWMP Priorities"). To codify agency support for the NCIRWMP, representatives from some of these and other organizations [e.g. CDFW, CCC, USDA Fish and Wildlife Office, USDA Natural Resources Conservation Service, California Department of Parks and Recreation, California Department of Forestry and Fire Protection (CALFIRE), and USDI Bureau of Land Management] have written letters in support of specific NCIRWMP implementation projects whose objectives align with those of the agency.

Implementation projects are the result of years of close collaboration between the project proponents and multiple public agencies and numerous private landowners. This type of long-term relationship building and incorporation of all perspectives and goals into an comprehensive project approach ensures that state and federal agencies have the opportunity to participate in regional planning not only in a top-down manner through dissemination of goals and technical information, but also in a bottom-up and detail oriented way, through direct involvement with each project, its feasibility, and its implementation.

2.5 DECISION-MAKING PROCESS

The NCRP PRP conducts decision-making for matters related to the NCIRWMP. PRP members (or alternates) each are granted one vote. The PRP makes the majority of its decisions by consensus and, in those instances where there is not consensus, the majority votes prevail, assuming a quorum (one half or more) of the PRP is present. The group works diligently to transact its business and arrive at decisions and often will continue to modify an option until it is acceptable to all NCRP members. A specific process for resolving lingering conflicts has been developed (e.g. Section 2.5.3 below). Because many NCRP members are representatives of DACs, DAC participation is built-in to the NCIRWMP planning process. At PRP meetings,

staff and consultants provide background, reports, analysis and facilitator services as requested by the PRP. All decisions are made by the PRP with input representing hundreds of hours of research and review from the TPRC, staff, and stakeholders. The PRP welcomes public input, and agendizes public comment prior to each decision at its meetings.

Interim changes to policy are considered on a quarterly basis at NCRP PRP meetings. The Adaptive Management approach necessitates decision-making outside of formal NCIRWM Plan updates; these are approached in the same manner that formal plan updates are approached. Challenges are identified, researched if necessary, discussed and voted on, with consensus the goal, but majority prevailing. See Section 2.5.2 for an example of a decision entertained and resolved outside of the formal NCIRWM Plan review process, but included in the next iteration of the plan.

Three examples of how critical decisions have been reached by the NCRP are provided below.

2.5.1 EXAMPLE 1: PLAN GOALS & OBJECTIVES

The establishment of NCIRWM Plan goals and objectives was accomplished with input from the PRP, TPRC, resource agencies, and stakeholders in the North Coast Region during focused strategic planning meetings facilitated by the PRP Chair, as well as via ongoing stakeholder input to staff and PRP members at meetings and workshops and via e-mail and phone. Input was then considered by the PRP and a final set of regional goals and objectives were selected to address the issues that were of primary concern to NCIRWMP participants. Six objectives for the Phase I Plan were approved by the PRP in early 2005. For the most recent Plan iteration (Phase III), eleven objectives and five associated goals were developed, again with broad stakeholder input using a transparent, PRP-approved process. Phase III goals and objectives were approved by the PRP in 2013 (Section 4 "NCIRWMP Goals & Objectives").

2.5.2 EXAMPLE 2: PROJECT REVIEW & SELECTION PROCESS

During the Round 1 Prop 50 project prioritization process, the TPRC assisted staff and consultants in the development of preliminary project application review criteria. These criteria were based on state IRWM requirements supplemented with local, regional, and statewide goals and objectives. TPRC members and stakeholders provided input into the development of a uniform scoring sheet for project ranking that incorporated state, regional and local objectives. Project scores allowed the TPRC and PRP to select and prioritize projects based on objective, quantifiable metrics. Standardized scoring of project proposals ensures the NCIRWM Plan presents a project portfolio that represent the most current priorities of stakeholders throughout the Region.

During Phase I project review, the TPRC became aware that many of the applications from disadvantaged communities were lacking the technical expertise evident in applications from entities with greater resources and capacity. The TPRC continued to evaluate each project on a technical basis, but included its concerns about this disparity when recommending projects for PRP approval. The PRP took this information into consideration when finalizing the Region's priority projects and revised the weighting criteria given to projects benefitting economically DACs. The result was inclusion of several DAC projects in the Phase I suite of projects and the inclusion of economic need in future project selection processes.

Subsequent refinement of the project application, review, and selection process and further development of appropriate scoring criteria has continued: for the current Phase III of the Plan, the PRP, TPRC, and stakeholders have developed criteria that integrate the latest (November 2012) DWR IRWM Guidelines and standards; that place specific emphasis on regional equity (e.g. inclusion of all counties and Tribal regions); and that balance project type (e.g. built infrastructure projects and natural infrastructure projects) and geographic location. The NCRP approved process for soliciting, reviewing, and selecting project applications is described in Section 7 and available online.[20]

2.5.3 EXAMPLE 3: LOCAL AUTONOMY & JURISDICTIONAL AUTHORITY

As stated in Section 1.4.1 "Statement of Purpose" the NCRP operates on a foundation based on local autonomy and jurisdictional authority. The PRP has developed a process to resolve cases in which there is not unanimous agreement among members of the PRP with regard to specific Plan contents or process elements. PRP, TPRC, and staff collaboratively craft language clearly specifying from which Plan element(s) a local entity wishes to be excluded, while still remaining eligible for NCIRWMP related state funding. In communications with DWR, NCRP leadership has established and confirmed the validity of this flexible, pragmatic approach. An example provided below illustrates the concept in principle and practice.

20 The 2012 NCIRWMP Project Application, Review & Selection Process Guidelines http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf; The 2014 NCRP Project Review & Selection Process Guidelines http://www.northcoastirwmp.net/docs.php?oid=1000009634&ogid=1000002551

- The County of Siskiyou may choose to option to address the statewide IRWM priority "climate change response actions" solely via NCIRWMP Objective #6 ("Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation"), having declined to directly implement Objective #5 ("Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors/ systems"). However, because both objectives do serve the same overarching goal (#3: Climate Adaptation & Local Energy Independence), Siskiyou County representatives to the NCRP can focus on local constituents' priorities (energy security, jobs) without jeopardizing the County's IRWM funding, contingent in part on addressing climate change.

North Coast Tribes are separate and independent sovereign nations within the territorial boundaries of the United States. The sovereignty of Tribes has been acknowledged in the U.S. Constitution. This sovereignty is inherent and flows from the pre-constitutional and extra-constitutional governance of the Tribe. Early federal policy and U.S. Supreme Court case law recognizes that Tribes retain the inherent right to govern within political boundaries (Worcester v. Georgia (1832) and that power to interact with Tribes is vested in the federal government. (Cherokee Nation v. Georgia (1831). This established governmental structure recognizes the sovereign and political independence of Tribal nations and its members. This right is also recognized by the State of California. Pursuant to the Executive Order B-10-11, the State "recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority of their members and territory."

The North Coast is the ancestral territory of North Coast Tribes. The majority of the North Coast Tribes have an inherent responsibility for managing their ancestral territories whether they currently have the capacity to or not. Therefore, North Coast Tribes' jurisdiction goes beyond the gathering, fishing, and hunting rights, which each individual Tribal member retains. It is the intent of the NCIRWMP to document the fact that each of the North Coast Tribes exerts their jurisdictional authority according to their own traditional policies, laws, mandates and capacity.

2.6 LONG-TERM IMPLEMENTATION & SUPPORT

The NCRP has experienced long term sustainability and stakeholder engagement due to its emphasis on transparency, collaboration and community input. To support the ongoing development and refinement of the NCIRWMP, the NCRP expects to maintain and enhance its collaborative framework through ongoing input and oversight from the PRP, technical evaluation by the TPRC, and input from stakeholders throughout the North Coast Region. The NCRP partnership framework has been identified as a powerful mechanism to provide input into legislative action and promote policies and programs that support rural and working landscapes. Ongoing support (2014-2018) for NCRP planning initiatives will occur through a Strategic Growth Council Sustainable Communities Planning Grant.

2.6.1 NCIRWMP IMPLEMENTATION & EVALUATION

By design, implementation of the NCIRWM Plan and its constituent projects is closely linked to monitoring and evaluation of Plan and project performance. The NCIRWMP (Section 11 "Performance Monitoring & Evaluation") contains a description of the process and criteria to evaluate the progress toward meeting NCIRWMP objectives and the processes that will link project completion to Plan implementation. NCIRWMP monitoring and evaluation also includes, per the requirements of DWR IRWM Guidelines:

- Assurance of efficient progress toward NCIRWMP objectives; implementation of the projects listed in the NCIRWM Plan; and monitoring of each project in compliance with all applicable rules, laws, and permit requirements;
- Explanation of whom or what group in the RWMG will be responsible for IRWM implementation and evaluation;
- Frequency (monthly, semi-annually, yearly) of evaluation of projects and stage of project development during which monitoring plan will be prepared;
- Explanation of how implementation will be tracked using the Data Management System (DMS) and who will maintain the DMS (see Section 13 "Data Management & Information Sharing"); and

- Discussion of how project findings/ "lessons learned" from project monitoring will feed into adaptive management, including Plan amendment as necessary
- Identify who has primary responsibility for development of project monitoring plans and activities

2.6.2 FINANCING PLAN DEVELOPMENT

Since 2005, the NCIRWM planning process and project implementation has been financed from a variety of sources, including via Proposition 50 (beginning in 2005) and Proposition 84 (beginning in 2011) grant funding; alternative grant sources (e.g. State Municipal Financing Program; CEC Energy Efficiency & Conservation Block Grant Program; and Strategic Growth Council Sustainable Communities Grant); and local cost-share agreements with the Sonoma County Water Agency, Humboldt County, and other NCRP member counties. NCRP funding awards from 2005-2013 total over $47 million and leverage over $75 million in funding match[21]. With its commitment to achieving multiple objectives through local action, the NCRP is well poised to attract and utilize new federal, state, local, and private funding sources as they become available. Projects included in the NCIRWMP are likely to qualify for many types of grants and low interest loans: natural resources, fisheries, drinking water, environmental justice, urban renewal, energy efficiency, public health, community development, and others, due to the diversity of conditions in the North Coast. However, the group is not dependent upon grant funding to continue; it was initiated with and continues to benefit from voluntary member contributions. Financial contributions have not been a requirement of membership in the NCRP, although all members have contributed substantial staff time to the effort.

The NCRP developed a financing plan to help stakeholders understand the complex history of NCIRWMP funding and develop future funding to sustain the North Coast IRWM effort (Appendix K "Financing History and Future Financing"). The financing plan identifies a diversity of funding types to ensure the long-term sustainability of the NCRP framework, processes, and projects. The Financing Plan will accommodate a 20-year planning horizon and include (in part per DWR IRWM Guidelines requirements) the following elements:

- Sources of funding (program-level description of funding sources for Plan development and potential sources for project implementation, and O&M costs) including but not limited to ratepayers; operating funds; water enterprise funds; special taxes, assessments, and fees; state, federal, and private grants & loans, and local bonds
- Potential alternative funding (consider other than grant awards; consistent, secure, long-term funding e.g. general funds, rate-based funds)
- Certainty of funding (current statues as secure, submitted, proposed)
- A review and input process to evaluate options for the Financing Plan for the NCRP Policy Review Panel and Technical Peer Review Committee, elected officials, decision-makers, and stakeholders
- Evaluation of the report by economic experts from throughout the Region, state, and country
- Summary of input from economic experts, resulting in the development of the final Financing Plan

2.7 PUBLIC INPUT & PLAN UPDATES

Formal public comment periods are scheduled into the NCIRWMP processes to capture stakeholder input for regular Plan updates. Public input guidelines and the Plan update process are described below. Appendix L Table 55 ("Public Outreach and Plan Input Opportunities") presents a chronology.

2.7.1 PUBLIC INPUT GUIDELINES

- Representative public input on the NCIRWM Plan and its implementation projects is solicited and welcomed during all phases of Plan development and update (Section 3 "Stakeholder Involvement"). Public input guidelines developed by the PRP and refined by stakeholders in 2013 are stated below:
- All NCRP meetings including project review meetings are noticed at least 72 hours in advance and are open and welcoming to the public.

21 [Current as of 2013] The North Coast had been awarded an additional $5 million via the California Energy Commission, but that award was struck down by a lawsuit.

- During project review meetings a conference call-in number is distributed so stakeholders (including but not limited to project proponents) may listen to the meeting and provide input during the public comment period, if desired.
- The meeting agenda and background materials to be used in PRP/TPRC decision-making are available at the meeting location, posted to the NCIRWMP website 72 hours in advance of the meeting, and mailed to any interested member of the public, upon request.
- Meeting agendas include designated times for public comment.
- Project proponents, interested stakeholders, and members of the public may be invited to speak on any item on the meeting agenda during public comment.
- The meeting Chair(s) may place time limits on public comment, depending on the number of public that wish to speak.
- Public comment and materials delivered to staff from the public as part of public comment are published on the NCIRWMP website.
- The PRP/TPRC may ask brief questions of the commenter for clarification, but do not engage in discussion, or debate an issue, with any member of the public.
- In the event that the TPRC requests specific or detailed clarifying information from a project proponent, this request will be made by PRP/ TPRC to NCIRWMP staff and thereby conveyed to the project proponent for response, which is relayed by staff back to TPRC to inform deliberations.
- The NCIRWMP and any NCRP planning documents and technical reports are made available as drafts on the NCRP website and public input is solicited with the intent of enhancing these draft documents
- All requests for clarifying information and the responses thereto are documented and made available to the public via the NCIRWMP website.

2.7.2 NCIRWM PLAN UPDATES

In November 2012, DWR released the final Integrated Regional Water Management Grant Program Guidelines for Proposition 84 and 1E (DWR 2012). These guidelines describe the process, procedures, and criteria DWR uses to implement the IRWM program including the regional plan standards and requirements. A revised and adopted NCIRWM Plan that is compliant to these plan standards is an eligibility requirement for IRWM implementation funding. Review and approval of the NCIRWM Plan(s) occurs by voting of the PRP, with input from the TPRC, Region stakeholders, and NCIRWMP staff. The Plan also is brought before each North Coast county's Board of Supervisors for consideration and adoption. Tribes approve the Plan according to the "Tribal Representation Process" in the NCIRWMP MoMU. Once the updated Plan is vetted and approved, it is adopted by project proponents and additional qualifying entities as warranted.

NCRP RWMG members and Counties adopt each iteration of the NCIRWM Plan at public meetings that have been publicly noticed through various media outlets, such as email, websites, and newspaper notifications. Tribal partners adopt the NCIRWM Plan at Tribal Council meetings which are noticed to their constituents. All counties notice their Board of Supervisors meetings at least 72 hours in advance to comply with Brown Act requirements. Each member County, Tribal Council, and project sponsor is expected to formally and publically adopt the Phase III Plan by September 9, 2014.

The NCIRWMP is a living and evolving document based on adaptive management principles. Phase I of the NCIRWMP provided an overview of present conditions in the North Coast Region, summarized existing planning efforts; described goals and objectives for water management; identified and prioritized integrated water management projects; and outlined monitoring for the success of those projects. Phase II (adopted 2007) further related state priorities to local planning and implementation efforts and improved coordination and project development between entities in the Region. While retaining all these elements, the NCIRWMP Phase III (the current document, to be adopted in 2014) has been updated to address new (2012) regional and local priorities and projects related to local autonomy and jurisdictional authority; economic vitality and energy independence; Tribal priorities and representation; infrastructure needs and upgrades; groundwater supply and quality; drought and flood preparedness; land use planning; and water supply security through efficiency. The Plan will continue to evolve, incorporating more stakeholder input and additional lessons learned along the way to ensure NCIRWMP projects continue to provide maximum water quantity, water quality, and habitat protection benefits while supporting viable communities and local economies.

SECTION 3.0 STAKEHOLDER INVOLVEMENT

The NCRP recognizes the need for active stakeholder involvement in Plan development, implementation, and evaluation to tailor a NCIRWMP that suits local needs while addressing regional, statewide, and federal priorities. Balanced representation by North Coast stakeholders helps identify and incorporate local priorities that align with NCIRWMP objectives, ensuring the adopted Plan is acceptable, meaningful, justifiable, and locally supported. Methods for identifying stakeholders and involving them in the NCRP are described below.

3.1 CURRENT & POTENTIAL STAKEHOLDERS

The NCRP uses a variety of strategies to identify individuals and groups with a potential stake in NCIRWM planning and project implementation. Outreach methods to identify and solicit stakeholders have included the NCRP website; presentations to local and regional groups; linking to regional industry and association membership lists; conducting formal and informal networking; convening focus groups; and contacting stakeholders from other past and current regional planning efforts.

The NCIRWMP was developed, and has been updated, with direct input from North Coast Tribes,[22] counties, and municipalities; water and flood control agencies; wastewater treatment facilities; water suppliers; RCDs and other special districts; agriculture interests; local watershed, landowner, and community groups; non-governmental and environmental organizations; universities; natural resources agencies; electrical corporations; industry organizations; and interested citizens. Hundreds of individuals and groups have provided and/or continue to provide input and direction to inform NCIRWMP process development and to identify priority projects for implementation (Appendix L Table 54 "Stakeholders and Participants in NCIRWM Planning Processes") lists these stakeholders and their role in the NCIRWMP.

3.2 OPPORTUNITIES FOR STAKEHOLDER PARTICIPATION

Since its inception, the NCRP process has been inclusive of all of the Region's stakeholders and has provided opportunities for a diversity of stakeholders to participate in all stages of the planning process and project implementation. The NCRP has developed and made available a variety of user-friendly options in order to facilitate representative participation in the NCIRWMP (see Sections 3.2.1–3.2.8 below). Because of the size and diversity of the Region, as well as a commitment by the leadership to reduce resource use and foster energy independence, many of these methods rely on telephone and other electronic means of communication. Remote-communication tools have been crucial in successfully implementing integrated regional water management planning at a very broad scale.

The NCIRWMP outreach mechanisms address the range of water management and stakeholder issues within the Region and provide for a balanced geographical representation. These efforts also promote access to, and collaboration with, people or entities with diverse viewpoints. Project proponents working in the same watershed or sub-region are encouraged to integrate their projects and planning processes, resulting in capacity building on a sub-watershed scale throughout the Region. The NCIRWMP process encourages stakeholders to view their projects and work plans from a watershed and/or regional perspective, providing a venue for increased collaboration with upstream and downstream neighbors. The NCIRWMP process and tools help to facilitate this capacity building process and have resulted in a greater understanding of the concept of integrated water planning. Ongoing education and technical assistance from NCRP staff continues to provide current information about multi-objective integrated projects and specific suggestions for improved project integration. Appendix L Table 55 ("Public Outreach & Plan Input Opportunities") quantifies the stakeholder outreach effort and results to date.

3.2.1 PUBLIC MEETINGS & WORKSHOPS

The primary interface for stakeholder involvement in the NCIRWMP is through regular NCRP meetings and topic-based local workshops, which are noticed/announced to interested parties via the NCRP website and email listserve (below). The NCRP is exploring improved web and teleconferencing options in an effort to include even more stakeholders in meetings and workshops, while reducing travel-related greenhouse gas emissions (and travel expenses) across the large Region.

Since 2005, the PRP and TPRC have met on an ongoing and regular basis to review the Plan and NCRP process; discuss water, energy, climate change, environmental, and economic issues related to the North Coast; evaluate funding opportunities; review legislative and policy issues; and discuss and review North Coast projects. In 2011, the PRP adopted a regular quarterly meeting

22 The NCIRWMP recognizes the dual nature of Tribal participants who are also Tribal government agencies.

schedule (January, April, July, October) that alternates between Humboldt, Mendocino, Trinity and Siskiyou county locations. All PRP and TPRC meetings are open to the public and public participation is encouraged. Prior to the TPRC and PRP meetings, the meeting date, location, time, and a preliminary agenda are posted on the NCRP website and, in accordance with the Brown Act, meeting agendas are publicly noticed at each meeting location. Each meeting agenda designates time for the public to comment on any items included on the agenda or any other items of interest and that time period often extends well beyond the time allotted on the agenda. Stakeholders are routinely brought into discussions, especially on issues that are controversial or contentious, and all interested perspectives are sought for comment and input. If interested parties are unable to attend a targeted meeting or agenda discussion, their input is solicited through other mechanisms (e.g. phone, email, or website submittal) and brought to the attention of the PRP by staff for discussion and consideration. Meeting schedules, agendas, minutes, and a list of attendees are archived on the NCRP website.

In addition to regular NCRP meetings, dozens of facilitated workshops on priority topics have been organized for stakeholders. Workshops are led by NCRP staff and have provided information pertinent to regional water management planning to groups of 10-50 individuals. Topics have included local, regional and statewide goals and objectives; information on the North Coast regional planning framework; opportunities for input on the Plan document; and opportunities for funding. The workshops provided a forum for incorporation of local issues, concerns, and priorities into the NCIRWM Plan. In order to provide equal access for all of the Region's residents, including DACs and others who might find travel costs prohibitive, workshops are held at locations throughout the Region.

Finally, these regular and publically-noticed meetings and workshops have been supplemented by a number of direct meetings and coordination with local Tribes, DACs, watershed groups, cities, and others to encourage representative participation by all potential stakeholder groups. These meetings are scheduled as warranted and may be held at the request of NCRP, or of the interested stakeholder(s).

3.2.2 NCRP WEBSITE

The NCRP website (www.northcoastirwmp.net) provides for information sharing among a diverse audience across a large, rural, decentralized region. The website was developed to extend outreach capabilities while reducing or eliminating travel-related restrictions that could limit participation. The website includes upload functionality to allow for project application upload by project proponents during various funding rounds. The website also provides background information about the NCIRWMP process; links users to NCRP programs and surveys; and offers a library of relevant planning documents and literature. An on-line mapping feature allows users to view various watershed, natural resources, socio-economic, and jurisdictional data as well as proposed project locations. A new North Coast Tribes portal is available on the website, linking website users to information related specifically to Tribal information. Website users also are alerted to public meetings, process decisions, funding opportunities, and North Coast regional news. When new information is posted to the website, registered users have the option to receive email alerts (see Section 3.2.3 "Email Listserve"). The frequency and content of the email alerts can be adjusted to conform to user preferences, allowing users to tailor updates to their interest level.

Although NCRP leadership and staff understand that the website is not a substitute for direct connections with North Coast stakeholders, it has been a powerful tool and a transparent mechanism for information dissemination and input from throughout the Region. Substantial stakeholder involvement has been accomplished via the NCRP website: over 1,000 individuals have become registered users of the site, and over 61,000 have visited the site since 2008. Users regularly provide suggested revisions, calendar items, questions, and other input via this mechanism. The North Coast website will be updated in the fall of this year to reflect the name change from NCIRWMP to North Coast Resource Partnership.

3.2.3 EMAIL LISTSERVE

Email has proved to be an effective mechanism for communication between North Coast stakeholders and the NCRP staff. The email listserve (approximately 1,000 members), which interested stakeholders may choose to join via the NCRP website, is used to inform stakeholders of upcoming NCRP events (meetings, conferences, workshops), share critical news items, access Plan drafts, and distribute information about potential funding opportunities. All correspondence to stakeholders contains contact information for NCRP staff so that questions or concerns can be addressed quickly and directly. NCRP staff is also made available to speak at organizational meetings, upon stakeholder request. The website and e-mail listserve have been very successful at conveying large amounts of complex information to a wide variety of stakeholders dispersed across the North Coast.

3.2.4 INTERVIEWS

NCRP staff has developed questions and conducted periodic interviews of NCRP participants, technical experts, and North Coast stakeholders to solicit specific information related to various Plan elements. These

one-on-one interactions are usually conducted by telephone, using a standardized list of topic areas and questions. Interview results (questions and anonymous answers) are summarized and posted on the NCIRWMP website for easy public access. Interviews conducted by NCRP staff in 2005/06 and 2011/12, focused on gathering responses from the NCRP governance and technical experts (e.g. PRP and TPRC members), and from project proponents, in order to conduct an initial evaluation of the NCIRWMP process to date. Interviews conducted in 2013 solicited additional and updated input from the PRP and TPRC (including new members since 2011), as well as land use and water planning personnel associated with the Region's Tribes, counties, municipalities, and other local planning departments and programs. 2013 interview respondents were asked to provide information and share opinions related to all or some of the following NCIRWMP topics (specific questions related to each topic are provided on the NCIRWMP website, along with a compendium of interviewee responses):

- Local and regional vision, conflicts, goals, constraints, and opportunities
- Priorities for economically disadvantaged communities (DACs)
- Priorities for local Tribes and Tribal Territories
- Priorities for addressing climate change vulnerability
- Priorities for energy efficiency/ independence/ security
- Priorities for integrated water management
- Storm and flood water management opportunities
- Identification of key water infrastructure and watershed projects
- North Coast financing needs and solutions

This source of information will help the NCIRWMP to comply with new (2012) DWR requirements for funding, as well as to identify and evaluate ongoing and upcoming planning efforts, documents, and processes; highlight data gaps and data needs; and foster incorporation of local land and water planning information.

3.2.5 NCRP CONFERENCES

Multi-day regional conferences on NCIRWMP-related topics have been held in the North Coast in 2007 and 2013. Nearly 250 stakeholders from the Region attended each conference including, local and state elected officials, Tribal representatives, local governments, water/wastewater entities, advocacy groups, non-governmental organizations, Resource Conservation Districts, and business groups (Appendix L "Stakeholder Analysis & Integration"). During both conferences, NCRP member agencies provided scholarships to more than 30 entities to ensure that no one who wished to attend would be excluded from participating due to inability to pay the conference fee.

Throughout the conferences, DWR and SWRCB representatives played key roles in information dissemination, participating in Plenary Sessions, panel sessions, as individual speakers, and as workshop leaders. The conferences offered half-day technical workshops including a grant-writing workshop which provided practical, hands-on information for those interested in submitting a grant application through the NCRP process and other funding agencies.

2007 Conference

The first North Coast regional IRWMP conference (October 10-12, 2007) brought together a geographically diverse region to one central location in Fortuna, California. Agenda items included a focus on the planning process to date, future opportunities, policy developments, climate change, economic development, sustainable agriculture, mechanisms to improve the planning process, interactive sessions on the website, an input session on the California Water Plan update, and technical sessions focused on grant application development and data integration & decision support tools. The conference provided networking opportunities and interactive forums to solicit input from stakeholders and worked to enhance the collaborative framework that has been the cornerstone of the NCIRWM planning process. Designed with a commitment to support local North Coast businesses, all the conference service providers were from the Fortuna area. Sustainability was a theme of the conference, with a focus on local food and recyclable/compostable materials.

DWR coordinated with NCRP staff to hold a session giving North Coast residents the opportunity to learn more about and provide direct input to the 2009 California Water Plan. This also provided a framework for information dissemination from state policy level

to the local implementation level, offering needed information to stakeholders and allowing the state to receive valuable feedback in a collegial setting from those directly affected by state water policy. During another session, participants developed input for the NCIRWMP Phase III update of processes and content.

2013 Conference

The NCRP presented a second regional conference in Fortuna on October 2-4, 2013. The 2013 Conference again provided an open, facilitated forum to communicate with legislators, agencies, and funding entities; educate stakeholders; feature the accomplishments of North Coast implementation projects; and gather information and innovative ideas to enhance the future of the NCIRWMP and NCRP efforts. The 2013 conference focused on economic vitality and reported on the return on the NCRP investments being made in the North Coast Region; explored potential future funding options for the NCRP; and provided interactive sessions and practical applications for stakeholders to more fully participate in the NCIRWM Plan update process.

3.2.6 NETWORKING

There is an extensive network of professional interrelationships that support refinement and implementation of the NCIRWMP and promote mutual understanding among Plan stakeholders. Many participants in the NCRP are members of the same water management or land planning groups and also have experience working together on large regional frameworks. Many of the NCIRWMP MoMU signatories also cooperate with other agencies, Tribes, and/or NGOs in sub-regional or special interest groups, or on special projects. NCRP conferences provide for particularly in-depth networking opportunities for Plan stakeholders.

3.2.7 TECHNICAL ASSISTANCE

Early in the NCIRWMP development process, the TPRC became aware that many of the NCRP project funding applications from DACs, Tribes with limited resources, and entities from rural areas were lacking the technical expertise evident in applications from entities with greater human and financial resources. The PRP considered this information when prioritizing projects and revised the weight given to projects benefitting DACs, specifically those projects identified by the applicants and TPRC as addressing threats to public health. This process also brought awareness to the regional nature of these issues: that these projects and communities weren't isolated, as some may have thought, and spanned the more than 19,000 square miles (7,336+ square kilometers) of the North Coast Region, and that the water supply, quality, and ecosystem benefits of solving these individual problems would yield results at local, regional, and statewide scales.

Since then, the PRP has consistently committed NCRP staff and subcontractors to provide technical assistance to proponents (or potential proponents) in need of it. Assistance has included project feasibility studies development, grant-writing technical assistance, engineering support, GIS mapping , eligibility, economic analysis, and budgetary advice to project proponent in need. Technical-assistance workshops were held at different locations in the Region prior to NCRP proposal solicitation rounds, in order to ensure accessibility to a broad number of participants. Additional technical assistance was provided during the project submittal process, including with budgets, economics, project evaluation, work plans, documentation, and troubleshooting upload tool problems.

The NCRP Water and Wastewater Service Provider Outreach and Support Program (WSWW) helps identify and provide technical assistance for underserved rural communities who have daunting water supply and wastewater challenges.[23] In 2011, DWR awarded funding for this pilot program to the NCRP to help improve local capacity and quality of services of small water supply and wastewater providers in the North Coast Region, including the overwhelming need for technical training support.

3.2.8 NCIRWMP UPDATE & READOPTION

As part of an adaptive management framework, and as described in Section 2.7 "Public Input & Plan Updates," the NCIRWMP has been revised twice since its initial publication in July 2005. The current iteration (Phase III) reflects local and regional priorities as well as the November 2012 IRWMP Guidelines and IRWM Plan Standards. As part of the update process, the PRP reviews any new requirements or proposed changes to the existing Plan and decides what elements need to be included in updated drafts (e.g. draft outlines, annotated outlines, full drafts). NCRP staff works with the PRP and TPRC to develop new draft language and/ or to revise existing language. Draft elements are presented at NCRP meetings and posted on the NCRP website. Public comment periods/opportunities are made available to stakeholders who wish to provide input on these elements. The Plan is presented to respective Tribal Councils and county Boards of Supervisors for consideration and adoption/ re-adoption. All NCIRWMP updates have been approved and readopted by all seven county Board of Supervisors.

23 NCIRWMP Water & Wastewater Service Provider Outreach & Support Program 2014 survey summary at http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207. See the program summary in Appendix O of this document.

3.3 FOSTERING COLLABORATIVE PARTNERSHIPS

The NCRP includes proven and ongoing processes for coordinating with all the water resource entities and interests in the Region, including DACs, agencies, Tribes, and adjacent IRWM regions (Section 2.4 "Coordination"). The Plan framework helps the diverse stakeholders of this large, non-homogeneous region to reach agreement on contentious issues, including those that disproportionately affect particular segments of the population. A strong emphasis on local autonomy has served the Region well in addressing ongoing and potential conflicts by identifying common ground, and by allowing each county or other designated sub-region to address the NCIRWMP goals and objectives in the way that works best locally. This method of bringing stakeholders together on common ground is a hallmark of the NCRP. With each successful resolution, the NCRP's financial and political capital, and the collective determination to collaborate for mutual benefit, is strengthened.

Engaging DACs and Water Service Providers

Economically disadvantaged communities (DACs) have been involved in all aspects of the NCIRWM and the locally elected leadership on the NCRP includes PRP and TPRC representatives of counties and communities that are designated "economically disadvantaged." This formal representation ensures DAC concerns are fairly addressed and DAC efforts are adequately supported. Also, many of the NCIRWMP implementation projects are expected to benefit the people, water resources, habitats, and economies in these communities. By engaging with DAC community members and their water service providers, the NCRP framework enhances the social, institutional, and financial capital and capacity in the North Coast, providing regional support, organizing, and technical assistance.

Engaging North Coast Tribes

North Coast Tribes have historically been under represented in conventional resource related decision-making processes. However, the NCRP has a long history of engaging Tribes and Tribal entities, and — at the insistence of North Coast Tribes — has expanded its emphasis on Tribal participation by inviting formal Tribal representation into NCIRWMP governance process and by conducting outreach to Tribal entities. Collaboration with North Coast Tribes is expanding meaningful Tribal participation in the NCRP water planning process and projects. To improve active collaboration between Tribes and the NCRP, the NCIRWMP website hosts a portal by which information related to Tribes, Tribal governments, and Tribal agencies may be easily accessed for sharing, discussion, and refinement. The goal of these and other efforts is a continually improved NCIRWM Plan that utilizes indigenous knowledge and expertise, represents the needs of North Coast Tribal governments and Tribal agencies, is sensitive to Tribal concerns, and is committed to honoring Tribal Sovereignty.

The NCRP considers Tribes eligible for funding through the IRWM Program and this NCRP IRWM Plan. Tribes are required to adhere to laws applicable to Tribes The NCRP is committed to removing barriers which limit Tribal collaboration and participation. North Coast Tribes are included as stakeholders in the NCIRMP: however, the NCRP recognizes the dual nature of Tribal participation because North Coast Tribes also are government entities.

Engaging State and Federal Agencies

The state and federal agencies in the North Coast Region with the most substantial statutory authority over waters are the SWRCB, NCRWQCB, US Army Corps of Engineers (USACE), US Fish and Wildlife Service (USFWS), Federal Energy Regulatory Commission (FERC), state and federal Environmental Protection Agencies (EPA, USEPA), and NOAA/National Marine Fisheries Service (NMFS). These entities have jurisdiction related to some of the most pressing concerns in the Region today. However, prior to the establishment of the IRWM program, agencies' regional planning took place only at the state level. Now, through participation in the NCRP, state and federal agencies with an interest in water management are able to integrate planning and implementation of resource management in a way that acknowledges and satisfies regional and local diversity.

SECTION 4.0 NCIRWMP GOALS & OBJECTIVES

4.1 PROCESS TO IDENTIFY & UPDATE GOALS & OBJECTIVES

The establishment of NCIRWM Plan goals and objectives was accomplished with input from the PRP, TPRC, resource agencies, and stakeholders in the North Coast Region during focused strategic planning meetings facilitated by the PRP Chair, as well as via ongoing stakeholder input to staff and PRP members at public meetings and workshops and via e-mail and phone. Input was then considered by the PRP and a final set of regional goals and objectives were selected. Six objectives for the Phase I Plan were approved by the PRP in 2005 and retained for Phase II (2007). For the most recent Plan iteration (Phase III), these were revised and subsumed into 12 updated objectives and six associated overarching goals were developed, again with broad stakeholder input by a transparent, PRP-approved process.

Goals and objectives most recently have been updated to reflect 2012 IRWM Guidelines and IRWM program preferences and local priorities identified by counties, Tribes, WMAs, and others. New objectives were added specifically to emphasize new regional and local priorities and requirements related to Tribal issues and objectives; needs for disadvantaged communities (DACs); infrastructure improvements; local energy independence; economic vitality; climate change vulnerability assessment and adaptation; groundwater protection; integrated flood management; agricultural water use; and Plan and project performance indicators.

NCIRWMP goals and objectives are intended to address the local and regional water and watershed management issues identified in this Plan (Appendix C "NCIRWMP Objectives X Key Issues"). Per the adaptive management approach of the NCIRWMP, the NCRP has reevaluated NCIRWMP objectives during periodic Plan updates to ensure that they continue to accurately reflect North Coast priorities (Section 1.5 "NCIRWMP Priorities"); address water and energy management issues of greatest importance to those living in North Coast communities (Section 6 "Local & Regional Water-Related Issues"); consider regional and watershed Basin Plan objectives (NCRWQCB 2011); and incorporate the State's latest IRWM funding criteria (DWR 2012), water efficiency goals (SB X-7X 2009), California Water Code, and other requirements as appropriate. As part of its adaptive management approach, the PRP will continue to lead further revision of these goals and objectives as deemed necessary based on PRP discussions and input from the TPRC and stakeholders.

The NCRP places an emphasis on local autonomy, allowing each county or sub-region to address and implement NCIRWMP goals and objectives in a way that works best locally. This approach has served the Region well in finding common ground within areas of potential conflict and respects local control, knowledge, and approaches to achieving regional objectives. The NCRP framework provides a means for local entities to address state and regional goals and objectives when implementing projects to meet local water, climate, and energy-related needs and provides the structure and flexibility necessary to promote cohesion and accommodate unique planning and implementation approaches region-wide.

4.1.1 OBJECTIVES FOR NCIRWMP PHASE I & PHASE II

Following are the six objectives originally approved for the NCIRWMP Phase I (NCRWMG 2007) and Phase II iterations.

Phase I and II NCIRWMP Objectives

1. Conserve and enhance native salmonid populations by protecting and restoring required habitats, water quality and watershed processes
2. Protect and enhance drinking water quality to ensure public health
3. Ensure adequate water supply while minimizing environmental impacts
4. Support implementation of Total Maximum Daily Loads (TMDLs), the North Coast Regional Water Quality Control Board's (NCRWQCB) Watershed Management Initiative, and the Non-Point Source Program Plan.

5. Address environmental justice issues as they relate to disadvantaged communities, drinking water quality and public health
6. Provide an ongoing, inclusive framework for efficient intra-regional cooperation, planning and project implementation

Associated goals were not articulated previous to this Phase III update. The Phase I-II predecessor to goals was NCIRWMP "themes" of intra-regional cooperation, salmonid recovery, and beneficial uses of water. These themes are retained in Phase III, although they are now subsumed by "goals" and explicitly related to the individual objectives that implement them.

4.1.2 GOALS & OBJECTIVES FOR NCIRWMP PHASE III

For the current update, the original NCIRWMP objectives were subject to a process of revision and refinement under the direction of the PRP and with input from the Region's stakeholders. Twelve NCIRWMP objectives are now subsumed under six Plan goals. All the objectives are interrelated, and are relevant at both the local and regional scale. Objectives are organized thematically, by goals, and are not ranked or listed here in order of priority. Although the objectives are not prioritized (they all are "priority"), proposals for NCIRWMP projects that ultimately implement the goals are: each application is systematically reviewed, scored, and ranked by the NCRP TPRC and approved by the PRP via the process described in Section 7 "NCIRWMP Project Application, Review & Selection Process."

Phase III NCIRWMP Goals & Objectives

GOAL 1: Intraregional Cooperation & Adaptive Management

Objective 1 — Respect local autonomy and local knowledge in Plan and project development and implementation.

Objective 2 — Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation.

GOAL 2: Economic Vitality

Objective 3 — Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities.

Objective 4 — Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas.

GOAL 3: Ecosystem Conservation & Enhancement

Objective 5 — Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity.

Objective 6 — Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes.

GOAL 4: Beneficial Uses of Water

Objective 7 — Ensure water supply reliability and quality for municipal, domestic, agricultural, cultural, and recreational uses while minimizing impacts to sensitive resources.

Objective 8 — Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities.

Objective 9 — Protect groundwater resources from over-drafting and contamination.

GOAL 5: Climate Adaptation & Energy Independence

Objective 10 — Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors.

Objective 11 — Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation.

GOAL 6: Public Safety

Objective 12 — Improve flood protection and reduce flood risk in support of public safety.

4.2 PROCESS TO MEASURE PROGRESS TOWARD NCIRWMP OBJECTIVES

DWR (2102) "Objectives" standard for IRWM plans requires that the objectives above must be measurable. A measurable objective means there must be some metric available to determine if the objective is being met as the Plan is implemented. The NCIRWMP is, like all IRWM plans, implemented through its project; relevant to measuring objectives, this implies that metrics must apply to projects, which in turn relate back to Plan objectives.

The process whereby these indicators of success toward achieving NCIRWM Plan Goals/ Objectives are integrated with long term monitoring, evaluation, and reporting is addressed in Section 11 "Performance Monitoring & Evaluation," Appendix F "Indicators of NCIRWM Plan and Project Performance," and Appendix G "Monitoring Protocols for NCIRWMP Evaluation."

4.2.1 INDICATORS TO EVALUATE NCIRWMP OBJECTIVES

Below is a listing of each goal, associated objectives, and measurable "indicators" for each objective that will be monitored to ensure success of the NCIRWM Plan and its projects. A suite of 21 indicators has been developed for the preliminary evaluation process. Indicators may be either *qualitative* (descriptive) or *quantitative* (numeric) metrics, per DWR IRWM Guidelines (DWR 2012). Many indicator data are already collected and evaluated as part of the NCIRWMP implementation project monitoring process described elsewhere herein.

GOAL 1: INTRAREGIONAL COOPERATION & ADAPTIVE MANAGEMENT

Objective 1 — Respect local autonomy and local knowledge in Plan and project development and implementation.

1) Inclusion of projects that meet goals included in local plans (qualitative)
2) Number of projects in NCIRWMP that meet goals included in local plans (quantitative)

These two indicators help determine the degree to which the NCRP is achieving Objective 1; if projects in the NCIRWMP meet local goals, there is respect for those goals and the local knowledge used to develop them. Additionally, during the application process, project proponents can be asked to name the local plans and the goals within them that project implementation will meet, allowing the TPRC and PRP to quantitatively include this Objective in the project evaluation process and allowing NCIRWMP staff a relatively easy way to quantitatively measure this indicator.

Objective 2 — Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation.

1) Publicly noticed, publicly held meetings that provide opportunity for public participation (*qualitative*)
2) Inclusion of and opportunity for public input in planning and project prioritization process (*qualitative)*
3) Number of publicly noticed, publicly held meetings that provide opportunity for public participation (*quantitative*)

These three indicators help determine the degree to which the NCRP is achieving Objective 2; if public meetings are held and public input solicited and considered during Plan/ policy formation and the project prioritization process, then the framework is providing for inclusive cooperation and effective, accountable project implementation.

GOAL 2: ECONOMIC VITALITY

Objective 3 — Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities (DACs).

1) Inclusion of DAC considerations in project prioritization process (*qualitative*)
2) Number of projects implemented in DACs (*quantitative*)
3) Number of jobs created/ maintained through project implementation (*quantitative*)

These three indicators help determine the degree to which the NCRP is achieving measurable support for, and some of the economic benefits realized by, DACs through the NCIRWMP planning process.

Objective 4 — Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas.

1) Inclusion of projects that benefit working landscapes and natural areas (*qualitative*)
2) Number of projects that benefit working landscapes and natural areas (*quantitative*)

These two indicators help determine the degree to which the NCRP is achieving Objective 4 through prioritization of projects that improve working landscapes and natural areas, which indirectly provide economic benefits for these areas.

GOAL 3: ECOSYSTEM CONSERVATION & ENHANCEMENT

Objective 5 — Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity.

1) Inclusion of projects that conserve, enhance, and restore watersheds and aquatic ecosystems and ecosystem function (*qualitative*)
2) Number of projects that conserve, enhance, and restore watersheds and aquatic ecosystems and ecosystem function (*quantitative*)

These two indicators help determine the degree to which the NCRP is achieving Objective 5 through prioritization and inclusion of projects that conserve, enhance, and restore watersheds and aquatic ecosystems and ecosystem function.

Objective 6 — Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes.

1) Inclusion of projects that conserve, enhance, and restore salmonid habitat and watershed processes that support salmonids (*qualitative*)

2) Number of projects that conserve, enhance, and restore salmonid habitat and watershed processes that support salmonids (*quantitative*)

These two indicators help determine the degree to which is achieving Objective 6 through efforts to include projects that enhance salmonid population through restoration of ecosystems and ecosystem function.

GOAL 4: BENEFICIAL USES OF WATER

Objective 7 — Ensure water supply reliability and quality for municipal, domestic, agricultural, cultural, and recreational uses while minimizing impacts to sensitive resources.

1) Number of projects that provide water supply reliability or improve water quality for municipal, domestic, agricultural, cultural, or recreational uses (quantitative)

This indicator helps determine the degree to which the NCRP is achieving Objective 7 through inclusion of projects that improve water supply reliability or water quality for multiple beneficial uses. Because of the strict state and federal environmental regulations governing project implementation, minimization of impacts to sensitive resources is inherent in CEQA/NEPA compliant project implementation.

Objective 8 — Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities.

1) Number of drinking water quality and water related infrastructure projects (*quantitative*)

1) Number of drinking water quality and water related infrastructure projects implemented in DACs (*quantitative*)

These two indicators help determine the degree to which the NCRP is achieving Objective 8 through inclusion of projects that are focused on improving drinking water quality and water-related infrastructure, particularly when those projects occur in DACs.

Objective 9 — Protect groundwater resources from over-drafting and contamination.

1) Number of projects that provide alternative sources of water to groundwater use and/ or reduce groundwater contamination (*quantitative*)

This indicator helps determine the degree to which the NCRP is achieving Objective 9 through inclusion of projects focused on groundwater supply and quality protection.

GOAL 5: CLIMATE ADAPTATION & ENERGY INDEPENDENCE

Objective 10 — Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors.

1) Number of projects (implemented by NCRP or project proponents) that assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors (*quantitative*)

This indicator helps determine the degree to which the NCRP is achieving Objective 10 by pursuing or including in the NCIRWMP projects that assess climate change effects, impacts, vulnerabilities and strategies.

Objective 11 — Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation.

1) Number of projects (implemented by NCRP or project proponents) that promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation (*quantitative*)

This indicator helps determine the degree to which the NCRP is achieving Objective 11 by pursuing or including in the NCIRWMP projects that promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation.

GOAL 6: PUBLIC SAFETY

Objective 12 — Improve flood protection and reduce flood risk in support of public safety.

1) Number of projects included in the NCIRWMP that improve flood protection and reduce flood risk (*quantitative*)

This indicator helps determine the degree to which the NCRP is achieving Objective 12 through inclusion of

flood protection projects in the NCIRWMP, the NCRP is improving flood protection and reducing flood risk.

4.3 INTEGRATION OF NCIRWMP GOALS & OBJECTIVES

NCIRWMP goals and objectives form the foundation for development, implementation, evaluation, and adaptive management of the Plan and its projects. The goals and objectives were conceived and developed explicitly to address North Coast issues and provide some resolution to conflicts inherent in considering and addressing multiple water-related priorities across such a diverse Region (Appendix C "NCIRWMP Objectives X Key Issues"). Integration of multiple North Coast objectives is evaluated and achieved by cross-walking local project and statewide priorities (Appendix A); local project and statewide goals (Appendix B); and local water (and, as appropriate, land) planning efforts (Appendix E). Objectives also are foundational to the monitoring/evaluation framework the NCRP is developing to evaluate the success of NCIRWMP, processes, and projects (Section 11 "Performance Monitoring & Evaluation"). The regular monitoring by project proponents of indicator data — and evaluation of indicator benchmarks by the NCRP — will demonstrate how well (i.e. Excellent, Good, Fair, Poor) the Plan objectives are being met, how well integrated the NCRP goals and objectives are, and where specific improvements are warranted.

SECTION 5.0 NORTH COAST REGION DESCRIPTION

The following description of the North Coast IRWM Region provides the historic, current, and near-future context for:

- Refinement of NCRP goals and objectives;
- Understanding of watersheds and water systems being managed;
- Identification of local and regional water-related issues;
- Selection of appropriate NCIRWM Plan implementation projects; and
- Project/ Plan evaluation.

In recognition of their functional interrelationships, both natural and anthropogenic ("man-made") components of the Region are described. As stipulated by the 2012 DWR Guidelines[24] for IRWM Plan development, this Plan includes descriptions (both quantitative and/ or qualitative) of the following required items:

- Watersheds/ water systems
- Internal boundaries
- Water supplies and demands, accounting for potential climate change
- Water quality for groundwater, surface water, imported water, and stored water
- Social and cultural makeup of the regional community
- Major water related objectives and conflicts (see Section 6 "Local & Regional Water-Related Issues")
- Explanation of regional IRWM boundary and identification of neighboring or overlapping IRWM Regions

Overview of the North Coast Region

The North Coast Region represents a large and diverse portion of the state (Map 1 "The North Coast Region"), encompassing a suite of coastal and inland areas, floodplains and uplands, urban centers and rural communities, and numerous land cover, habitat, and land use types. This diversity is exemplified by the wide variety of human-built and natural attributes that comprise the Region; from north to south and east to west, the North Coast exhibits a range of geologic, hydrologic, climatic, ecological, resource, political, jurisdictional, socioeconomic, demographic, and cultural characteristics (Appendix H Table 13 "Summary of North Coast Region Attributes"). The subsections below and associated Appendices describe, quantify, and illustrate these and other regional and local features, and provide summary information by river basin (i.e. Watershed Management Area (WMA), Tribal Territory (where appropriate/available), and county.

Although consisting of diverse attributes, the Region as a whole may be characterized as relatively rural, economically disadvantaged, and rich in natural resources and intact landscapes, as compared to the state as a whole and to other more heavily populated and developed IRWM regions (e.g. in southern California, San Francisco Bay area). See Section 6 "Local & Regional Water-Related Issues" for information on the concerns, conflicts, and potential vulnerabilities identified as currently or potentially detrimental to the Region's viability; many of these are shared by stakeholders across this large swath of rural northern California.

Process to Determine the North Coast Region Planning Boundary

Prior to development of the first iteration of the NCIRWM Plan (2005), extensive thought, discussion, and debate contributed to the determination of the North Coast regional boundary. The Policy Review Panel made a decision early on to focus on watershed boundaries and to align the NCIRWMP planning boundary with the hydrologic boundary of the Regional Water Quality Control Board, Region 1. Although the Region contains all of Del Norte, Humboldt, Trinity, and Mendocino Counties, it contains only portions of the others that drain to the Sacramento River or San Francisco Bay. NCRP staff encouraged counties not fully within the northeastern boundary of the NCIRWMP to connect with other IRWM efforts underway in the Northern Sacramento Valley and

24 Details on requirements of the IRWM program, see pages 19-20, 38-40 at http://www.water.ca.gov/irwm/grants/docs/Guidelines/GL_2012_FINAL.pdf

Lahontan funding areas and has, during discussions with DWR, encouraged the state to set monies aside for these developing IRWM efforts occurring in Tribal jurisdictions, rural and/or economically disadvantaged communities.

Under the direction of the PRP, NCRP staff has engaged in an ongoing dialogue with Lake County about their participation and gave a presentation to the County Board of Supervisors in 2007, inviting their participation. Since only a small portion of the county is within the North Coast Region and most of those lands are federal, Lake County has not chosen to actively participate in the NCIRWMP. The county is currently pursuing IRWM planning and projects located outside of the North Coast. Lake County is a signatory to the NCRP's MoMU and is supportive of the NCIRWMP. Marin County, which only has a small portion in the North Coast Region, also pursues planning and project implementation outside of the North Coast Region. Marin stakeholders participate in the San Francisco Bay Area IRWMP, as do the communities located in the southern portion of Sonoma County outside of the North Coast hydrologic region.

Datasets & Analyses

The North Coast Region description is based on publicly available resource agency reports[25], peer reviewed literature, local planning documents[26], and datasets. Where feasible, data have been analyzed in a Geographic Information System (GIS) to produce both tabular (i.e. summary tables) and spatial (i.e. map) formats. Tables and maps describing a number of features and attributes of the North Coast are presented in subsections below and/or in the Appendix. To the degree possible, all descriptive information is provided at multiple local scales (e.g. for individual basins/ WMAs, Tribal areas, and counties), as well as for the Region as a whole.

Datasets were downloaded from, and are compatible with, a number of federal and statewide GIS clearinghouses, including California Environmental Resources Evaluation System (CERES), Cal-Atlas, CalAdapt, Calwater, Integrated Water Resources Information System (IWRIS), Natural Resources Conservation Service (NRCS) Geospatial Gateway, and U.S. Census 2010. Data used for spatial analysis were selected based on their relevance and spatial location within the North Coast Region. Data were edited from their original sources by clipping them to the North Coast boundary (and/or boundaries of counties, Tribal Territories, and WMAs) and analyzed using ESRI's ArcGIS GeoProcessing tools. Federal Geographic Data Committee (FGDC) compliant metadata was developed for each new data file, incorporating new information and metadata of the original source data. Supporting information for the Region description was also provided by the DWR Red Bluff (Siskiyou County) document library; feedback obtained during NCRP interviews, surveys, and conferences; project monitoring results; and findings of key reports developed at the request of the NCRP PRP or TPRC (see Appendix O "Reports & Programs of the NCIRWMP"). All data presented in this Plan are available by request or online through the NCRP Data Management System/Portal (see Section 13 "Data Management & Information Sharing").

5.1 INTERNAL BOUNDARIES

Various internal boundary designations are used (both individually and in concert) to evaluate the Region's data, guide NCIRWM planning, support project implementation, and evaluate Plan and project performance. The internal boundaries of the North Coast Region are delineated for these purposes in two ways: by jurisdictional boundaries (e.g. Tribal Territories, county, city, special district) for planning and coordination purposes; and by physical boundaries (e.g. watershed, basin) for implementation and evaluation purposes and to meet local, regional, tribal, statewide, and federal water and watershed management priorities.

5.1.1 JURISDICTIONAL BOUNDARIES

The Region contains a number of jurisdictional, administrative, and management boundaries. These include federal, state, regional, county, municipal, Tribal, water district, special district, RCD, RC&D, and LAFCO boundaries. Each of these jurisdictions has a particular thematic and geographic scope and there is some degree of overlap or conflict between some boundaries. The NCIRWMP planning approach includes a strong emphasis on local autonomy and jurisdictional authority and (in Section 1.4.3 and 1.4.4, respectively) strives to achieve a balanced representation of relevant jurisdictional and administrative requirements and concerns at all scales, from local to Tribal to federal.

5.1.1.1 Land Management

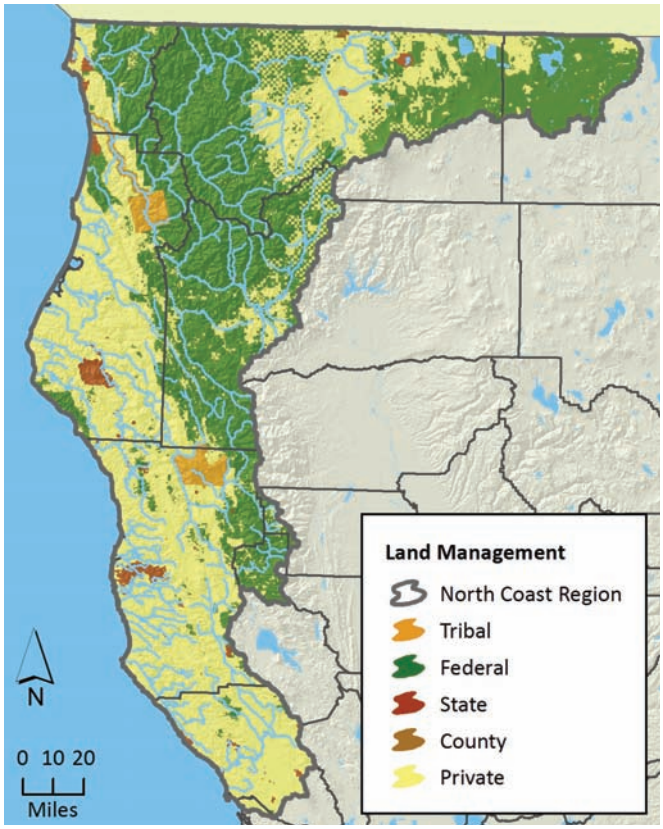
The 12,337,300 acre North Coast Region includes considerable privately owned land and land within Tribal, federal, state, and local jurisdiction. Land ownership and/or management[27] for the North Coast Region is

25 Primary report sources cited throughout Section 5 include (1) California Water Plan, DWR 2013; (2) North Coast Region Water Quality Control Plan/ Basin Plan, NCRWQCB 2011; (3) California Flood Future Report, DWR USACE 2013; (4) Draft Southern Oregon Northern California Coho Salmon Recovery Plan, NOAA/ NMFS 2012; and (5) Climate Change Handbook for Regional Water Planning, DWR USEPA 2011.

26 The current status of local (e.g. county, tribal, municipal, Resource Conservation District) water and land use planning efforts in relation to NCRP priorities, and the integration of these elements through the NCIRWM Plan, is presented in Section 9 ("Relation to Local Water & Land Use Planning")

27 See Sections 5.3 and 5.4 for information on land cover and land use, respectively.

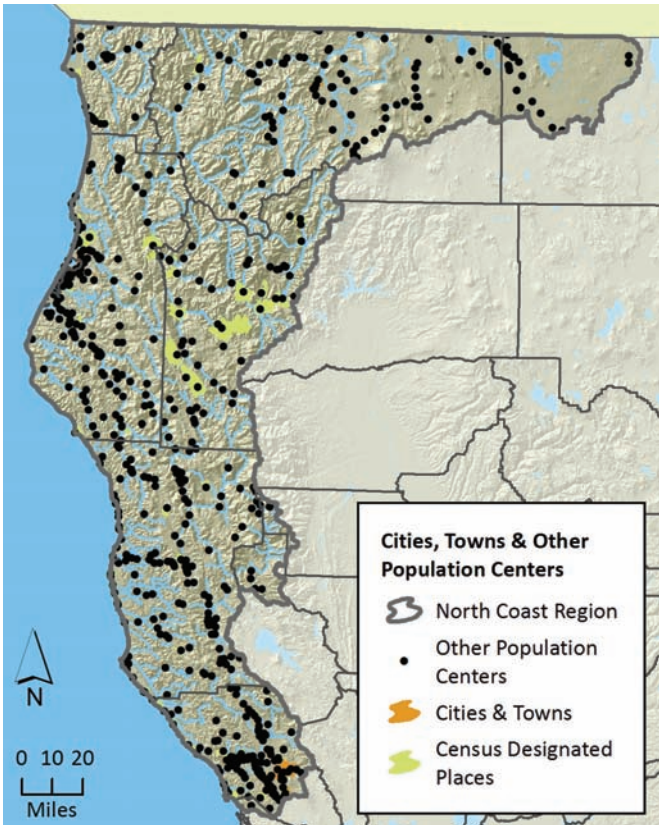
as follows:[28] private/ other entities manage 6,317,932 acres (51%) federal entities manage 5,732,223 acres (46%), Tribal[29] entities manage 256,280 acres (2%), state entities manage 291,877 acres (2%), non-profit entities manage 62,622 acres (0.19%), special districts manage 8,805 acres (0.07%), counties manage 4,567.39 (0.03%), and cities manage 5,387.75 (0.02%). Significant land ownership and/or management responsibility changes between 2007 (Phase II NCIRWMP) and 2013 include management by city (up from 2,215 acres), non-profit (up from 24,118 acres), and special district (up from 5,430 acres). Appendix H Table 14 ("Land Management Types of the North Coast Region"), Appendix P Table 64 ("Land Management Types of North Coast WMAs"), and Appendix P Table 72 ("Land Management Types of North Coast Counties") summarize land Management for the Region, WMAs, and counties, respectively. See Map 3 ("Land Management").



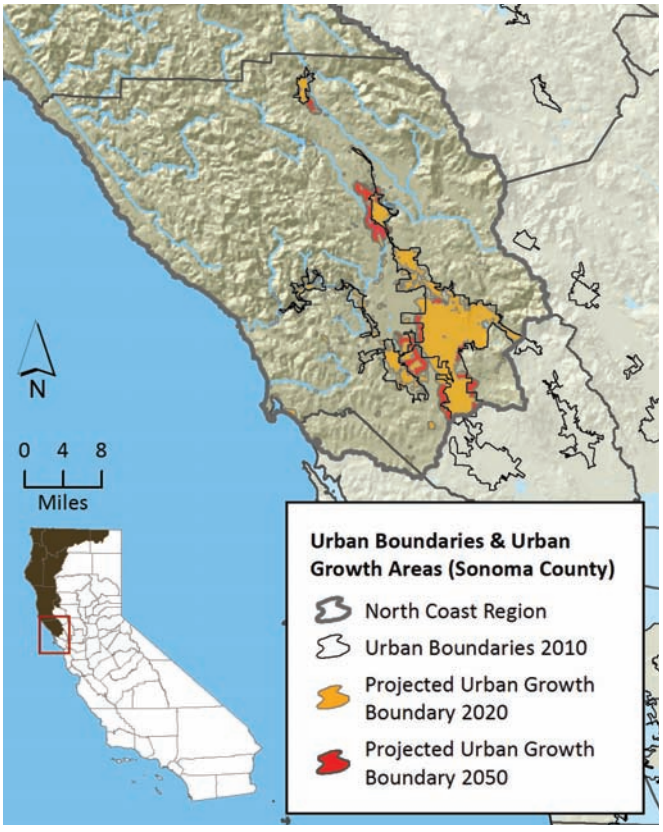
MAP 3 LAND MANAGEMENT

5.1.1.2 Federal and State Jurisdictions

On a federal level, the North Coast Region is contained within the US Environmental Protection Agency (US EPA)



MAP 4 CITIES, TOWNS & OTHER POPULATION CENTERS

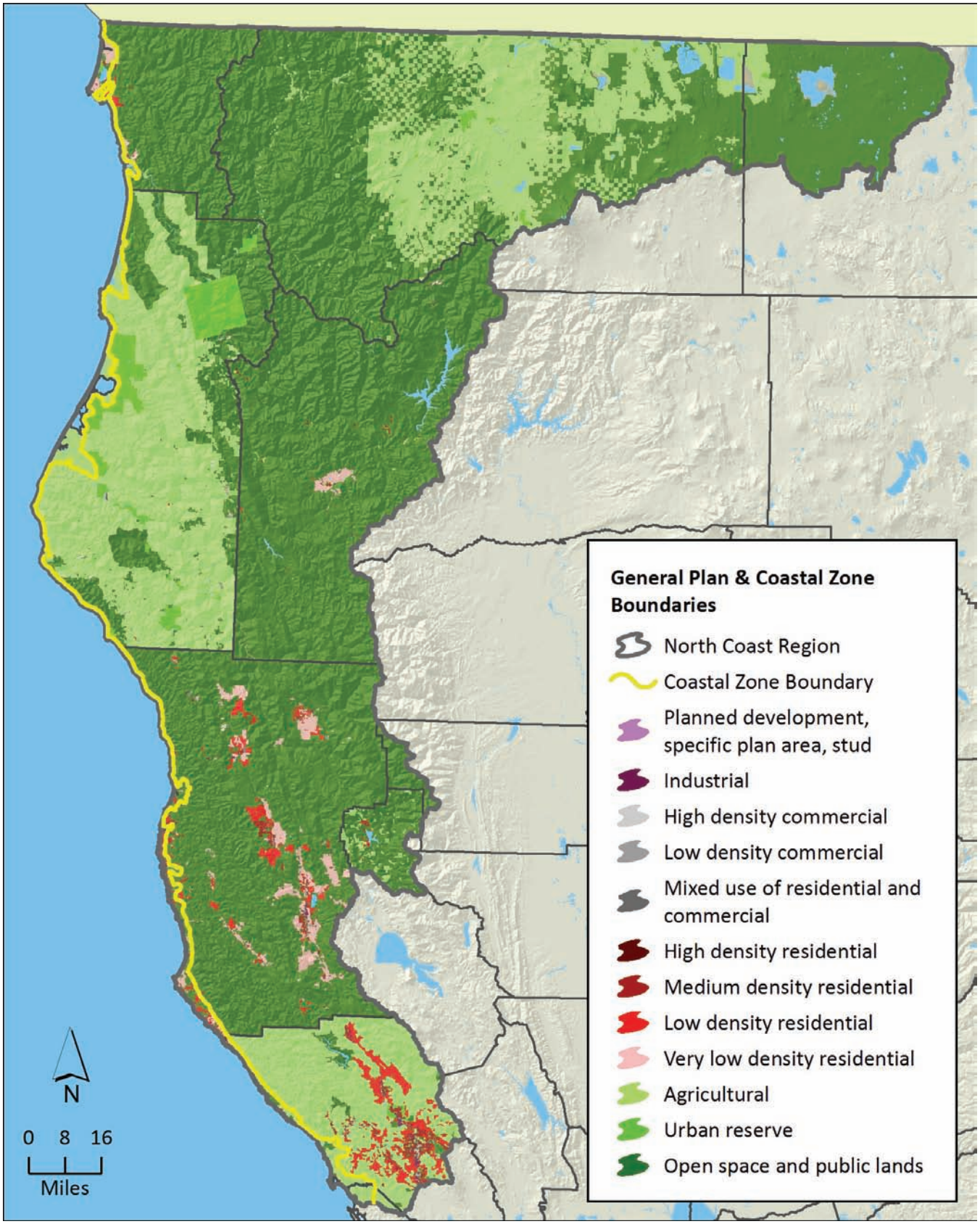


MAP 5 URBAN BOUNDARIES & URBAN GROWTH AREAS

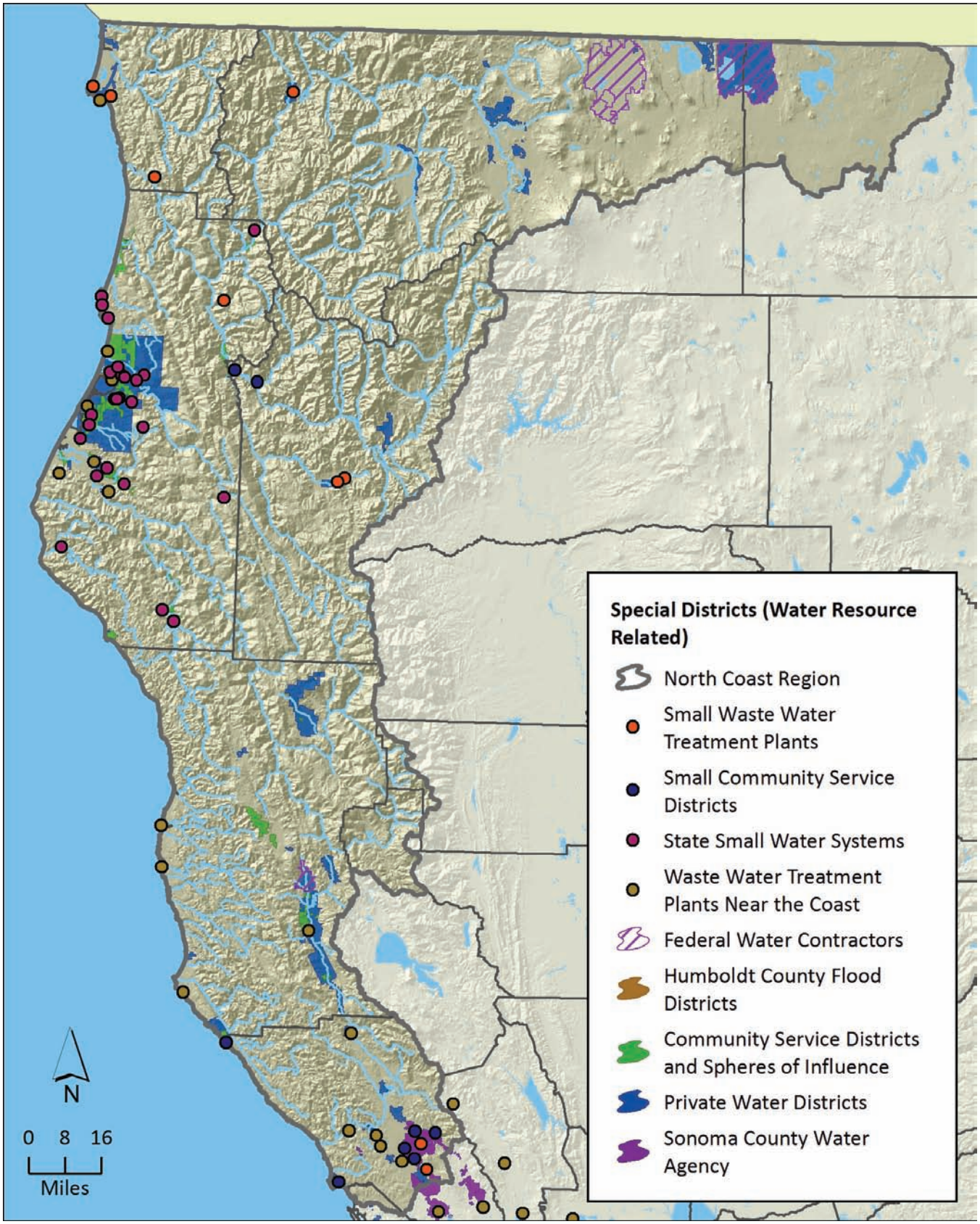
28 Source: California Protected Areas Database is a GIS inventory of all Californian lands held in fee ownership by public agencies and non-profits, developed and maintained by GreenInfo Network. http://www.greeninfo.org/services.php?j=gis

29 Source: CalTrans and Bureau of Indian Affairs GIS layer, 2012.

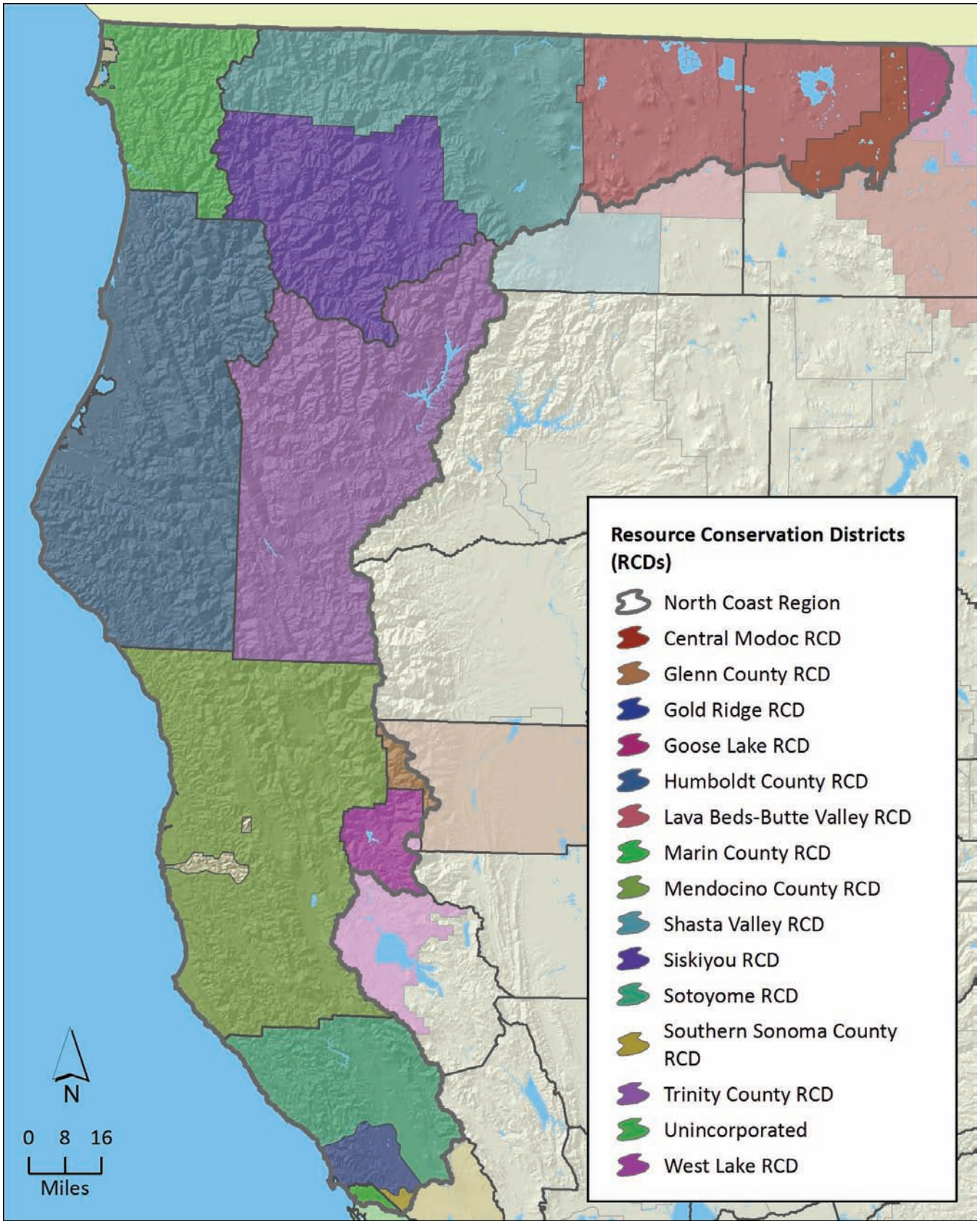
MAP 6 GENERAL PLAN & COASTAL ZONE BOUNDARIES



MAP 7 SPECIAL DISTRICTS (WATER RESOURCE RELATED)

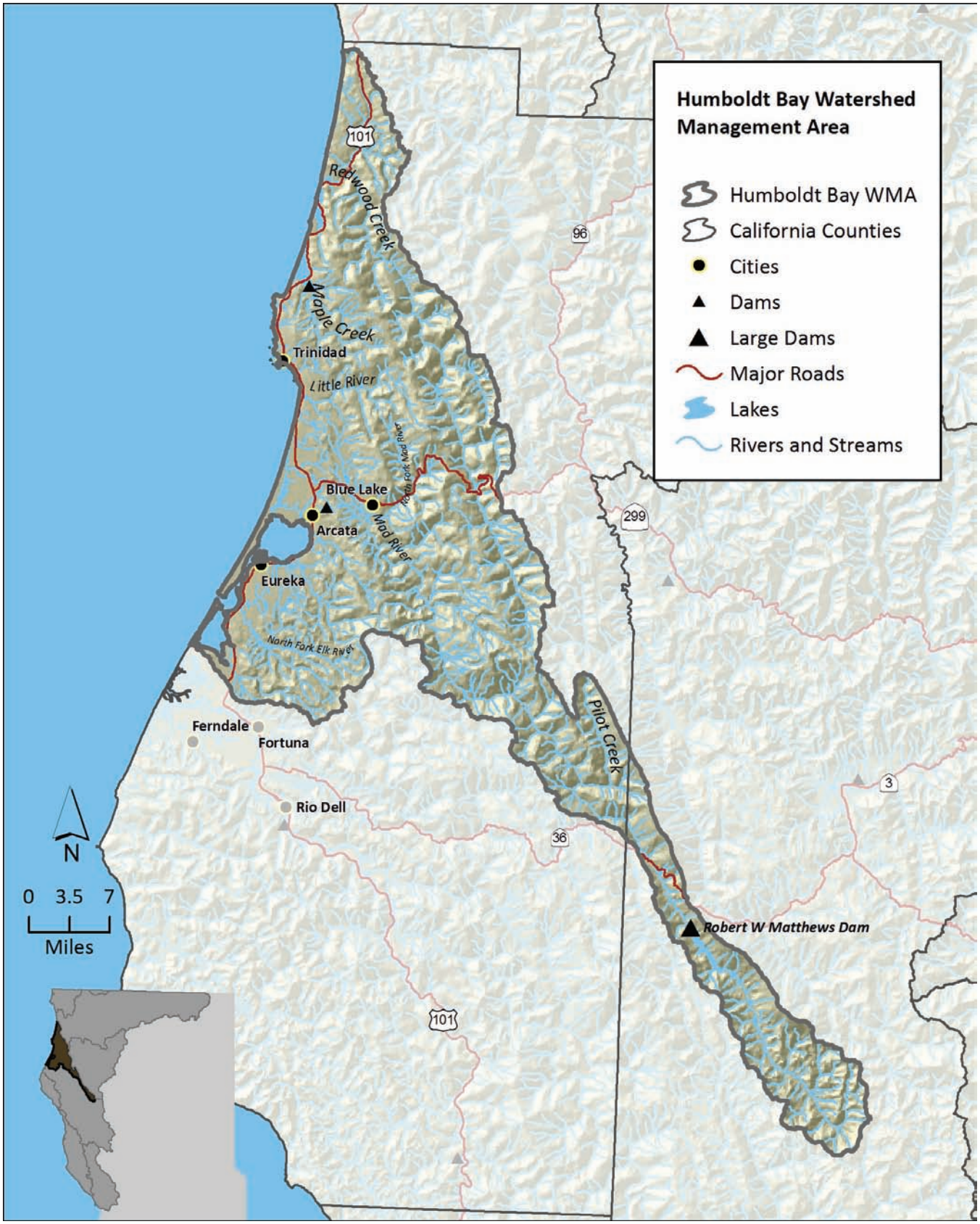


MAP 8 RESOURCE CONSERVATION DISTRICTS

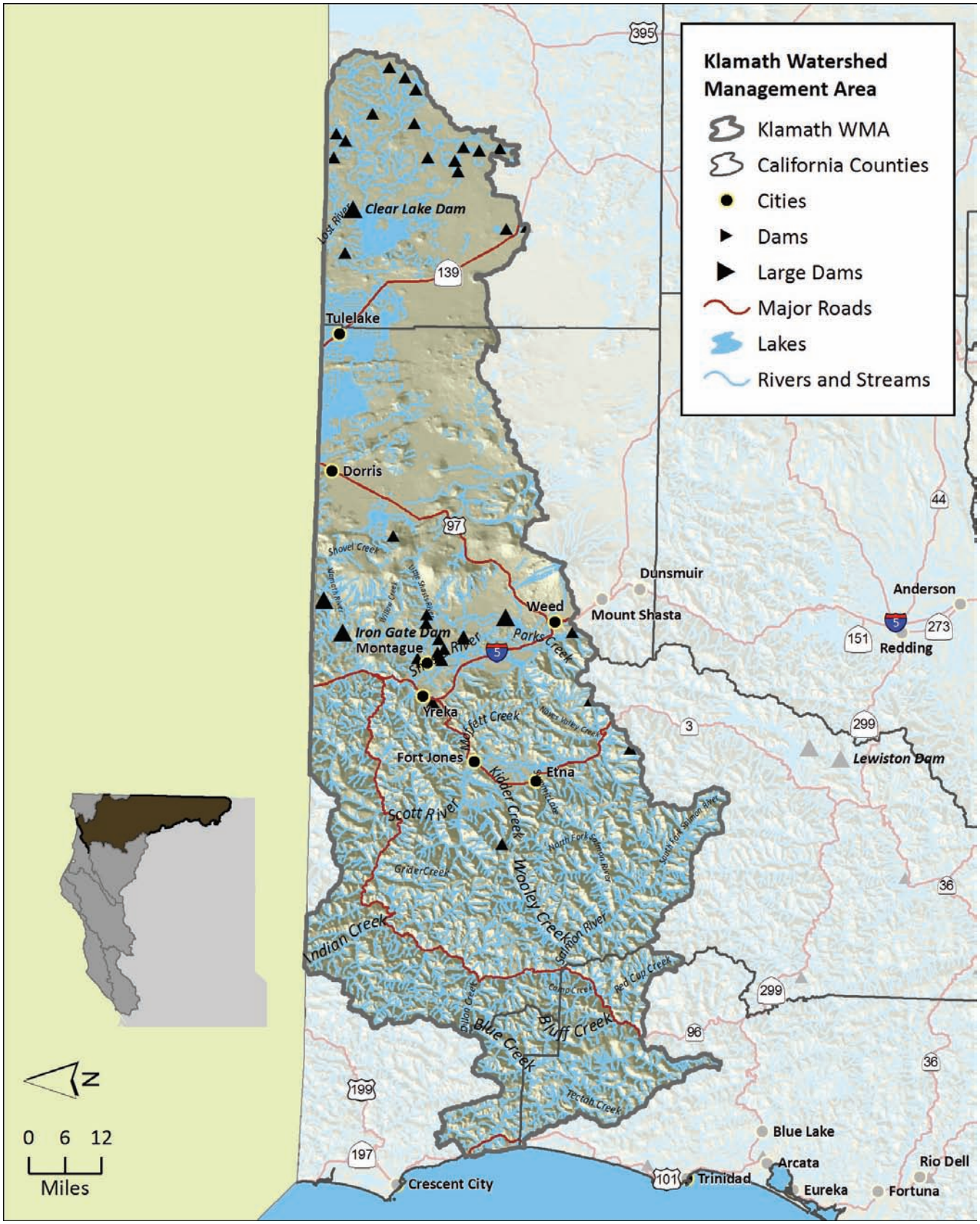


MAP 10 EEL RIVER WATERSHED MANAGEMENT AREA

MAP 11 HUMBOLDT BAY WATERSHED MANAGEMENT AREA

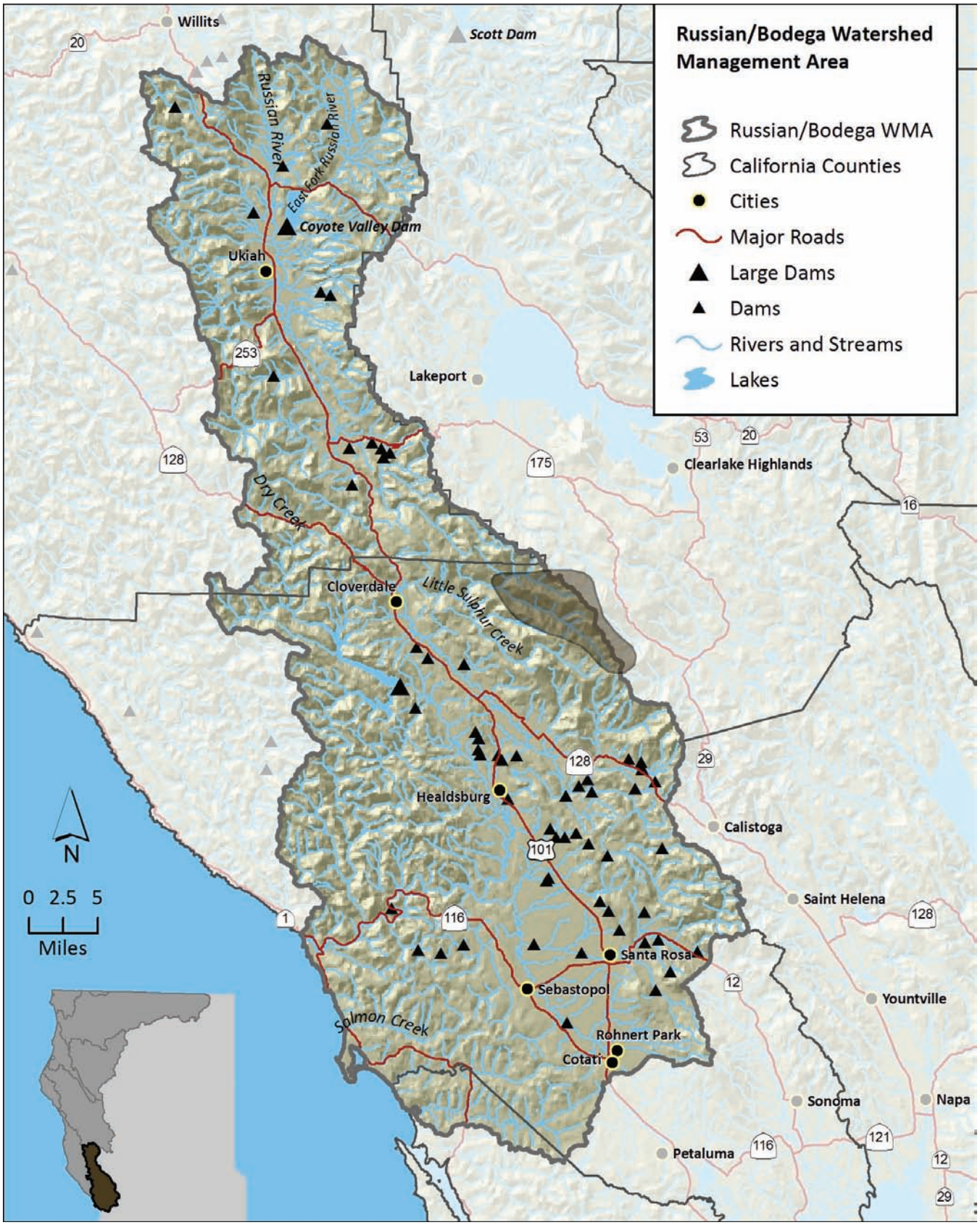


MAP 12 KLAMATH WATERSHED MANAGEMENT AREA

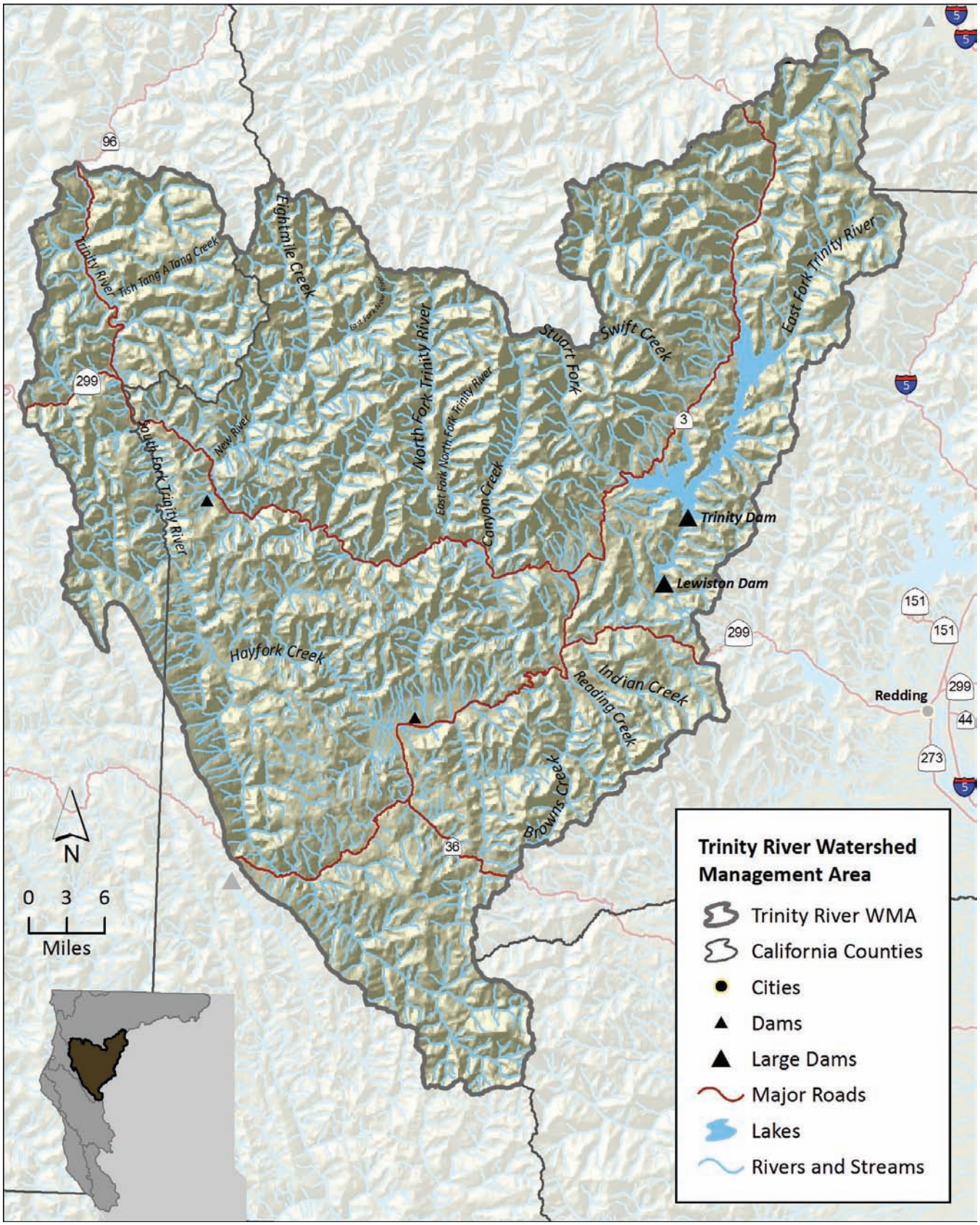


MAP 13 NORTH COAST RIVERS WATERSHED MANAGEMENT AREA

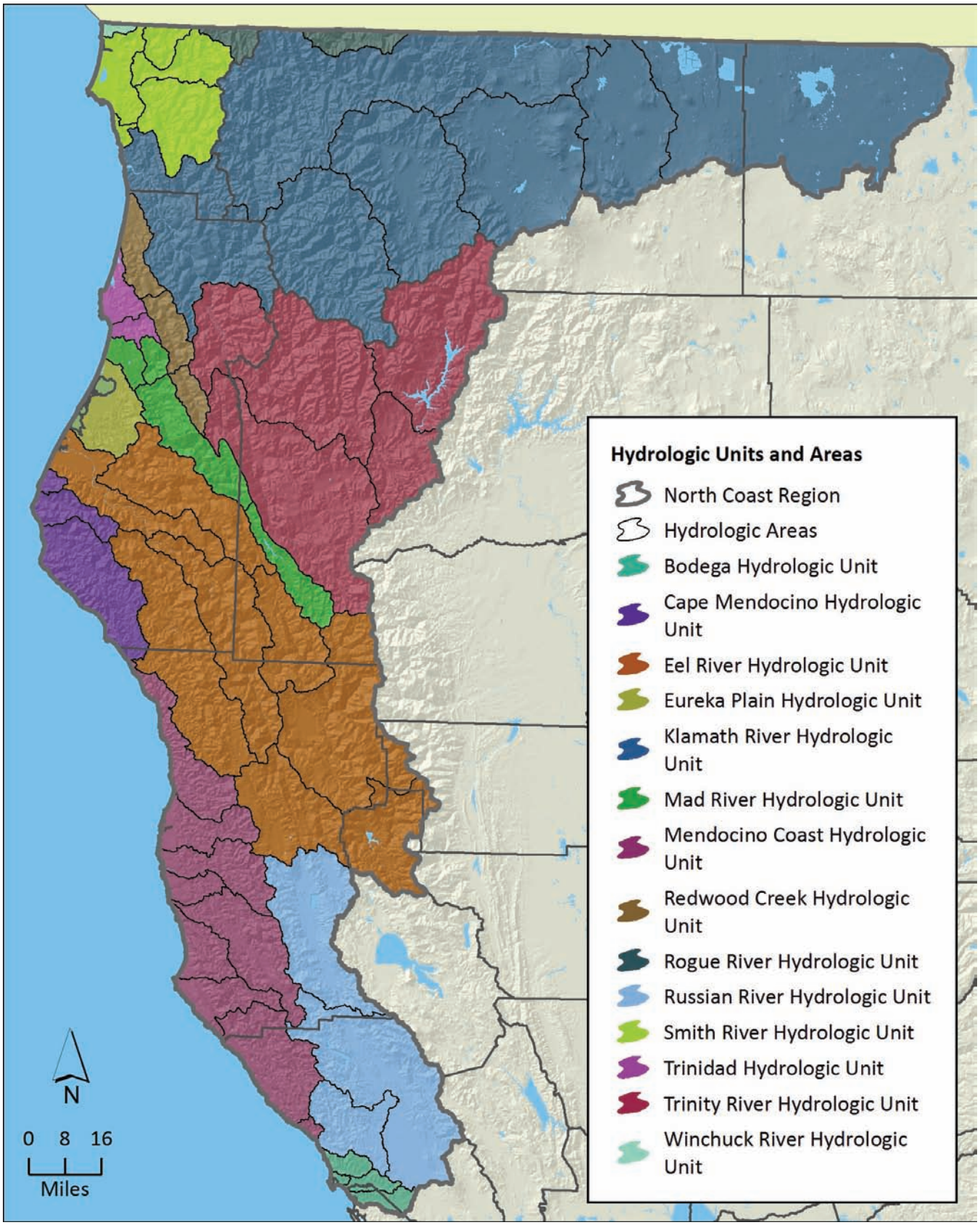
MAP 14 RUSSIAN/ BODEGA WATERSHED MANAGEMENT AREA



MAP 15 TRINITY RIVER WATERSHED MANAGEMENT AREA



MAP 16 HYDROLOGIC UNITS (BASINS) AND AREAS



Region Nine, which covers the entire Pacific Southwest; the US Department of Agriculture Forest Service Pacific Southwest Region 5 (equivalent to the state of California); and NOAA National Marine Fisheries Service (NMFS) Southwest Region, which includes California coasts and portions of the eastern Pacific and Southern Oceans. The U.S. Fish & Wildlife Service (USFWS) Region 8 includes all of California, plus Nevada and the Klamath Basin. For the U.S. Bureau of Reclamations (USBR), the North Coast is part of the Mid-Pacific Region, which covers the northern two-thirds of California, most of western Nevada and part of southern Oregon. The Federal Emergency Management Area (FEMA) places California in Region IX, with Arizona, Nevada, Hawaii, and the Pacific Islands. The only federal water boundary in the Region is the Klamath Project, which is administered by the US Bureau of Reclamation.

On a state level, the North Coast Region has the same boundaries as Region 1 "North Coast Region" (per SWRCB). According to the DWR, the North Coast Region is partially contained within its North Coast and Central Districts. Two of DWR's IRWM funding regions border Region 1. These are[30] the Sacramento River funding area (comprised of eight IRWM Regions, four of which share borders with the North Coast) and the San Francisco Bay Area funding area (with 2 IRWM Regions, of which the San Francisco Bay Area Region borders the southern North Coast Region). The North Coast Region is the only DWR IRWM Region that comprises a single, large IRWM funding area. According to California Department of Fish & Wildlife (CDFW, formerly CDFG) boundaries, the North Coast Region spans portions of three units: the North Coast, North Central, and Bay Delta Regions. According to the California Biodiversity Council bioregional boundaries (developed by the Inter-agency Natural Areas Coordinating Committee), the North Coast Region includes portions of the Klamath/ North Coast, Bay Area/Delta, and Modoc bioregions.

5.1.1.3 County Jurisdictions

The North Coast Region comprises four entire counties (Del Norte, Humboldt, Mendocino, and Trinity), major portions of two counties (Siskiyou and Sonoma), and smaller portions of four counties (Glenn, Lake, Marin, and Modoc) (Map 1 "The North Coast Region" and Appendix P Table 71 "County Size and Relative Proportion of the North Coast Region"). An elected Board of Supervisors governs each county. Socioeconomic and demographic data for these counties are provided in Section 5.14.1.1 "Population Size, Density, and Distribution." Summary information characterizing each North Coast County is presented as tables in the "County Profiles" (Appendix P.3).

30 http://www.water.ca.gov/irwm/grants/fundingarea.cfm

5.1.1.4 Tribal Jurisdictions

North Coast Tribes are separate and independent sovereign nations within the territorial boundaries of the United States. The sovereignty of Tribes has been acknowledged in the U.S. Constitution. This sovereignty is inherent and flows from the pre-constitutional and extra-constitutional governance of the Tribe. Early federal policy and U.S. Supreme Court case law recognizes that Tribes retain the inherent right to govern within political boundaries (Worcester v. Georgia (1832) and that power to interact with Tribes is vested in the federal government. (Cherokee Nation v. Georgia (1831). This established governmental structure recognizes the sovereign and political independence of Tribal nations and its members. This right is also recognized by the State of California. Pursuant to the Executive Order B-10-11, the State "recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority of their members and territory."

The North Coast is the ancestral territory of North Coast Tribes. The majority of the North Coast Tribes have an inherent responsibility for managing their ancestral territories whether they currently have the capacity to or not. Therefore, North Coast Tribes' jurisdiction goes beyond the gathering, fishing, and hunting rights, which each individual Tribal member retains. Each of the North Coast Tribes exerts their jurisdictional authority according to traditional policies, laws, mandates and capacity.[31]

5.1.1.5 Municipal Jurisdictions

Being predominantly a rural region, the North Coast is home to relatively few large population centers (i.e. cities, towns; municipalities). The boundaries of 25 incorporated municipalities and 9 "census-designated places" (CDPs as defined by DWR) fall within the North Coast Region boundary (Appendix H Table 15 "Municipalities & CDPs of the North Coast Region" and Map 4 "Cities, Towns & Other Population Centers"). Most of these entities are signatories to the NCRP MoMU (Appendix M "Governing Documents" lists MoMU signatories). Urban boundaries and urban growth areas have been designated near select municipal areas in the Region (i.e. in Sonoma County; Map 5 "Urban Boundaries & Urban Growth Areas").

5.1.1.6 General Plan & Coastal Plan Zone Boundaries

The General Plans of all North Coast counties and many of its cities have designated specific local land use/development categories, ranging from industrial

31 See Appendix P.2 for a more in-depth profile of North Coast Tribes and Tribal Territories, including a 2014 list Native American Tribes and North Coast Tribal Lands that comprise the IRWM North Coast Region or overlap with this planning border. These Tribal Factsheets compliment the County and WMA profiles.

and commercial uses (relatively restricted to urban centers), to agricultural and open space (comprising the vast majority of the Region; Map 6 ("General Plan & Coastal Zone Boundaries"). General Plans are fundamental to local resource planning in the Region and contents vary for different counties and municipalities. It is critical that the NCRP and project proponents have a clear understanding of the solid foundation already established by local General Plans to guide local land and water decisions. The County General Plans that have been developed for each of the North Coast counties includes, where appropriate, a corresponding "County Coastal Plan."

5.1.1.7 Special Districts

Voters statewide have established various "special districts" in order to fund and perform many functions, from libraries to cemeteries. A number of special districts are natural-resource focused (e.g. fire, air, water), and a subset of these are intended to support attributes and functions that are priorities of the NCRP and NCIRWMP including Community Service Districts, flood/drainage, irrigation, reclamation, resource conservation, water supply, and wastewater treatment providers (Map 7 "Special Districts"). Special districts are formed by local election and governed by elected (or sometimes, appointed) boards. With regard to "jurisdictional authority," special districts serve their constituency based on identified need, not based on political boundary. This allows special districts a level of flexibility not afforded to cities, counties, and other local jurisdictions. Coordination with these local water-related jurisdictions is essential to planning, implementing, and monitoring the projects that will realize the NCIRWMP goals and objectives. Note that Resource Conservation Districts, a type of special district, are specifically addressed below.

5.1.1.8 Resource Conservation Districts

The Region has eleven Resource Conservation Districts (RCDs), special districts authorized under Division 9 of the Public Resources Code. RCDs work in local communities to implement water and habitat conservation and restoration projects, often on private and agricultural lands, and as such are an integral part of the NCRP stakeholder outreach and project identification and implementation processes. North Coast Region RCDs are Lava Beds/ Butte Valley, Shasta Valley, and Siskiyou RCDs (Siskiyou County); Gold Ridge, Sonoma (formerly Sotoyome and Southern Sonoma County RCDs) (Sonoma County); and Central Modoc, Humboldt County, Marin County, Mendocino County, Trinity County, and West Lake (respective counties). These RCDs primarily occur entirely within the Region, but those in the Northeastern and Southern portions extend beyond the Region's boundaries. In most cases, RCD jurisdictional boundaries are shared with county boundaries, with the exception of Sonoma, Siskiyou, and Modoc counties (Map 8 "Resource Conservation Districts").

5.1.1.9 Resource Conservation and Development Councils

The Region has four Resource Conservation and Development Councils (RC&D). The purpose of an RC&D is to accelerate the conservation, development, and utilization of natural resources to improve the general level of economic activity, and to enhance the environment and standard of living in authorized RC&D area. An RC&D area covers several counties and is locally defined and directed by a council consisting of public and private sponsors. Currently, Del Norte and Humboldt counties do not have a RC&D council. The authorized RC&D areas within the Region are as follows:

- Ore-Cal = Siskiyou County into Oregon
- North Cal-Neva = Modoc County
- Northwest California = Trinity, Del Norte and Humboldt Counties
- North Coast = Sonoma, Mendocino, Marin and Lake Counties

5.1.1.10 Local Agency Formation Commissions

Local Agency Formation Commissions (LAFCO) are independent agencies established by State law. A LAFCO in each North Coast county is responsible for reviewing, approving or disapproving changes in organization to cities and special districts including annexations, detachments, new formations and incorporations[32]. Much of the current authority for LAFCO came from the Cortese-Knox Hertzberg Local Government Reorganization Act (CKH Act) of 2000. The objectives of LAFCO are to encourage the orderly formation of local governmental agencies, to preserve agricultural land resources and to discourage urban sprawl.

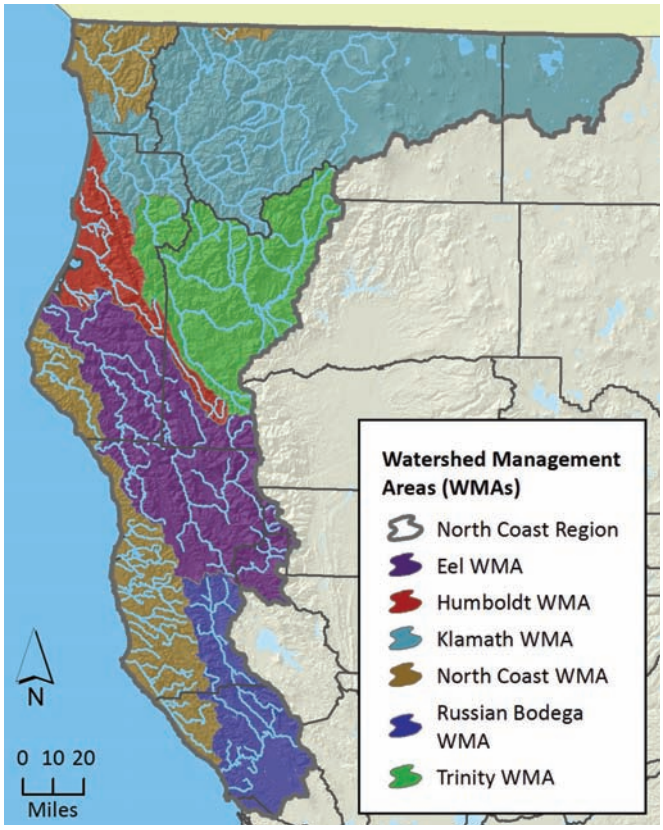
5.1.2 PHYSICAL BOUNDARIES

The NCIRWMP process utilizes a hydrologic, basin-level approach to regional water management planning and project implementation. This approach integrates planning and implementation for physical (as opposed to jurisdictional) areas bounded by drainage basin, groundwater, and/or watershed boundaries. At the broad scale of regional basins, the Plan demonstrates the effectiveness of a decision-making body composed of elected officials from the Region supported by technical staff and consultants

32 http://www.calafco.org/index.php/about-us/member-lafcos

and guided by an IRWM Plan. At the local watershed scale, NCIRWMP implementation projects demonstrate the Region-wide involvement and cooperation of state agencies and boards, tribes, counties, cities, special districts, watershed associations, landowner groups, service providers, and the general public.

The physical geographic boundaries of North Coast Region WMAs, hydrologic units/ areas/ sub-areas, and groundwater basins are briefly addressed in subsections below.



MAP 9 WATERSHED MANAGEMENT AREAS (WMAS)

5.1.2.1 Watershed Management Areas

The Water Quality Control Plan ("Basin Plan") for the North Coast Region delineates two large natural drainage basins covering the entire Region: the Klamath River Basin and the North Coastal Basin (NCRWQCB 2011). Attributes of the two basins are summarized in Section 5.1.2.3. For water management planning purposes, and to promote the statewide goal of protecting water through the Watershed Management Initiative (WMI), the NCRWQCB has further divided the Klamath and North Coastal Basins into six designated "watershed management areas" (WMAs; Map 9 "Watershed Management Areas"): the Eel River (Map 10), Humboldt Bay (Map 11), Klamath River (Map 12), North Coast Rivers (Map 13), Russian/Bodega (Map 14), and Trinity River (Map 15). At the finer scale, the Region's WMA comprise 14 individual Calwater Hydrologic Units and 42 composite Hydrologic Areas (see following subsection).

The NCIRWMP utilizes WMAs as the broad-scale planning unit for among other purposes integrating multiple implementation projects within the Region's basins. Using watershed-based (as opposed to strictly jurisdictional/administrative) boundaries as the Plan's geographic planning unit also allows the NCRP to integrate the NCIRWMP with other regional, state, Tribal, and federal planning, implementation, and funding efforts that utilize a watershed-based approach (e.g. including those already in place with CDFG, CCC, SWRCB, Regional Boards, and DWR).

Appendix P.1 ("Profile of WMAs") presents a narrative description of each WMA, including outstanding natural features, major river systems, and current ecological conditions. The profiles summarize and emphasize local natural infrastructure (e.g. forested watersheds and wetlands, which naturally treat water) and natural resources, complementing the "county profiles," which emphasize local built infrastructure (e.g. pumps and pipes) and human resources, as previously described in Section 5.1.1.3.

5.1.2.2 CalWater Hydrologic Units (Basins)

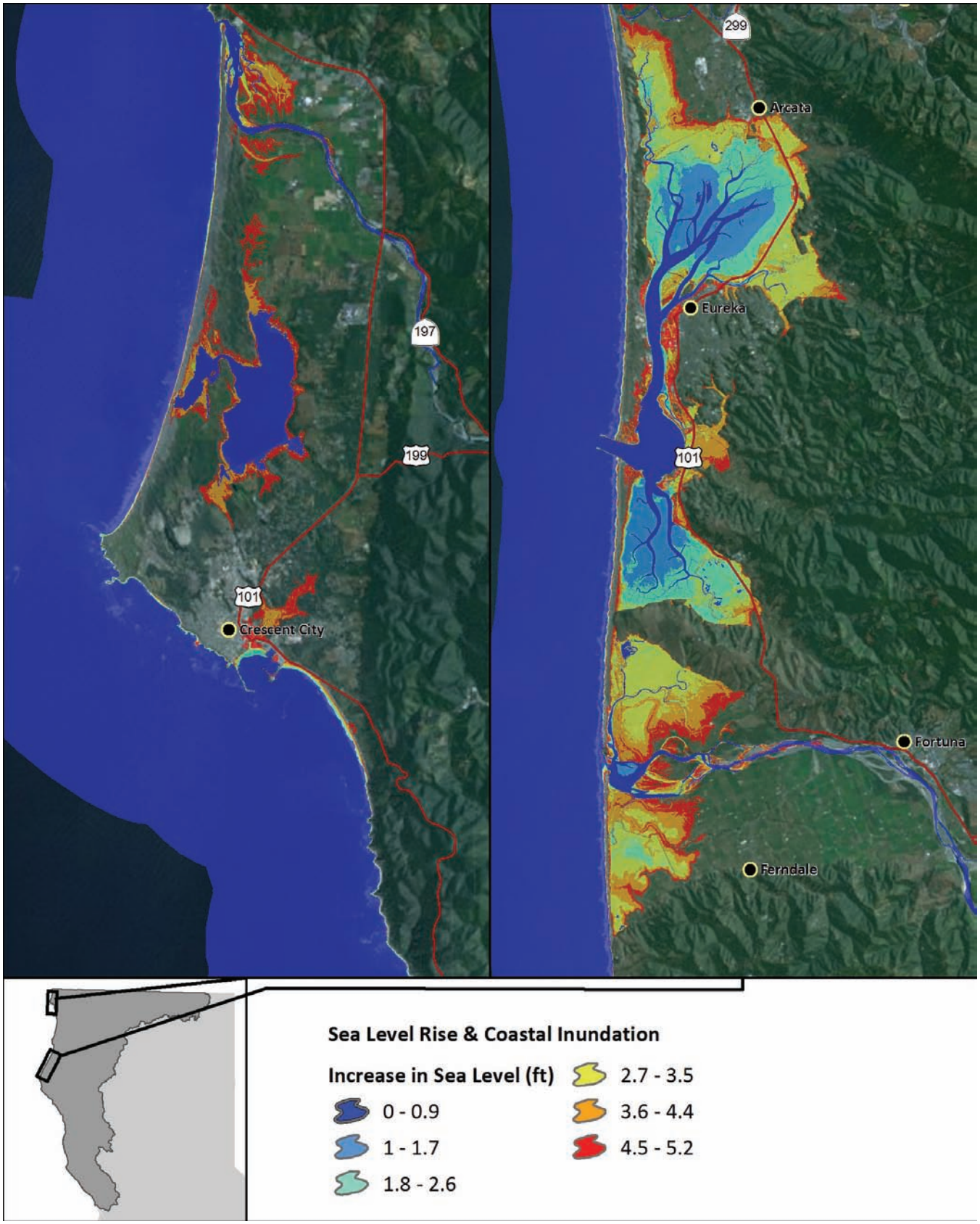
Each of the six North Coast WMAs consists of multiple CalWater-delineated[33] Hydrologic Units (HUs), with each HU indicating an entire major river basin (14 total). Large tributaries of major rivers in each HU are designated as Hydrologic Areas (42 HAs) (Map 16 "Hydrologic Units (Basins) and Areas" and Appendix H Table 16 ("Hydrologic Units of the North Coast Region"). HAs may be further divided for local planning purposes into Hydrologic Sub-Areas (80 HSAs). Groupings of Hydrologic Units comprise major natural "drainage basins," of which there are two in the North Coast: the Klamath and the North Coastal basins (NCRWQCB 2011).

5.1.2.3 Drainage Basins

The North Coast Region is divided into two natural drainage basins: Klamath River and North Coastal. Distinguishing features of each basin are described below (NCRWQCB 2011). See Appendix H Table 34 ("North Coast Drainage Basin Water Resources and Water Use") for a detailed summary of the two basins' surface and groundwater supplies, water uses, and water-related infrastructure development.

33 CalWater is a spatial dataset of watersheds in California, developed by the Interagency Watershed Mapping Committee (IWMC), often referred to as the "CalWater Committee." CalWater datasets at http://cain.ice.ucdavis.edu/calwater/

MAP 23 SEA LEVEL RISE & COASTAL INUNDATION



Klamath River Basin

- **Total Area**: 10,830 square miles (28,050 square kilometers)
- **Counties**: All of Del Norte, major portions of Humboldt, Modoc, Siskiyou, and Trinity
- **Location**: Bounded by Oregon state border to north; Pacific Ocean to west; Redwood Creek and Mad River HUs to south; and Sacramento Valley to east
- **Elevation/ Geology**: Western portion within Klamath Mountains and Coast Range provinces: steep, rugged peaks ranging 6,000 to 8,000 feet (1,829-2,438 meters) with relatively little valley area. Eastern portion predominantly high broad valleys 4,000-6,000 feet, with peak surrounding elevation of 14,162 feet (Mt. Shasta); mountain soils are shallow and highly erodible
- **Major Rivers**: Northern CA tributaries of Klamath, Smith, Applegate, Illinois, and Winchuck Rivers; closed drainage areas for Lost River and Butte Valley
- **Climate**: Precipitation ranges 15-70 inches (38.1–177.8 cm) per year in eastern portions to 60-125 inches (152.4–317.5 cm) per year in western portions; heavy fog is common on 45-mile long the coastal plain

North Coastal Basin

- **Total Area**: 8,560 square miles (13,776 square kilometers)
- **Counties**: All of Mendocino, major portions of Humboldt and Sonoma, 1/5th of Trinity, and small portions of Glenn, Lake, and Marin
- **Location**: Bounded by Klamath and Trinity Rivers Basins to north; Pacific Ocean to west; Marin-Sonoma area to south; and Sacramento Valley, Clear Lake, Putah and Cache Creeks, and Napa River Basin to east
- **Elevation/ Geology**: Primarily rugged, forested, coastal mountains dissected by major rivers (below); soils generally unstable and erodible
- **Major Rivers**: Eel, Gualala, Mad, Navarro, Noyo, and Russian Rivers
- **Climate**: Precipitation is generally high throughout the basin

5.1.2.4 Groundwater Basins

The North Coast Region contains 58[34] delineated groundwater basins (plus nine sub-basins) totaling approximately 1,015,139 acres, distributed across the Region. Groundwater basins in each of the Region's WMAs and counties as indicated in Appendix P Table 65 and Table 73, respectively, and Map 17 ("Groundwater Basins & Sub-basins"). Groundwater basins are designated by DWR on the basis of geological and hydrological conditions, these usually being the occurrence of alluvial or unconsolidated deposits. See Sections 5.6.3 and 5.7.3 for more on groundwater quality and quantity, respectively.

5.2 GEOLOGY, CLIMATE, AND HYDROLOGY

MAP 17 GROUNDWATER BASINS & SUB-BASINS

5.2.1 GEOLOGY

The North Coast Region is characterized by sedimentary geology with inclusions of metamorphic, granitic, and volcanic rock. The presence of northwest-southeast trending faults and geologic structures largely defines the river systems located in the Coast Ranges of the

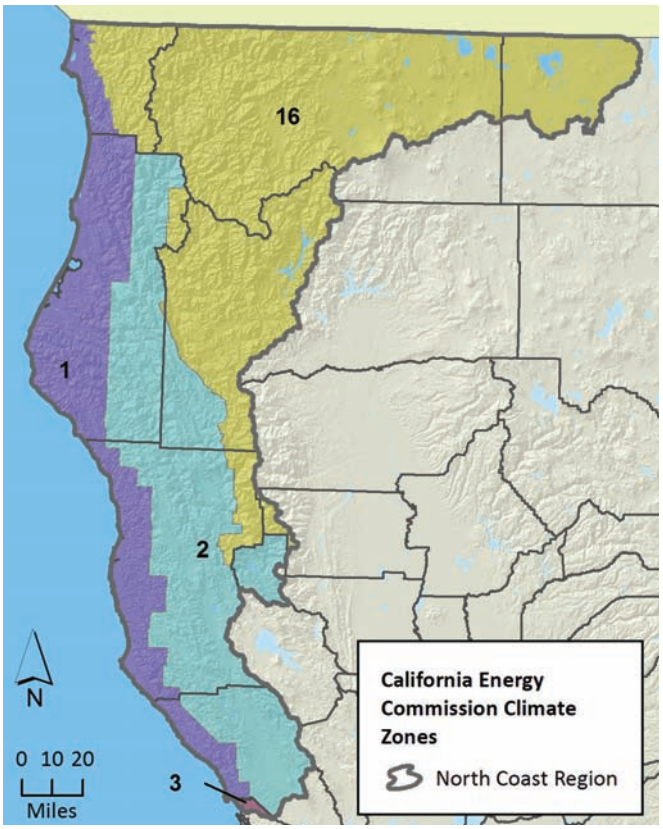
34 http://www.water.ca.gov/groundwater/bulletin118/north_coast.cfm

southern coastal area of the Region. Larger metamorphic and intrusive blocks form the Siskiyou Mountains in the northern coastal and interior region. The eastern extent of the Klamath basin lies within the volcanic Cascade Mountain range. The soils underlying the Region have direct implications for maintenance of water quality and beneficial uses of waters. The California Division of Mines & Geology and the California Department of Forestry & Fire Protection (CALFIRE) provide detailed mapping of the Region's geology and the geomorphic features affecting landslide potential, soil erosion, and stream bank erosion in sensitive watersheds (mainly in Mendocino, Humboldt, and Del Norte counties)[35].

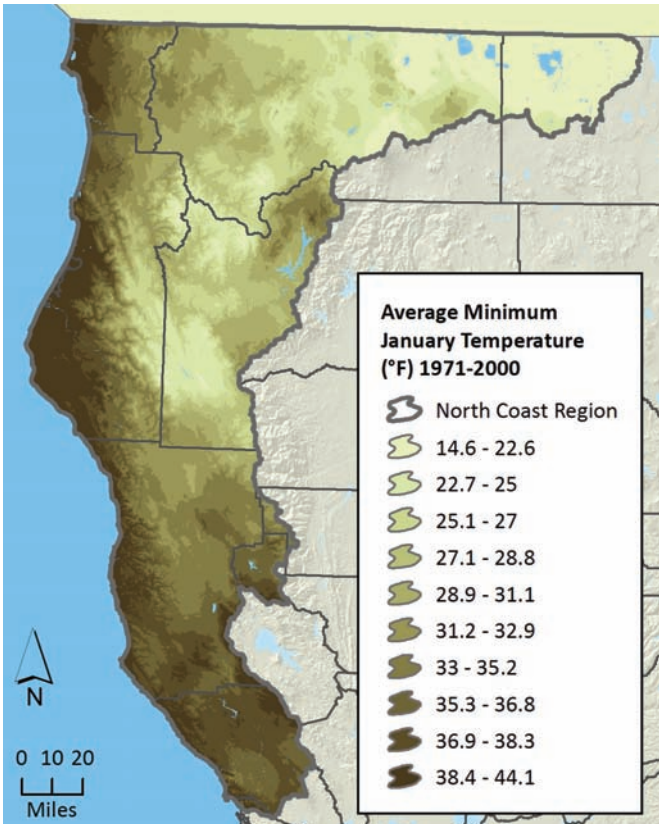
5.2.2 CLIMATE

Distinct climate zones characterize the North Coast Region[36]. Map 18 ("CEC Climate Zones") illustrates the distribution of the Region's four "climate zones," as defined by the California Energy Commission: Zone 1 (Arcata), Zone 2 (Santa Rosa), Zone 11 (Red Bluff), and Zone 16 (Mt. Shasta). Each zone exhibits similar climate attributes, relative to surrounding zones[37]. In general, the coastal climate is "oceanic" with regular precipitation and frequent fog; temperature does not vary greatly by season. Inland parts of the Region are less affected by the moderating coastal influence and experience a more "Mediterranean" temperature regime, with seasonal temperatures ranging from over 100 degrees Fahrenheit during the summer to below freezing in winter. Farther inland, a "continental" climate prevails, with even more pronounced temperature extremes and the potential for semi-arid conditions. For example, in Eureka (Humboldt County), the seasonal variation in temperature has not exceeded 63 degrees F for the period of record. Inland, however, seasonal temperature ranges in excess of 100 degrees F have been recorded (NCRWQCB 2011). The historic (1971-2000) average annual winter and summer temperatures of the Region are illustrated in Map 19 and Map 20, respectively.

The North Coast receives more precipitation than any other part of California. The Mattole watershed in Mendocino County has the highest recorded rainfall and has received as much as 125 inches of rain per season (NCIRWMP 2011). By county, average annual rainfall varies drastically (Map 21 "Annual Average Precipitation 1971-2000"): in water year 2012 (Oct 2011–Sept 2012), precipitation ranged from just 4.81 inches (38% of normal) in Mt. Hebron (Siskiyou County) to 76.42 inches



MAP 18 CALIFORNIA ENERGY COMMISSION CLIMATE ZONES

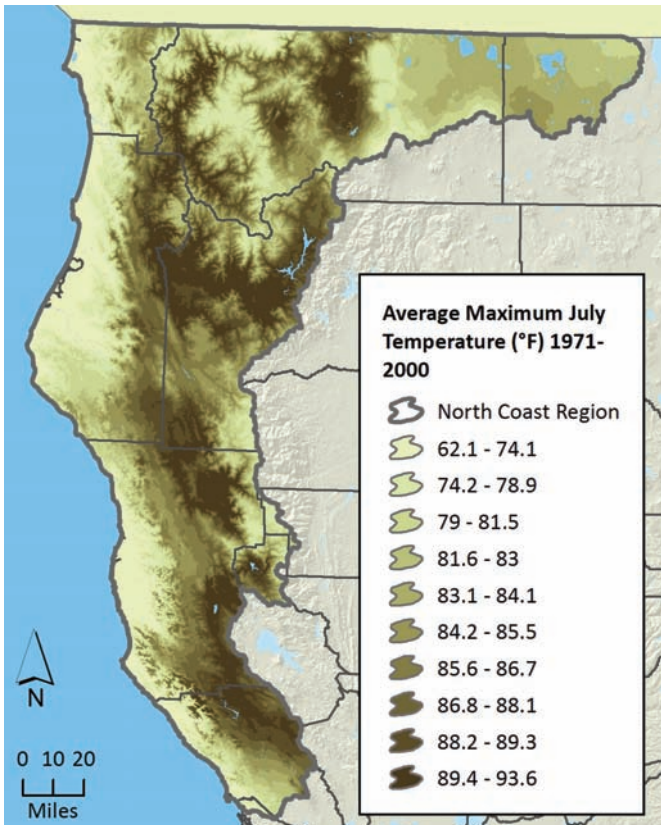


MAP 19 AVERAGE MINIMUM JANUARY TEMPERATURE (1971-2000)

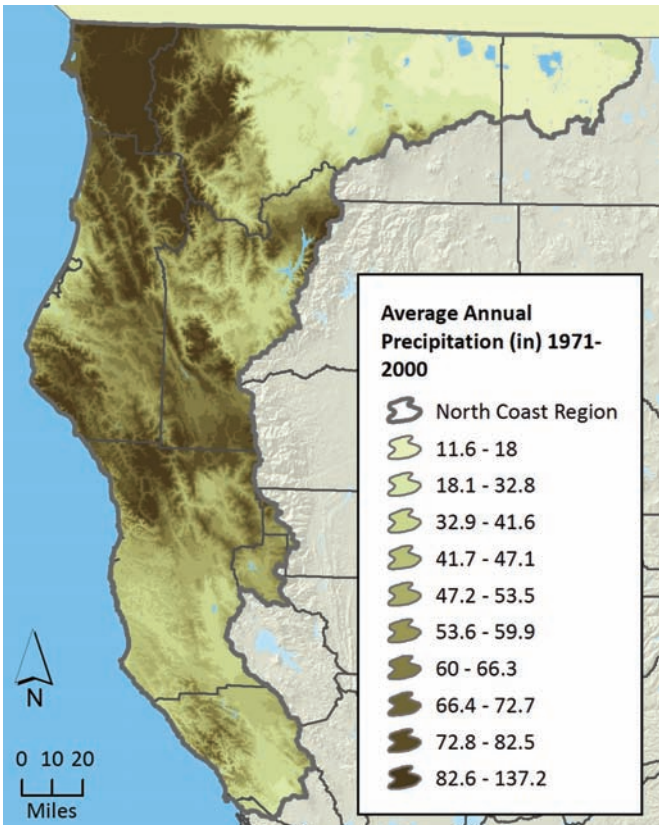
35 http://libguides.humboldt.edu/content.php?pid=445666&sid=3651603

36 California climate zones as defined and mapped by the State are not the same as what we commonly call an area like "Mediterranean" or "coastal" climate. The climate zones are based on energy use, temperature, weather and other factors. They are basically a geographic area that has similar climatic characteristics.

37 http://www.energy.ca.gov/maps/renewable/building_climate_zones.html



MAP 20 AVERAGE MAXIMUM JULY TEMPERATURE (1971-2000)



MAP 21 ANNUAL AVERAGE PRECIPITATION (1971-2000)

(114% of normal) in Crescent City (Del Norte County)[38]. Some high-elevation areas (e.g. north-central) of the Region receive and store significant precipitation as snowfall/snowpack. Precipitation, temperature, and other climate variables at any particular location vary from year to year, with relatively wet years and dry years (characterized by flooding and drought, respectively) occurring at somewhat unpredictable frequencies.

5.2.3 HYDROLOGY

Overview

Mean annual runoff in the North Coast is about 29 million acre-feet (maf), which constitutes about 41 percent of the state's total natural runoff (DWR 2013), greater than any other single hydrologic region in California. The estimated 2000-2010 water balance for the Region's four DWR-designated Planning Areas is provided in the California Water Plan (DWR 2013). The volume of water exported to other IRWM regions is generally greater than all the water the North Coast Region consumes for urban, agriculture and wildlife refuges combined.

There are fundamental physical and mechanistic connections between groundwater basins and surface water bodies, although they are frequently designated "ground" and "surface" water for management and planning purposes (including for organizing Plan elements herein). Although the two forms appear to be different supplies, they in reality, they form a single water supply joined by the hydrologic cycle.[39] This understanding has direct implications for the Region's domestic and municipal water supplies, which depend heavily on a single ground-surface water supply. For example, lowering of groundwater levels can impact the surface water–groundwater interaction by inducing additional infiltration and recharge from surface water systems, thereby reducing the groundwater discharge to surface water base flow and wetlands areas. Extensive lowering of groundwater levels can also result in land subsidence (lowering of the ground surface) due to the dewatering, compaction, and loss of storage within finer grained aquifer systems (DWR and USACE 2013).

Beneficial management practices like "conjunctive water use" (storing excess surface waters in groundwater basins for use during dry periods) and ecosystem processes like water recharge also rely on this basic ground-surface relationship. Conjunctive use of surface water and groundwater has been utilized for decades by

38 NOAA monthly precipitation totals for stations throughout the Region http://www.cnrfc.noaa.gov/monthly_precip_2012.php

39 DWR Groundwater Basics http://www.water.ca.gov/groundwater/groundwater_basics/gw_sw_interaction.cfm

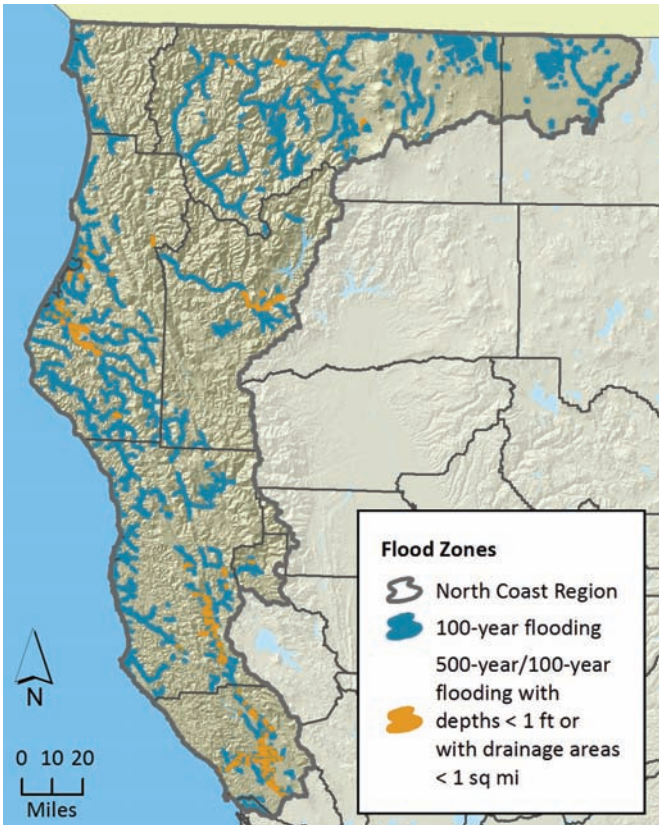
numerous coastal and inland basins throughout the North Coast Hydrologic Region, including the Eureka Plain, Eel River Valley, Santa Rosa Valley, Smith River Plain, Wilson Grove, Big Valley, Tule Lake Valley, Scott Valley, and Shasta Valley (DWR 2013). Many agencies have erected systems of barriers to allow more efficient percolation of ephemeral runoff from surrounding mountains.

Seasonal flooding is characteristic of much of the Region, including along river floodplains and low-lying coastal areas. The intensity, distribution, and duration of precipitation are strongly correlated with flood potential. Proximate factors may either facilitate or confound effective management of flood levels, depending on how water and land are managed. These factors may include[40] the size of the watershed drained; channel capacity; infiltration and runoff rates; urbanization; dams and reservoirs; snowmelt, stormwater runoff retention; and natural and built infrastructure capabilities. Damaging floods occur relatively frequently in the Region, with particularly destructive floods documented in December 1955, December 1964, February 1986, spring 1995, and January 1997 and 2006 (NCRWQCB 2011, DWR 2013).

The extent and nature of impacts to stream morphology from flooding depends on the channel geometry, longitudinal slope, channel material type(s) and size(s), and the type and density of channel vegetation (Center for Watershed Protection 2003, Roesner and Bledsoe 2003). For example, increased flows within a deep, narrow channel may result in significantly higher shear stresses at the bed; this same increase in a wide, shallow channel may become predominantly overbank flow. Where all other factors are equal, fewer impacts would be expected where flows have access to broad overbank areas (i.e., floodplains) during relatively common floods (Segura and Booth 2010), channel materials are more resistant, and stabilizing riparian vegetation is present. Conversely, where erosion and bank instability result in the loss of vegetation reinforcement, a positive feedback response may cause erosion to be accelerated.

The approximate areas of the Region that experience 100- and 500-year floods, as defined by the Federal Emergency Management Agency, are illustrated in Map 22 ("Flood Zones"). In the North Coast, more than 30,000 people (5% Region population) and $3 billion in assets lie within the 100-year flood zone. Some 40,000 people and over $4 billion in assets are exposed to the 500-year flood event (DWR 2013). Flood zones for select coastal areas are illustrated in Map 23 ("Sea Level Rise & Coastal Inundation"). Flood management integration and improvement is a priority goal of the NCRP and flood-related themes are revisited throughout this document (e.g. 5.6.4 "Floodwater/ Stormwater Quality," 5.7.6 "Floodwater/ Stormwater Quantity," 5.12 "Flood/ Stormwater Management Infrastructure," and 6.2.5 "Flood Protection & Flood Management").

40 http://www.sonoma-county.org/prmd/docs/hmp_2011/chapters/ch3.pdf



MAP 22 FLOOD ZONES

Hydromodification

Changes in flow and sediment loads to streams and other watercourses associated with storm and flood events can result in significant and long-standing impacts to beneficial uses of North Coast waters. These changes are collectively referred to as "hydromodification"[41]. Most jurisdictions in California are now required to address the effects of hydromodification through either a municipal stormwater permit or the statewide construction general permit. The State and Regional Water Boards have recognized the need to manage and control the effects of hydromodification in order to protect beneficial uses in streams and other receiving water bodies. This recognition has led to the inclusion of requirements for development of "hydromodification management plans" (HMPs) in many Phase 1 and some Phase 2 Municipal Stormwater (MS4) permits (see Section 6.2.5 "Flooding & Flood Management").

41 See 2012 report for the SWRCB: Hydromodification Assessment and Management in California (Stein et al. 2012) available at http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/hydromodification/docs/667_ca_hydromodmgmtapr2012.pdf

5.2.3.1 Surface Waters

The North Coast Region contains numerous rivers, streams, and creeks, some of which flow year-round and others that are more or less seasonally intermittent. A total of approximately 34,586 kilometers (21,491 miles) of rivers and streams drain watersheds of the Region (Map 24 "Surface Waters"). The Region's major rivers and their tributary streams are listed in Appendix H Table 17 ("Rivers and Streams of the North Coast Region"). The total length of streams varies across the Region's WMAs and counties. The rank, from highest to lowest, of total stream length for WMAs is: Klamath (9,056 km.), Eel (8,351 km.), North Coast Rivers (6,082 km.), Trinity (5,567 km.), Russian/Bodega (3,270 km.), and Humboldt (2,260 km.). The rank for counties is: Mendocino (7,798 km.), Humboldt (7,356 km.), Siskiyou (6,976 km.), Sonoma (2,481 km.), Del Norte (1,940 km.), Lake (937 km.), Modoc (801 km.), Glenn (174 km.), and Marin (71 km.).

MAP 24 SURFACE WATERS

Other than the extensive river and stream networks referenced above, major natural freshwater bodies are relatively rare in the North Coast Region. Major natural freshwater bodies include Meiss Lake in Siskiyou County, the Laguna de Santa Rosa in Sonoma County, and historic Tule Lake in Modoc County. Small natural lakes are few relative to other regions, and are particularly common (though again, not numerous) in Siskiyou and Trinity counties. Human-built reservoirs and lakes (e.g. of all sizes and for flood control, recreation, agriculture, or other purposes) are numerous.

Extensive estuaries (brackish and associated with mouths of rivers) and varied littoral (shoreline) environments occur throughout the North Coast. Estuarine environments are areas of high primary productivity and thus critical to the support of marine and coastal biodiversity. Coastal and estuarine habitats are critical for many species of waterfowl and shore birds, which feed and nest there. Intertidal areas throughout the Region are used extensively as nursery habitat for many types of marine organisms, including shellfish and fishes. Salmonids require estuaries as a staging area to physiologically adapt to environmental changes in salinity. Marine invertebrates and fish utilize the rich resources in tideland areas along the North Coast, and serve as forage for seabirds and marine mammals. Offshore coastal rocks are used for resting and reproduction by marine mammals and as nesting areas by many species of seabirds. Examples are Lake Earl in Del Norte County, Humboldt Bay and lagoons in Humboldt County, and Bodega Bay in Sonoma County. Also included in this category are the extensive estuarine environments of rivers at their confluence with the Pacific Ocean (e.g. the Smith, Klamath, Tenmile, Noyo, Albion, Big, Navarro, Gualala, and Russian Rivers, plus numerous smaller waterways). These important areas include a number of protected coastal and near-shore marine areas (Section 5.3.2.1 "Marine Managed Areas").

Various pollutants (especially sediment; NCRWQCB 2011) have compromised the quality of many North Coast surface waters (lakes, estuaries, bays and others, in addition to rivers). These are designated as "impaired waterbodies" (or "waters" or "segments") under Section 303(d) of the California Clean Water Act (Appendix H Table 25 "Section 303(d) Impaired Waters of the North Coast Region"). The state publishes surface water monitoring results for select water bodies throughout the Region; data may be uploaded or downloaded from the Surface Water Ambient Monitoring Program (SWAMP[42]).

5.2.3.2 Groundwater

Groundwater resources in the North Coast Hydrologic Region are supplied by both alluvial and fractured-rock aquifers. Alluvial aquifers are composed of sand and gravel or finer grained sediments, with groundwater stored within the pore spaces between sediment particles. Fractured-rock aquifers, in contrast, consist of impermeable rocks with groundwater

42 The State Water Resources Control Board's SWAMP program website at http://www.waterboards.ca.gov/water_issues/programs/swamp/reports.shtml

stored in cracks, fractures, or other void spaces. The distribution and extent of alluvial and fractured-rock aquifers and water wells vary significantly within the Region (Map 17 "Groundwater Basins & Sub-basins"). Alluvial groundwater basins and subbasins underlie approximately 1,600 square miles (8 percent of the Region). Fractured-rock aquifers in the foothill and mountain areas adjacent to the many alluvial groundwater basins also provide groundwater supply in the region. Groundwater from fractured-rock aquifers tends to supply individual domestic and stock wells, or small community water systems. Fractured-rock aquifers, and the wells that they supply, tend to have less capacity and reliability than wells in alluvial aquifers. However, localized fractured-rocks within the Klamath, Butte, and Shasta Valley groundwater basins tend to form some of the most highly productive fractured-rock aquifers in California.

A minimum of 63 groundwater basins and subbasins underlie the North Coast Region (DWR 2013). Groundwater basins are unevenly distributed throughout the Region's WMAs and counties (Appendix J Table 65 and Table 73, respectively). The two largest groundwater basins in the Region are described in some detail below (see the California Water Plan (2013[43]) for details on other basins).

- The Klamath River Valley Groundwater Basin is the largest groundwater basin in the North Coast Hydrologic Region, encompassing approximately 159,000 acres. It is the most heavily used of the Region's basins, and is shared with users across the Oregon border. It is composed of two subbasins — the Tule Lake and Lower Klamath, by Sheepy Ridge. The primary aquifers in the Klamath River Valley Groundwater Basin consist of sand, silt, and clay sediments. Although these deposits are widespread and hundreds of feet thick, the permeability of the sediments and therefore, the associated well yields, are generally low.
- The Santa Rosa Valley Groundwater Basin in Sonoma County is the second largest groundwater basin in the Region, encompassing approximately 101,000 acres. It is composed of three subbasins: the Santa Rosa Plain, Healdsburg Area, and Rincon Valley. The Santa Rosa Plain Subbasin covers an area of approximately 80,000 acres and is home to approximately half of the population of Sonoma County. The subbasin's best water-producing units are stream channels filled with alluvial sands and gravels, basin-fill alluvium, and alluvial fan deposits that connect the Santa Rosa Plain with its bordering hills, and massive sandstone units of the Wilson Grove Formation. The Sonoma Volcanics, a thick sequence of lava flows present along the eastern boundary of the basin, produce variable amounts of water. The Glen Ellen Formation consists of continental deposits of partially cemented gravel, sand, silt, and clay, and yields modest amounts of water to smaller groundwater wells. Groundwater within the Santa Rosa Plain Subbasin is generally present under confined conditions, except locally in the vicinity of clay or silt horizons where conditions may be semi-confined or confined (Sonoma County Water Agency, Groundwater Level Monitoring Plan for CASGEM, December 2011).

Groundwater is functionally linked to surface waters, although they may or may not be physically connected to them (i.e. water in fractured-rock aquifers is physically disconnected from the surface, relative to the water alluvial basins). Groundwater basins do not always follow the same boundaries as surface waters and groundwater sources likely exist even where groundwater basins have not been identified (NCRWQCB 2011). The volume of groundwater cached in North Coast basins is not fully quantified. In some areas (e.g. Klamath Basin), groundwater quality may not be adequate to support use as drinking water, due to naturally occurring elements (e.g. arsenic). Where feasible, North Coast groundwater is pumped for consumptive uses related to agricultural, domestic, and municipal supply. In some areas, surplus pumped groundwater is returned to the hydrologic cycle to regulate the water table (e.g in the Butte Valley, via Lake Meiss, to the Klamath River; NCRWQCB 2011).

DWR ranks the Region's groundwater basins and sub-basins (Map 17 "Groundwater Basins & Sub-Basins") as "high," "medium," or "low" priority for monitoring/response. DWR currently requires compliance with CASGEM only in high and medium priority basins, and restricts many of its funding programs to these same basins (Revelle 2014). There are no high priority basins in the North Coast Region, but there are eight preliminarily designated (DWR 2013) medium priority basins (the 55 remaining basins are designated as low or very low priority). The eight medium priority basins account for about 60 percent of the population and about 80 percent of groundwater use for the Region. They are:

- Butte Valley
- Eel River Valley
- Klamath River Valley (Tule Lake Subbasin)
- Santa Rosa Valley (Santa Rosa Plain Subbasin)
- Scott River Valley
- Shasta Valley (Shasta Valley Subbasin)
- Smith River Plain
- Ukiah Valley

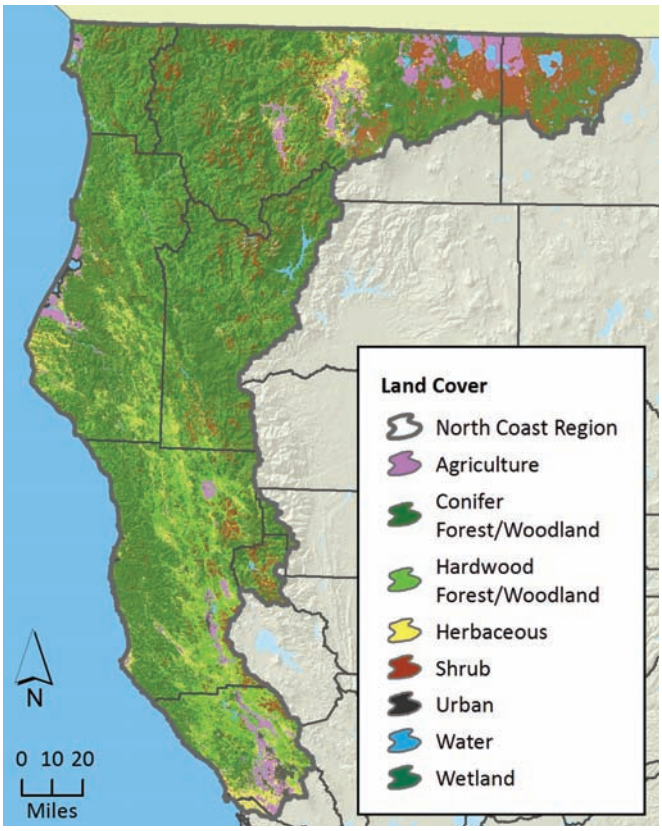
43

California does not have a statewide management program or statutory permitting system for groundwater. However, one of the primary vehicles for implementing local groundwater management in California is a Groundwater Management Plan (GWMP). Some agencies utilize their local police powers to manage groundwater through adoption of groundwater ordinances. Groundwater management also occurs through other avenues such as basin adjudication, Urban Water Management Plans, and Agriculture Water Management Plans. As of 2013, four GMPs have been developed in the Region, comprising a total of just 90 square miles. Two of the Region's GWMPs have been developed in NCRP-participating counties: Humboldt Bay Municipal Water District (2006; Humboldt County) and Mendocino City Community Service District (2007; Mendocino County). Glenn and Lake counties each have one GWMP, but do not currently participate in the NCIRWMP.

Substantial data on groundwater basins exist: however, there are still data gaps related to the extent and function of groundwater basins; some basins are not documented at all; and there is an imperfect understanding of the role that the "recharge landscape" (i.e. the surrounding watershed) plays in the functioning of groundwater basins. DWR publishes "California Groundwater Bulletin 118" (updated 2003[44], the first update since 1980), which presents comprehensive results of state groundwater evaluations including of groundwater quantity, quality, and management strategies for each basin in the North Coast Region. The State Water Resources Control Board[45] monitors groundwater quality at select wells throughout the Region.

5.3 KEY WATERSHED ATTRIBUTES

Key watershed attributes are the "natural" components of North Coast WMAs. Information on key watershed attributes is intended to supplement the jurisdictional (Sections 5.1.1) and physical (Section 5.1.2) boundary information introduced previously and infrastructure, demographic, and socioeconomic information in Section 5.4. By definition, the Region's key watershed attributes fundamentally support the functional natural infrastructure (e.g. flood attenuation, salmonid habitat, groundwater recharge, etc.) and directly or indirectly influence land and water use; water quantity and quality; built infrastructure systems; and demographic and socioeconomic conditions. Myriad attributes contribute to the character and viability of the Region's watersheds. Those described below are a subset identified by stakeholders or by the state as of particular relevance to NCRP planning.



MAP 25 LAND COVER

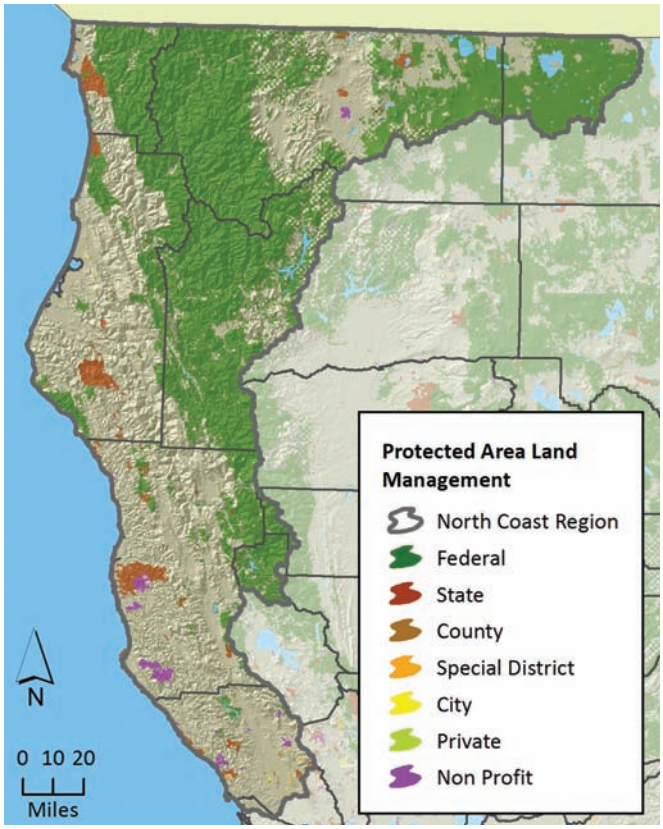
5.3.1 LAND COVER

The North Coast Region comprises a mosaic of varied land cover/vegetation types, ranging from vast forests and grasslands to smaller areas of urban and agricultural lands (Map 25 "Land Cover"). Land cover for the Region, WMAs, and counties are provided in Appendix H Table 18 ("Land Cover Types of the North Coast Region"), Appendix P Table 66 ("Land Cover Types of North Coast WMAs"), and Appendix P Table 74[46] ("Land Use Types of North Coast Counties"). An understanding of the variation in local land cover is vital to understanding the context of NCIRWMP project planning and implementation in different parts of the Region.

44 http://www.water.ca.gov/groundwater/bulletin118/history.cfm

45 See the California State Groundwater Ambient Monitoring & Assessment program (GAMA) description and data at http://www.waterboards.ca.gov/gama/

46 CDFW CWHR database http://www.dfg.ca.gov/biogeodata/



MAP 26 PROTECTED AREA LAND MANAGEMENT

5.3.2 PROTECTED AREAS

Approximately 49% of the North Coast Region land is permanently protected by public agencies (e.g. federal, state, local), private entities, or non-profit organizations (CPAD; see Map 26 "Protected Areas Land Management"). Appendix H Table 19 ("Protected Areas of the North Coast Region") lists nearly 300 protected areas including parks, preserves, reserves, recreation areas, national/state forests, private lands, and other sites in the North Coast Region. Conservation easements offer one means through which public agencies and non-governmental organizations (NGO) can sell parcels and keep them protected while retaining private or NGO management. Conservation easements comprise approximately 100,000 acres in Sonoma County alone. Functionally, "protection status" for these lands varies, depending on a number of factors, including how lands are managed: for example, "protected lands" may be managed to mimic natural disturbance processes, or for multiple uses including resource extraction and recreational uses (Map 27 "Management Status of Protected Lands"). Subsections below address two main protected area designations that are of particular relevance to the NCRP and NCIRWMP: Marine Managed Areas (MMAs), including Marine Protected Areas (MPAs) and State Water Quality Protection Areas (SWQPAs)/Areas of Special Biological Significance (ASBS) and 303(d)-Listed Impaired Waters[47]. Also protected in the North Coast are Wild and Scenic Rivers and National Wilderness Preservation System Areas (Map 28 "Significant Biological/Wilderness Areas").

5.3.2.1 Marine Managed Areas

Legislative protection has been assigned to many of the North Coast's estuarine, marine, and terrestrial coastal resources that are considered to be environmentally sensitive and in need of protection or improvement by federal, state, and/or local government actions. Designation of the most significant of these as Marine Managed Areas[48] serves to protect water quality and constituent ecosystems from further degradation. In 2013, there were 21 Critical Coastal Areas (CCAs) in the North Coast Region. Marine Managed Areas include MPAs, SWQPAs, and ASBSs. Appendix H Table 20 ("Marine Managed Areas of the North Coast Region") lists the Region's CCAs and other MMAs.

Marine Protected Areas

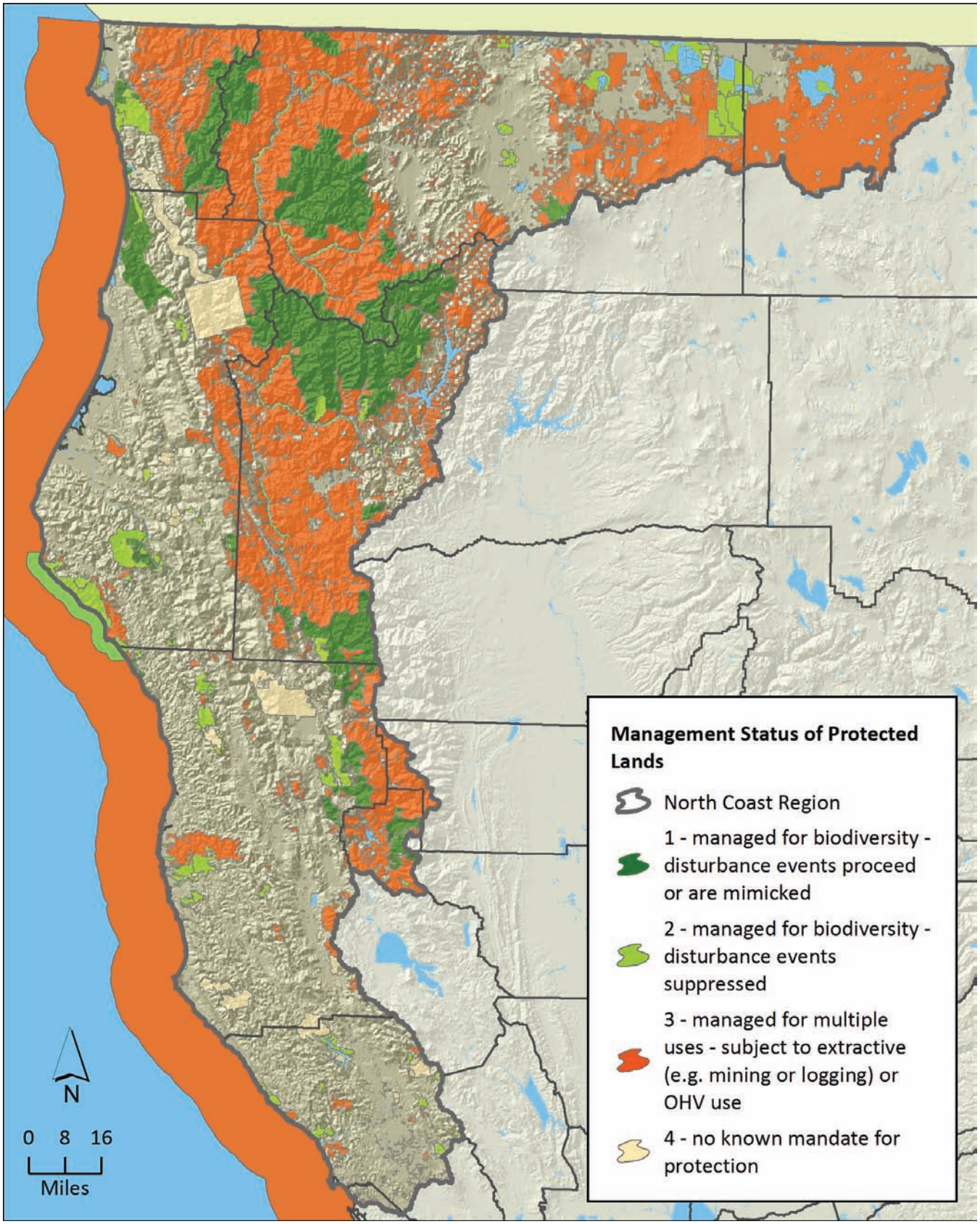
Developed pursuant to the California Marine Life Protection Act (MLPA), MPAs have been established for conservation and management of the natural marine resources and allow specific recreation and commercial activities. MPAs are primarily intended to protect or conserve marine life and habitat, and are therefore a subset of marine managed areas (MMAs). MPAs may be classified as marine parks, marine reserves, or marine conservation areas. Pollution control and prevention measures for MPAs are set forth in the policies adopted by State and Regional Water Quality Control Boards (e.g. North Coast RWQCB). MPAs are generally subject to certain fishery restrictions. Provisions allow non-commercial take to continue, consistent with existing regulations, in MPAs other than State Marine Reserves, where there is a record of ancestral take by a specific North Coast Tribe[49]. There are 19 MPAs, seven special closure areas, and one State Marine Recreational Management area in the (2012) North Coast Region. These areas cover approximately 137 square miles of state waters. Recent additions include

47 Note: These three designations together have previously been known as "Critical Coastal Areas" but for the NCIRWMP are considered individually as well.

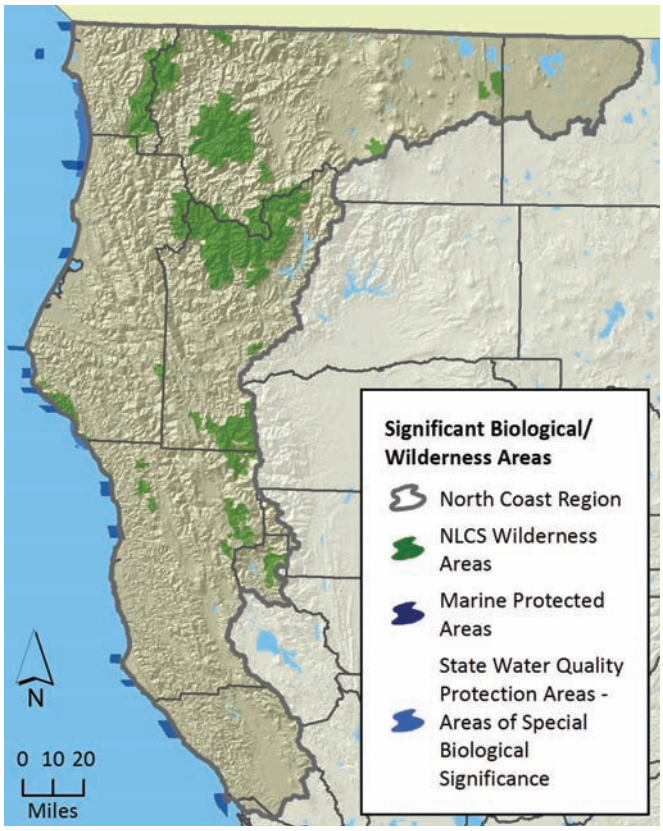
48 "Marine Managed Area" is a named, discrete geographic marine or estuarine area along the California coast designated by law or administrative action, and intended to protect, conserve, or otherwise manage a variety of resources and their uses. The resources and uses may include, but are not limited to, living marine resources and their habitats, scenic views, water quality, recreational values, and cultural or geological resources. MMAs offer many benefits, including protecting habitats, species, cultural resources, and water quality; enhancing recreational opportunities; contributing to the increased tourism and property values; and fisheries management. http://www.dfg.ca.gov/marine/pdfs/revisedmp0108b.pdf

49 CDFG (CDFW) 2012 at http://cdfgnews.wordpress.com/2012/11/28/north-coast-marine-protected-areas-effective-december-19/

MAP 27 MANAGEMENT STATUS OF PROTECTED LANDS



four of the five pre-existing MPAs on the North Coast: however, the MPA at Punta Gorda (Punta Gorda State Marine Reserve) has been removed from the network.[50]



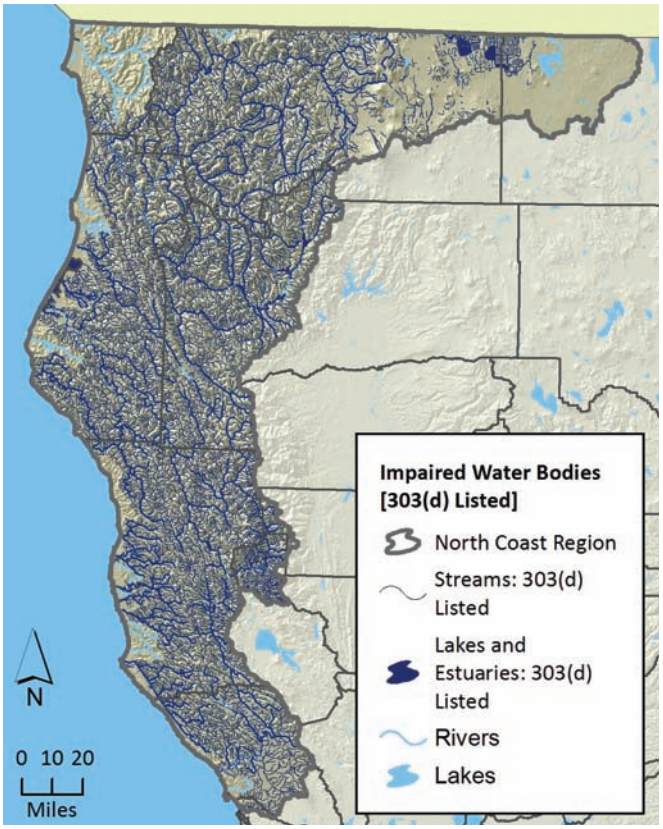
MAP 28 SIGNIFICANT BIOLOGICAL/ WILDERNESS AREAS

State Water Quality Protection Areas & Areas of Special Biological Significance

ASBS are a subset of SWQPAs, which, like MPAs, are a subset of MMAs. ASBS are designated and monitored by the SWRCB through its water quality control planning process. In ASBS, water quality conditions are maintained to protect against impacts to marine aquatic life. A SWQPA is a non-terrestrial marine or estuarine area designated to protect marine species or biological communities from an undesirable alteration to natural water quality. In a SWQPA, point source waste and thermal discharges are prohibited or limited by special conditions in discharge permits. Nonpoint source pollution (NPS) is controlled to the extent practicable but no other use is restricted. There are 8 ASBS in the North Coast Region, seven of which are co-located with existing MPAs (SWRCB 2003[51]).

50 No explanation is given for the removal http://www.dfg.ca.gov/marine/mpa/ncmpas_list.asp

51 SWRCB map of State Water Quality Protection Areas, revised June 2003 at http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/asbs/asbs_areas/asbs_swqpa_publication03.pdf



MAP 29 IMPAIRED WATER BODIES [303(D) LISTED]

5.3.2.2 Impaired Waters

Most of the streams and rivers throughout coastal Northern California contain excessive amounts of pollutants (e.g. sediment) and/or exhibit increased water temperatures. These and other nonpoint pollution sources result in a reduction in water quality and in water quality impacts to the beneficial uses (Appendix H Table 24 "Beneficial Uses of Water in the North Coast Region") of those waters. These waterbodies (or portions of them) are defined "California Impaired Waters" per the Federal Clean Water Act, Section 303(d). The North Coast Basin Plan (NCRWQCB 2011) estimates there are 20,298 miles (32,667 km) of impaired streams in the Region (approximately 85% of streams). The 2010 impaired waters of the North Coast Region are listed in Appendix H Table 25 "Section 303(d) Impaired Waters of the North Coast Region" and illustrated in Appendix H Table 29 "Impaired Water Bodies." Each impairment designation requires development and implementation of a Total Maximum Daily Load "TMDL" Plan to reduce pollution loads to recommended levels, which approach background/pre-resource extraction levels (Appendix H Table 26 "TMDL Status for Impaired Waters of the North Coast Region"). Temperature and sediment are particularly widespread causes of impairment. Some of the most sensitive beneficial uses defined for the Region

are directly impaired by increased temperature and sediment, such as those associated with the migration, spawning, and early development of cold water fisheries.

5.3.2.3 Wild and Scenic Rivers

The California Wild and Scenic Rivers Act was passed in 1972 to preserve designated rivers possessing extraordinary scenic, recreation, fishery, or wildlife values. The Act provides three levels of protection: wild, scenic, and recreational. "Wild" rivers are free of dams, generally inaccessible except by trail, and represent vestiges of primitive America. "Scenic" rivers are free of dams, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. "Recreational" rivers are readily accessible by road or railroad; may have some development along their shorelines; and may have been dammed in the past. Wild and Scenic Rivers are a component of National Conservation Lands. [52]

The volume of water dedicated to wild and scenic rivers, called "statutory required outflows," is the largest component of dedicated water uses in the Region (DWR 2013). In the North Coast, the Bureau of Land Management manages 38 Wild and Scenic Rivers comprising more than 2,050 river miles and 1,002,000 acres[53] (Appendix H Table 21 "Wild & Scenic Rivers of the North Coast Region"). Further major developments on the Klamath and Trinity Rivers or on the Smith River and any of its tributaries are forbidden by the Wild and Scenic Rivers Act; only minor additional surface water development for local use is foreseen, primarily because of the high costs in relation to crops that can be grown in the area (NCRWQCB 2011). Nine Wild and Scenic Rivers have been 303(d) listed as impaired: Albion River, Albion River Lagoon, Eel River, Middle Fork Eel River, North Fork Eel River, Klamath River, Salmon River, Trinity River, and Van Duzen River. Appendix H Table 22 lists the Region's impaired streams that flow directly to Wild and Scenic rivers.

5.3.2.4 National Wilderness Preservation System Areas

Of the federally managed land in the Region (5,732,223 acres), approximately 1,073,735 acres (2007) have been designated as National Wilderness Preservation System (NWPS) areas, under the provisions of the Wilderness Act of 1964. NWPS areas are administered by the US Bureau of Land Management, US Fish & Wildlife Service, US Forest Service, and/ or US National Park Service. There are 11 NWPS in the Region (Appendix H Table 23 "NWPS Areas of the North Coast Region"). These areas are subsumed under "National Landscape Conservation System (NLCS)" areas indicated on Map 28 ("Significant Biological/Wilderness Areas").

5.3.3 SPECIAL STATUS SPECIES & CRITICAL HABITATS

5.3.3.1 Federal & State Listed Species

Biogeographic analysis documents a total of 526 plant and animal species within the North Coast Region boundary (CNDDB, CDFW[54]). Most if not all of the watersheds within the North Coast Region support some "special status[55]" plant and animal species (e.g. those designated of special concern, rare, threatened, or endangered by state or federal governments). Not all of these special-status species occur in every watershed and there are likely additional special-status species present within the Region that are not yet accounted for in the NCIRWMP.

Particularly relevant to implementing the NCIRWMP and its projects is consideration of a subset of special status species: the Region's 86 state- or federally-listed threatened and/or endangered species (46 plants, 40 animals). *See* Appendix H Table 27 *("Threatened and Endangered Species of the North Coast Region") for a full listing.* These plant and animal species are currently (2013) on state and federal protection lists per the U.S. Endangered Species Act (ESA). The ESA is administered by two federal agencies: the United States Fish and Wildlife Service (USFWS[56]) and the National Oceanic and Atmospheric Administration (NOAA[57]).

Enhancement of native salmonid species has been a priority of the NCRP since the inception of the NCIRWMP in 2005. In theory and in practice, salmonids are a point of focus for improving all beneficial uses of water: management strategies and projects that benefit salmonids will improve overall watershed health and quality of life for all watershed inhabitants. Because of their economic, cultural, and ecological significance, supplemental information specific to salmonid population trends and current condition (e.g. of watersheds, habitats, populations) is provided below,[58] followed by a discussion of critical habitat for salmonids (and other North Coast species). North Coast salmonid ESUs are well-studied and many comprehensive sources and interactive web-based

52 http://www.blm.gov/ca/st/en/prog/blm_special_areas.html

53 http://www.blm.gov/ca/st/en/prog/blm_special_areas/wildrivers.html

54 http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp

55 http://www.dfg.ca.gov/wildlife/nongame/list.html

56 http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm

57 http://criticalhabitat.fws.gov/crithab/

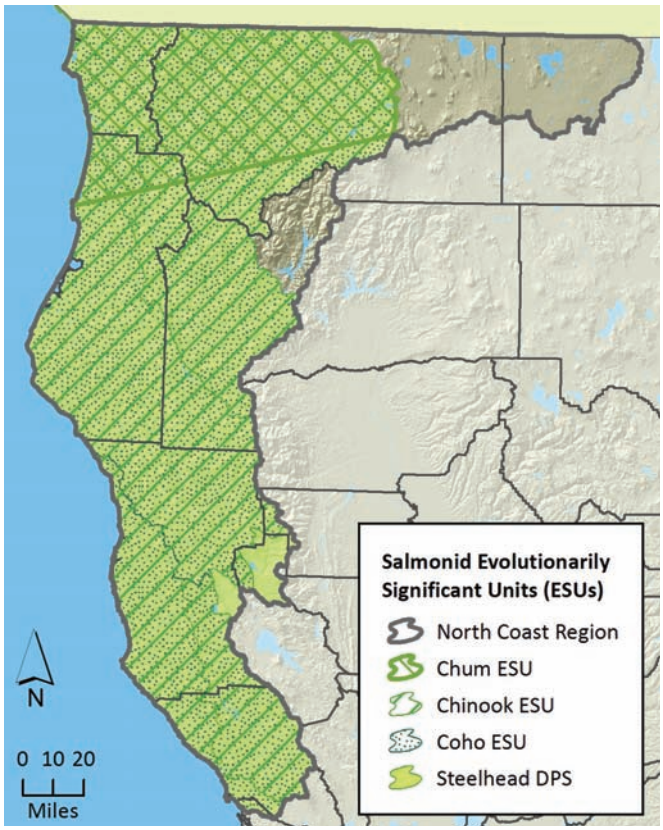
58 The 2012 NOAA/ NMFS (Draft) SO/NCC Coho Salmon Recovery Plan at http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/soncc_plan_draft_2012_entire.pdf

tools exist for stakeholders interested in learning more about local and Regional condition, status, and needs.

North Coast Salmonids

Salmonids are fishes with cold-water requirements and anadromous lifestyles; three salmonid species inhabit the North Coast Region rivers, streams, estuaries, and coastal/nearshore environments: steelhead (*Oncorhynchus mykiss irideus*), Chinook (*O. tshawytscha*), and Coho (*O. kisutch*) salmon. The current status of their populations (Evolutionary Significant Units, ESUs) under the federal and state ESAs is summarized below: (Map 30 "Salmonid Evolutionary Significant Units").

- Central California Coast Coho Salmon ESU: Federal and state listed endangered
- Southern Oregon/Northern California Coho Salmon ESU: Federal and state listed threatened
- California Coastal Chinook ESU, Central California Coast Steelhead ESU, Northern California Steelhead ESU: Federal listed threatened



MAP 30 SALMONID EVOLUTIONARILY SIGNIFICANT UNITS

Because their life cycle is intricately tied to conditions of water quality and quantity, salmon and steelhead are useful indicators of overall watershed health (DWR and USACE 2013) and may be appropriately applied at multiple geographic scales to address local stakeholder priorities. Recent numeric or narrative indicator for salmonid habitat and population conditions are available for the watersheds of the North Coast Region (NMFS 2010). Salmonid condition data provided the "bio-indicator" framework adopted during recent development of the Russian River Integrated Coastal Watershed Management Plan (RRICWMP[59]). Salmonid habitat condition indicators that can provide relevant information for the NCIRWMP and its projects are summarized in Appendix H Table 32 ("Habitat Attributes for North Coast Salmonids"). In addition to providing an indicator of watershed health, salmonids also serve important socio-economic purposes. North Coast fisheries have traditionally supported a commercial and recreational fishing industry, and salmon have always been an important component in the traditional North Coast Native American cultural and spiritual practices, social structure, and economy.

Summarized below60 are some vital statistics related to salmon. See Section 6.2.1 "Salmonid Population Decline" for a fuller discussion of impacts to North Coast salmonid populations, fisheries, and habitats.

Population Trends

Abundance-trend information for salmonid populations in stream systems along the Pacific central and north coasts indicates an overall declining trend for salmonid populations. North Coast salmonid ESUs exhibit (1) low abundance (2) reduced distribution, and (3) generally negative trends in abundance (NOAA 2005). Survival rates in the marine environment can be strong determinants of population abundance. The observed and reported increases in some salmon populations and/or fisheries in recent years may, therefore, be largely a result of more favorable ocean conditions (i.e. increased marine productivity) leading to higher juvenile fish survival and significantly increased recruitment into North Coast streams. It is difficult to determine the relative cause and effect on salmon of ocean conditions versus conservation/restoration measures. For further details on historic and projected population trends, see the NOAA 2005 status review report[61].

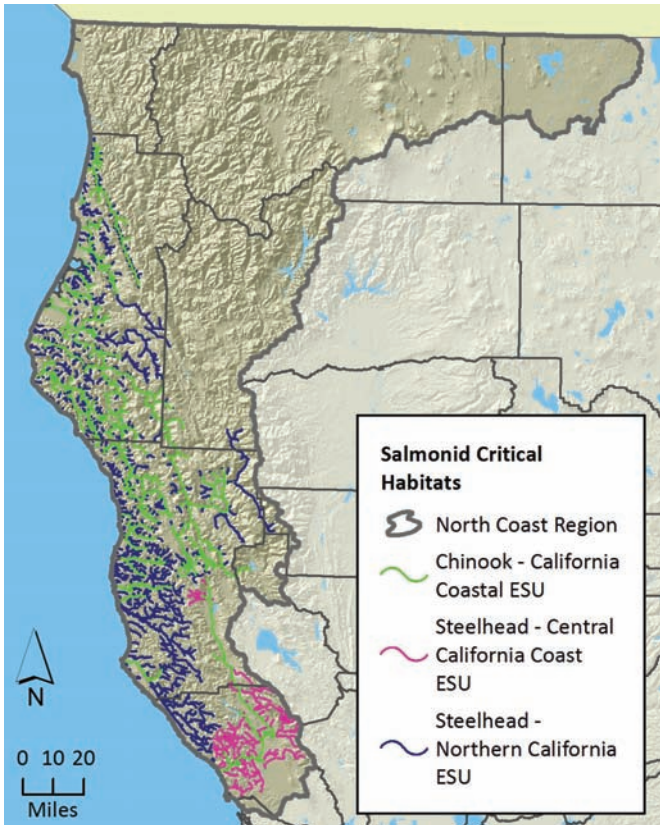
59 Russian River Integrated Coastal Watershed Management Plan draft at http://www.northcoastirwmp.net/Content/10414/Russian_River_Integrated_Coastal_Watershed_Management_Plan.html

60 NOAA Fisheries Office of Protected Resources (August 2013) http://www.nmfs.noaa.gov/pr/species/fish/cohosalmon.htm

61 NOAA "Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead" (2005) http://www.nwfsc.noaa.gov/assets/25/203_08302005_132955_brttechmemo66final2.pdf?CFID=32216459&CFTOKEN=14622252&jsessionid=8430f08d9cadad69fdc0215c587c6175e5d2

Critical Habitat

See Section 5.3.3.2 "Critical Habitat" and associated Appendix H Table 30 ("Critical Habitats of Salmonids in the North Coast Region") and Map 31 ("Salmonid Critical Habitats").



MAP 31 SALMONID CRITICAL HABITATS

Threats & Uncertainties

It is generally agreed that there is no single factor responsible for the observed continued decline in salmonid numbers and distribution. This is due to the complexity of the salmon species life history and the multiple ecosystems they inhabit during their life cycle. Factors responsible for salmonid declines include a combination of anthropogenic and naturally occurring causes that may be exhibited both in freshwater, in estuaries, and the ocean. Inadequate streamflow, impaired water quality, loss of access to habitat, past and present poor land use practices, instream mining, and ocean-atmosphere climate variability are among the causes of salmonid decline. Freshwater fishes are highly vulnerable to climate change impacts, particularly native fishes and cold-water species, such as salmonids (Moyle et al 2013[62]). See Section 6 for more on these and other threats to salmonids.[63]

Conservation Efforts

Congress established the Pacific Coastal Salmon Recovery Fund in 2000, in support of salmonid restoration nationwide. At the federal level, efforts to restore and conserve salmonids are led by National Marine Fisheries Service (NMFS, a.k.a. NOAA), which is the entity with ultimate jurisdiction over North Coast salmonid ESUs, and that is charged with coordinating salmonid recovery in the North Coast. NMFS works closely with the state Department of Fish & Wildlife (CDFW) to implement substantial, salmonid habitat restoration and ongoing monitoring data collection and dissemination. NMFS considers a wealth of available salmonid- and watershed-related data, and has recently (2014[64],) incorporated them into published recommendations that are specific to the stream basins of the North Coast Region. The CDFW in 2004 released the Recovery Strategy for Coho Salmon[65] and previously published the Steelhead Restoration and Management Plan (CDFW 1996). The California Salmonid Stream Habitat Restoration Manual (CDFW 1994, 1998, 2010) is used as a guide by restoration practitioners throughout California, including for the implementation of several of the NCIRWMP prioritized projects. Local watershed initiatives that benefit salmonids in the North Coast Region are numerous and include captive-rearing in hatcheries; removal and modification of dams that obstruct salmon migration; restoration of degraded habitat; sediment source reduction and prevention; acquisition of key upland, riparian, estuarine, and coastal habitat; improved water quality; and maintenance of sufficient instream flow. Section 7 and associated appendices describe how NCIRWMP projects implement these and other initiatives that specifically benefit salmonids.

5.3.3.2 Critical Habitats

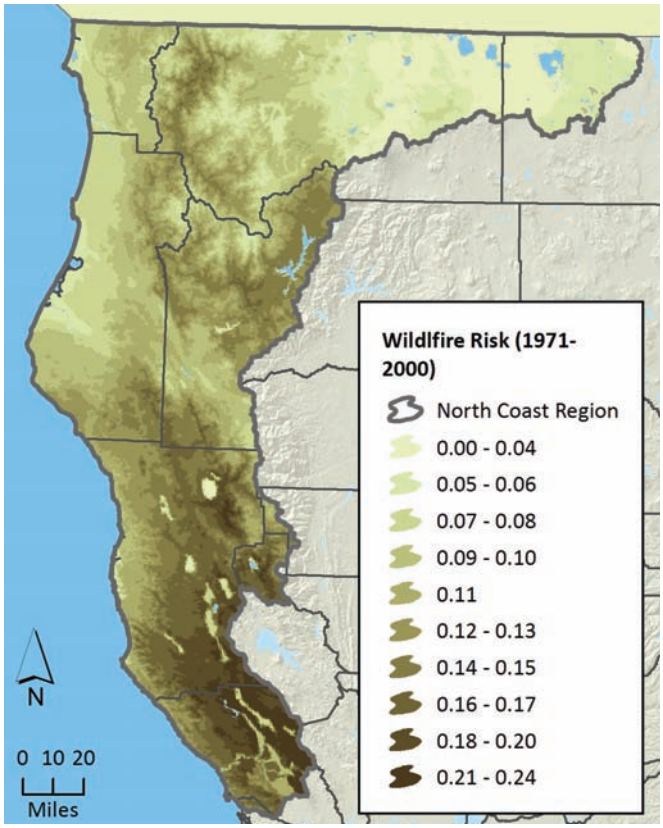
The Endangered Species Act (ESA) requires the federal government to designate "critical habitat" for any species it lists under the ESA. However, a critical habitat designation does not set up a preserve or refuge; it applies only when Federal funding, permits, or projects are involved and to ensure projects are

62 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0063883

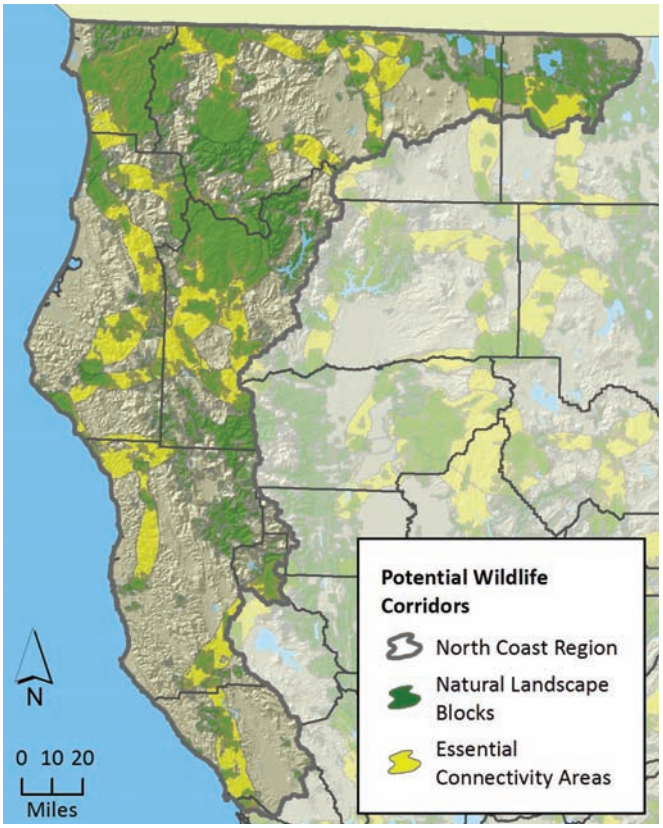
63 NOAA "Pacific Salmonids: Major Threats and Impacts" http://www.nmfs.noaa.gov/pr/species/fish/salmon.htm

64 Including NOAA's "2014 Recovery Steps" outlined for North Coast basin streams at http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/2014_soncc_coho_all_recovery__actions.xlsx

65 California Department of Fish and Game. 2004. Recovery strategy for California coho salmon. Report to the California Fish and Game Commission. 594 pp. http://www.dfg.ca.gov/nafwb.cohorecovery



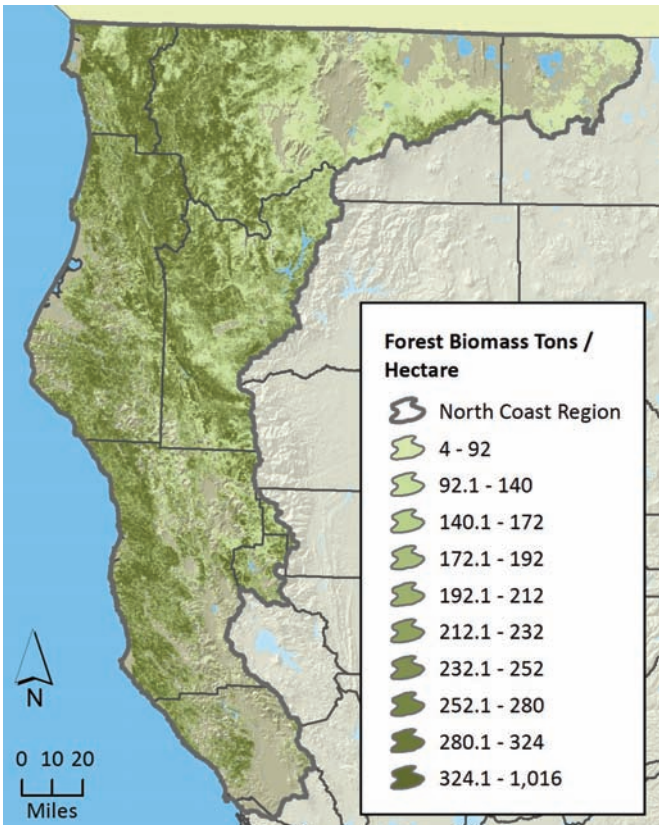
MAP 33 WILDFIRE RISK (1971-2000)



MAP 34 POTENTIAL WILDLIFE CORRIDORS

not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat. Critical habitat requirements also do not apply to citizens engaged in activities on private land that does not involve a Federal agency.

GIS-based critical habitat data[66] are available for several North Coast special status plant and animal species with designated critical habitat in the Region (Map 32 "Critical Habitats, Non-Salmonid"; also Appendix H Table 28 "Critical Habitats of the North Coast Region, Non-Salmonid," Appendix H Table 29 "Critical Habitats for Marbled Murrelet"). Appendix H Table 31 ("Critical Habitats that Intersect with North Coast Impaired Streams") documents special situations where rivers/streams that are designated impaired by the state (e.g. NCRWQCB 2011) for water quality reasons intersect with these habitats.



MAP 35 FOREST BIOMASS STORAGE POTENTIAL

66 http://www.nmfs.noaa.gov/gis/data/critical.htm

MAP 32 CRITICAL HABITATS (NON-SALMONID)

North Coast Salmonid Critical Habitat

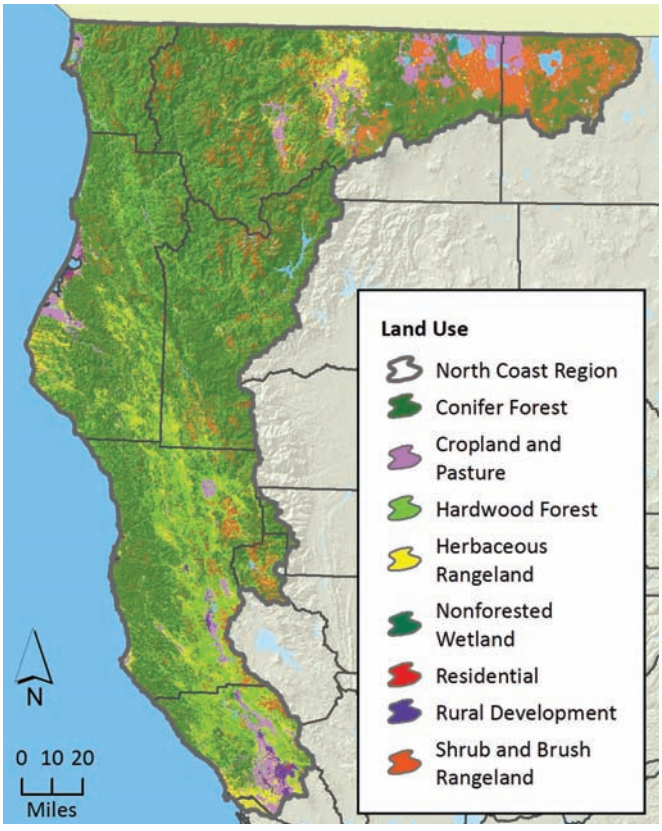
Habitat factors related to water flow, water quality, and habitat complexity are known to be critical requirements for salmonid populations. Sedimentation, increased water temperature, and chemical and biological pollution can reduce habitat viability and negatively affect at least some stages of the salmonid life cycle. Spawning salmon are known to require adequate surface flows in order to return upstream to their natal streams and clean, appropriately sized gravel in which to spawn; juveniles need intact complex habitat (a matrix of pools, riffles, large woody debris, and riparian vegetation) to provide shelter, food, cool water temperatures, and other factors necessary for survival; and smolts seek intact, unpolluted estuarine habitat to physiologically adjust to the salinity environment prior to outmigration to the ocean.

Salmonid population declines are believed to result from a complex combination of numerous direct and indirect factors in freshwater, estuarine, and/or marine environments. Although the ultimate and proximate causes are uncertain, most factors impacting salmonids are expressed at the habitat level; protection and enhancement of the critical habitats salmonids might occupy during different life stages is one strategy with strong potential to facilitate salmonid recovery to sustainable population levels. Appendix H Table 30 lists the critical habitats of North Coast salmonids that are illustrated in Map 31 ("Salmonid Critical Habitats").

5.3.4 ECOLOGICAL PROCESSES

In addition to the key watershed attributes described above (e.g. land features, vegetation, species, and habitats) there is a suite of equally important, but less tangible elements that are fundamental to watershed function: these are ecosystem processes. Natural ecosystems are the result of the interactions of the abiotic and biotic (nonliving and living) components that interact as a unit. The climate, location, soil, biota, and topography of the North Coast Region have contributed to the development of large ecosystems that have come to characterize it, including forests, rivers, estuaries, coastal tidelands, and — in portions of Siskiyou and Modoc counties — treeless sagebrush steppe (CWP 2013).

The ecological processes that support North Coast ecosystems may include, but are by no means limited to water and nutrient cycling; streambed and sediment dynamics; flood attenuation (Map 22 "Flood Zones"); wildfire (Map 33 "Wildfire Risk"); migration and dispersal; habitat connectivity (Map 34 "Potential



MAP 36 LAND USE

Wildlife Corridors"); genetic exchange; pollination; and sequestration of atmospheric carbon into soil and plant biomass (Map 35 "Forest Biomass Storage Potential"). The North Coast Region provides relatively clean air and water resources and aesthetic resources which results in a high quality of life for residents. In non-drought water years, the Region receives plentiful rainfall to support environmental resources and other beneficial uses. Furthermore, the Region's environmental resources serve as habitat for a large number of plant and animal communities and large corridors of undeveloped land allow for migration, dispersal and genetic exchange.

With the exception of dammed watersheds, many of the river systems in the North Coast Region still possess intact fluvial geomorphic processes and the habitats that form in response to them, although many of those habitats have been impacted by timber harvest, invasion of non-native plant species, or other intensive/extractive land uses. Additionally, in some locations, the geomorphic and ecological processes have been negatively affected by a variety of land use changes including channelization, road development, agriculture, instream mining, and dam construction.

Forests store large amounts of water because of their large size and physiological characteristics. They are important regulators of hydrologic processes, especially those involving groundwater, evaporation, and precipitation patterns. Forests accumulate large amounts of biomass (e.g. Map 35 "Forest Biomass Potential") and provide ecological services that directly maintain and improve water quality. Forest cover is correlated to drinking water treatment costs: the more forest in a source watershed, the lower the treatment costs (DWR and USACE 2013). According to the Trust for Public Lands (in Ernst et al. 2004):

- For every 10 percent increase in forest cover in the source area (up to about 60 percent cover), treatment costs decreased approximately 20 percent
- About half the variation in operating treatment costs may be explained by percent forest cover (the rest by facility and management practice variation)

Riverine ecosystems are complex and result from the physical, chemical, and biological processes acting upon them. Many of the rivers of the North Coast retain functional habitats and geomorphic processes but are affected by land use practices and invasion of non-native plants. The life cycle of salmonids is closely interwoven with water quality and quantity and, therefore, is an excellent indicator of the "health" of streams and rivers (DWR and USACE 2013).

Ecological processes should not be confused with ecosystem services, although the two are interrelated: When the ecological processes are operating normally, they provide critical benefits ("ecosystem services") to North Coast stakeholders. Services that are provided by ecosystems include: water filtration and storage; oxygen production and carbon dioxide removal; soil improvement, crop pollination and food production; flood control and risk reduction; fish and wildlife habitat; outdoor recreation, spiritual fulfillment, and aesthetic enjoyment; and many others. Ecological processes often overlap with ecosystem services (e.g. water filtration and carbon sequestration both involve functional forested watersheds).

The ecosystem services provided by working lands, open spaces, and wilderness may be quantified and monetized using a variety of accepted economic tools. In some cases, economic valuation studies have demonstrated that the conservation of natural infrastructure (such as a forested intact watershed) is a more cost-effective method to deliver services (e.g. clean drinking water, abundant water supply, flood attenuation) to human communities than traditional built infrastructure. Also, built infrastructure generally depreciates in value over time, while a well-maintained natural capital investment appreciates in value. These ecosystem services provided by natural capital have the additional benefit of meeting multiple other objectives, including agricultural viability, recreation, scenic viewsheds, and the maintenance of biological diversity. In some cases, land and water stewards have begun to generate voluntary, market-based incentives to assess, protect, and enhance the function of ecosystems (Schrier et al. 2013[67]). Section 12 "Long Term Financing & Implementation" discusses in detail this emerging approach to the economic valuation of natural capital.

5.4 LAND USE

The North Coast Region economy historically has been based on agriculture and resource extraction. Less than 2% of the region is currently developed land (i.e. urban/residential/ rural development). Forest and rangeland together account for more than 96% of the land cover of the Region, with the proportion of different land uses varying across the Region (Appendix H Table 33 "Land Use Types of the North Coast Region" and Map 36 "Land Use"). Extractive and recreational uses may be permitted on some public and private "protected lands," depending on the specified management status and protections afforded thereby;

67 What Is Your Planet Worth? A Handbook for Understanding Natural Capital (2013) http://www.eartheconomics.org/FileLibrary/file/EE%20Handout%20Final.pdf at Earth Economics http://www.eartheconomics.org/Page105.aspx

other protected lands are managed to mimic natural disturbance regimes and maximize biodiversity (Map 27 "Management Status of Protected Lands"). There is also a very substantial underground economy based on the illegal cultivation and sale of marijuana; much of which is illegally grown on public lands. Because of its illegal nature, it is difficult to assign an accurate dollar value to this economic sector. The emergence of new laws regarding medical marijuana (some of which may be in conflict with federal law) may provide more precise data regarding the economic contribution of the legal elements of this agricultural enterprise.[68]

Today, the major land uses in the Region are resource extraction (e.g. fisheries, timber harvest, and aggregate mining) and agriculture (e.g. vineyards, rangeland, dairies, row crops, and marijuana cultivation). Recreation, fish and wildlife management, and open spaces comprise major non-consumptive uses. Some of these are outlined below. Land uses in specific basins (WMAs) and counties are summarized in Appendix P Table 67 ("Land Use Types of North Coast WMAs") and Appendix P Table 75 ("Land Use Types of North Coast Counties").

Agricultural lands use significant volumes of water and a large portion of the water supply: irrigated agriculture accounts for about 80% of the developed uses of water supplies in the Region. Crops range from vineyards and orchards that are mainly concentrated in the Russian River, to pasture, alfalfa, grain and potatoes in the Klamath watershed. Dairies and ranches also account for agricultural land uses. In addition to food products, agricultural lands also may provide forage and habitat for wildlife (NCRWQCB 2011). High value crops in the Region include grapes and orchards in the Russian River Basin and ornamental flowers and bulbs in Del Norte County. In this decade, the acreage of orchards has declined and the acreage planted in vineyards has increased. Most of the newer grape vineyards use drip irrigation systems for irrigation allowing plantings in areas previously unavailable (i.e., sloping hillsides). This places a greater demand on the available water resources requiring surface water infrastructure improvements or reliance on groundwater (DWR 2013). The water supply and quality impacts associated with illegal cultivation of marijuana are not well quantified, but anecdotal evidence from local experts indicates that these impacts are substantial and growing (Section 6.3.1 "Issues for North Coast WMAs"). Land consolidation to form larger holdings, and the conversion of prime agricultural land for urban growth are both the result of low crop values, the lack of additional inexpensive surface water, and the ability to use only the most economically developable groundwater (DWR 2013).

The cost of environmental regulation and uncertainty of continued water supply for irrigation also contribute to decisions to convert land from agricultural use. The impacts of potential climate change on agriculture (particularly viticulture suitability in the Region) are "substantial," leading to possible conflicts in land use and freshwater ecosystems (Hannah et al. 2012).[69]

Aggregate mining (in-stream and upland types) is the mechanical removal of aggregates (i.e. sand, gravel, and cobble) from the Region's river systems. Aggregates are used to make concrete and asphalt, and as road base/ sub-base and drain rock. Gold mining in streams also occurs. Sediment suspension from aggregate and/or gold mining has degraded salmonid habitat and impaired water quality. Individual mining operations should be judged in the context of their spatial, temporal, and cumulative impacts, and that potential impacts to habitat be viewed from a watershed management perspective. Extraction in and near streams directly impacts salmonid habitat (Packer et al. 2005). Potential impacts include loss or degradation of spawning, rearing, resting, and staging habitat; migration delays and/or blockages; channel widening, shallowing, or ponding; loss of channel stability; loss of pool/riffle structure; increased turbidity and sediment transport; re-suspension and distribution of mercury and other toxins; increased bank erosion and/or stream bed downcutting; and loss or degradation of riparian vegetation.

Timber harvest and thinning still occurs locally. Much of the Region is identified as national forests, State and national parks, under the jurisdiction of the federal BLM, and Native Indian lands such as the Hoopa Valley and Round Mountain reservations. Both large corporations and smaller, family-owned companies conduct timber harvest operations. In recent years, the timber industry has declined as a result of economic issues, changes in international markets, and the expansion of environmental regulations (Timber Harvest Levels on the Major National Forests in Siskiyou County 1978-2009, National Forest Growth 2009). Regulations regarding timber harvest currently moderate sediment and temperature impacts to water bodies, but significant legacy effects from past practices are still present. Failure to manage national forests by thinning and harvesting has caused an unnatural massive buildup of biomass that has reduced water available to streams by canopy interception of snow and evapotranspiration. The NCRP has determined that sustainable harvesting of forest biomass/ timber waste may provide a viable, low-GHG emission source of local energy, independence, and revenue.

68 The NCIRWMP recognizes that not all jurisdictions would characterize marijuana cultivation as an "agricultural enterprise."

69 http://www.conservation.org/Documents/CI_PNAS_Climate-Change-Wine-production-Conservation_Lee-Hannah_March-2013.pdf

Forested lands also are essential for maintaining and improving water quality (specifically, drinking water quality). According to the Trust for Public Lands (in Ernst et al. 2004):

- For every 10 percent increase in forest cover in the source area (up to about 60 percent cover), treatment costs decreased approximately 20 percent
- About half the variation in operating treatment costs may be explained by percent forest cover (the rest by facility and management practice variation)

Tourism, both traditional (e.g. camping, hiking, cycling, swimming, kayaking, and sport fishing) and specialty (e.g. agricultural tourism including wine tasting, artisanal cheeses, organic and biodynamic farm tours, and rural B&Bs) comprises an important component of the regional economy. The North Coast contains about 400 miles of scenic shoreline, more than 40 state parks, scenic vistas and open spaces, reservoirs stocked with sport fish, whitewater runs, and other attributes to support recreational activities. The Region's appeal, and ability to generate tourism dollars, will remain based in large part on the aesthetic appeal of its open spaces and ready access to its plentiful, clean waters.

A developing product of the NCRP, the "Land Use and Regional Planning Report," will enhance the current understanding of North Coast land use and land use planning and will fill an important data gap. NCRP staff and consultants will summarize the status of local land use planning and identify a process and priorities for enhanced integration of the NCIRWMP and methods by which the NCIRWMP can support and add value to local land use planning efforts. The report will also describe water management projects that are compatible with existing and planned land use designations; describe the current relationship between land use and water planning; and describe the model planning elements developed in collaboration with local planning agencies and the NCIRWMP.

5.5 BENEFICIAL USES OF WATER

In 1972 (updated in 1996), the California State Water Resources Control Board adopted a uniform list codifying the various "beneficial uses" for waters of the state to protect water quality and supply to retain maximum benefits for current and future generations of water consumers and stewards. Twenty-eight beneficial uses (Appendix H Table 24 "Beneficial Uses of Water in the North Coast Region, 2011") are designated within the North Coast Region, affording protection to its bays, estuaries, minor coastal streams, ocean waters, wetlands, inland surface waters, and groundwater (NCRWQCB 2011[70]). It is the intent of the NCRP to simultaneously support as many beneficial uses of water as possible, through implementation of the Region's diverse portfolio of local projects. Protection of beneficial uses in the Plan Goals and Objectives emphasizes surface and groundwater sources; agricultural, municipal, cultural,[71] and wildlife uses; public health and safety; and economically disadvantaged communities. The priorities placed on particular beneficial uses is often best determined at the local (e.g. county, municipality, tribal) level.

According to DWR (2013), irrigated agriculture in the North Coast uses most of the Region's developed water supplies (81 percent of non-environmental water use), while municipal and industrial use comprise only about 19 percent. Approximately 422,300 acres in the Region are irrigated (3.4 percent). Approximately 65 percent the Region's irrigated agriculture is in the Middle and Upper Klamath River basins (including Scott, Shasta, and Butte valleys and Tule Lake), above the confluence of the Salmon and Klamath rivers.

With respect to drinking water, the State Water Resources Control Board (Resolution 88-63[72]) defines "sources of drinking water" as water bodies with beneficial uses designated in Water Quality Control Plans as "suitable, or potentially suitable, for municipal or domestic water supply (MUN)" and that "all surface and ground waters of the State" are "suitable, or potentially suitable" for MUN uses, with the exception of (1) contaminated waters that cannot reasonably be treated; (2) sources that do not provide sufficient water to supply a single well a sustained average 200 gallons/day; (3) water systems designated or modified to collect or treat waste, stormwater runoff, and/or agricultural drainage; (4) groundwater aquifers regulated as geothermal energy producing sources; and (5) certain site-specific cases.

5.6 WATER QUALITY

The present water quality within the Region generally meets or exceeds state and regional water quality objectives set forth in Section 3 of the "Water Quality Control Plan for the North Coast Region" (a.k.a. Basin Plan, NCRWQCB 2011). In most cases the water quality is "sufficient to support, and in some cases, enhance the beneficial uses assigned to water bodies." The Basin

70 See Table 2-1 of Water Quality Control Plan for the North Coast Region — the "Basin Plan" — for a listing of existing and potential Beneficial Uses in Calwater hydrologic areas, and/ or waterbodies. http://www.waterboards.ca.gov/northcoast/

71 See Tribal beneficial uses (CUL & COMM/FISH) being considered for adoption by SWRCB http://www.epa.gov/region9/tribal/rtoc/fall13/final/2013-10-01-final-letter-tribal-adhoc-beneficial-use-group.pdf

72 SWRCB Revised Resolution No. 88-63 http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2006/rs2006_0008_rev_rs88_63.pdf

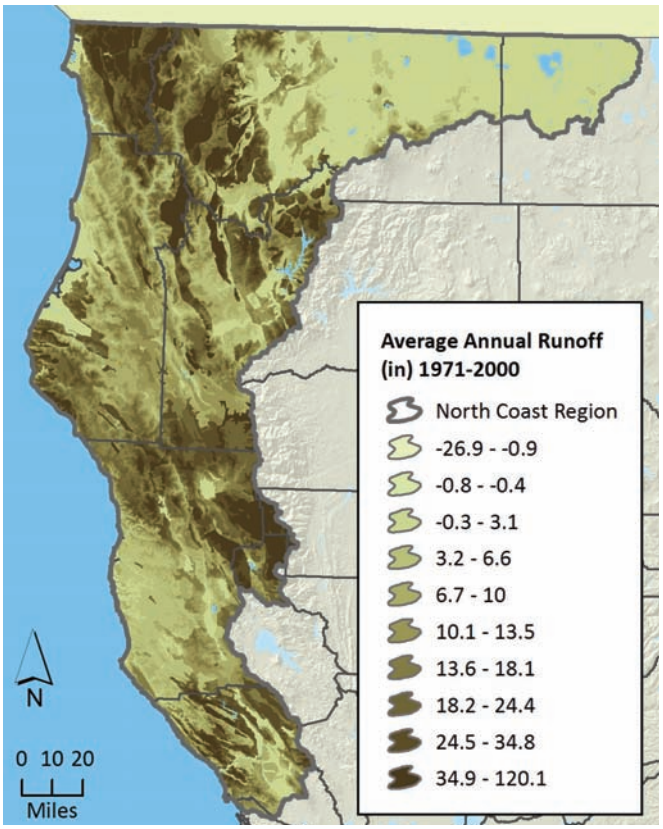
Plan continues "However, there are a number of present or potential water quality problems which may interfere with beneficial uses or create nuisances or health hazards." Water quality for different water sources are described briefly below (Section 6.2.2 "Impaired Water Quality" provides details on local water quality issues).

5.6.1 SURFACE WATER QUALITY

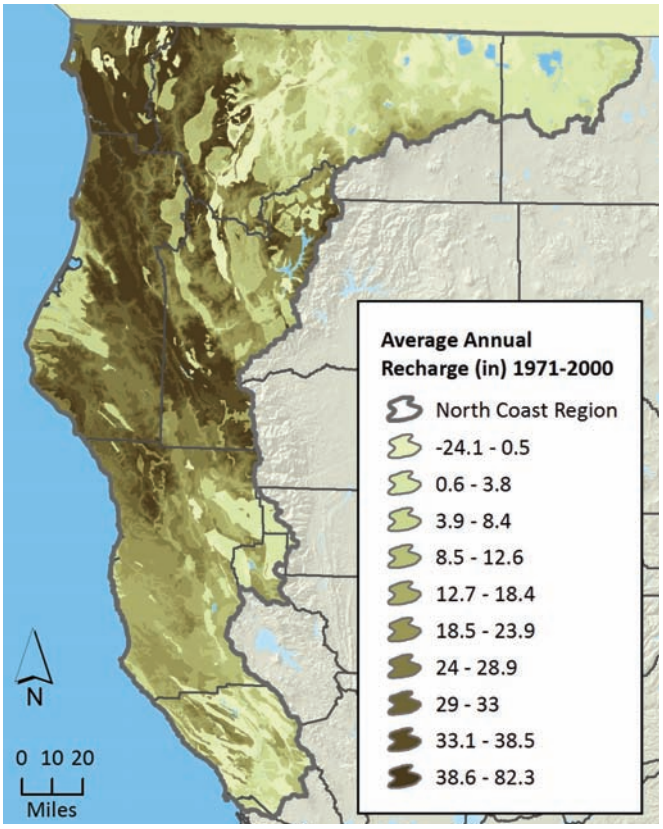
The North Coast Region faces many water quality challenges. The US EPA has listed 85 percent of the Region's rivers and streams as impaired (NCRWQCB 2011), per the Clean Water Act Section 303(d) (Map 29 "Impaired Waters"). The majority of TMDLs (benchmarks established by the EPA) are developed in response to sediment and temperature (Appendix H Table 25 "Section 303(d) Impaired Waters of the North Coast Region"). Sediment and temperature are thought to be associated with salmonid decline and impairment of beneficial uses (NCRWQCB 2011). The major primary of surface water impairment is NPS pollution produced by a variety of sources including stormwater runoff, erosion and sedimentation from roads, agriculture, and timber harvest, channel modification activities, gravel mining and dairy operations, failing septic tanks and MTBE, PCE, and dioxin contamination from gas stations and industrial activities (NCRWQCB 2011).

5.6.2 GROUNDWATER QUALITY

Groundwater quality problems in the North Coast Region include seawater intrusion and elevated nutrients in shallow coastal groundwater aquifers; high total dissolved solids (TDS), elevated mineral and heavy metal concentrations and alkalinity in groundwater in the Modoc Plateau basins; and iron, boron, and manganese in the inland groundwater basins of Mendocino and Sonoma counties. Legacy pollution from abandoned mines and historical lumber mills and present-day forest and agricultural herbicide application also pose a potential threat to regional groundwater, as do septic



MAP 37 AVERAGE ANNUAL RUNOFF (1971-2099)



MAP 38 AVERAGE ANNUAL RECHARGE (1971-2000)

tank failures throughout the Region. Additionally, there are numerous small wastewater treatment plants operating in violation of waste permit discharges due to issues with aging infrastructure, equipment malfunction, limited capacity, or a combination of these problems.

In 2009, the USGS, in conjunction with the SWRCB, collected groundwater data from 58 wells selected from the California Department of Public Health database within 34 groundwater basins located in the North Coast Region (DWR 2013). Randomly selected wells included locations in Lake, Mendocino, Glenn, Humboldt, and Del Norte counties. All detected concentrations of organic constituents, nutrients, major and minor ions, and radioactive constituents were less than health-based benchmarks for the 30 wells sampled in the northern Coast Ranges. There were a few detections of arsenic, boron, and barium in the 28 wells of the interior basins, which exceeded MCLs or notification levels (however, these are likely related to the area's geology). The results of this study (Mathany et al. 2011) indicate that community drinking water systems drawing from primary aquifer systems in the North Coast region generally provide safe drinking water, with the exceptions noted.

5.6.3 RECLAIMED/ RECYCLED WATER QUALITY

The practice of collecting and reusing (rather than disposing of) "excess" water from storm runoff and "used" water from municipal treatment plants is utilized in the North Coast to improve local water supply security (Section 5.7.3 "Reclaimed/ Recycled Water Quantity"). Programs that capture urban runoff and/or reclaimed (i.e. recycled) water must incorporate protection of human health and the environment per state and federal water quality laws (e.g. recycled water criteria in Title 22 of the California Code of Regulations) and the state Recycled Water Policy[73]. The level of treatment will vary depending upon the intended end use of the recycled water. For the most part, agriculture can usually utilize lower quality water than most urban users, but some crops will be sensitive to certain constituents such as boron, and there may be perception issues with using treated wastewater for some applications (e.g. irrigating crops). The quality of recycled water is of less concern for projects such as recharging the aquifer that supplies the Geysers geothermal facility in Sonoma and Lake counties

5.6.4 FLOODWATER/ STORMWATER QUALITY

During rainfall events, water runs across surfaces that may be contaminated by pollutants (such as motor oil, litter, etc). The stormwater runoff is often directed into storm drains, which then discharge to nearby creeks and rivers. Stormwater runoff is a significant contributor to regional and local non-point source water pollution and impacts both surface and groundwater supplies. Water runoff from cities, highways, industrial facilities and construction sites can carry pollutants that harm water quality and impair the beneficial uses of waters. Urbanization also can reduce the quality of stormwater runoff (Brabec et al. 2002) by increasing pollutant loads (Owe et al. 1982), increasing nutrient loads (Hubertz and Cahoon 1999), and diluting dissolved minerals through increased runoff and decreased infiltration and soil contact (Loucaides et al. 2007).

The California Flood Future Report (DWR and USACE 2013) provides comprehensive information about flood risks and integrated flood management strategies with direct applications for the North Coast Region. According to the report, common pollutants contained in stormwater runoff include:

- *Sediment:* Construction or other activities expose and loosen soils, while vehicles break-up pavement. Excessive sediment in water can effect the respiration, growth, and reproduction of aquatic organisms, cause aesthetic impacts to receiving streams and affect spawning habitat for salmonids.
- *Nutrients*: Sources include fertilizer, lawn clippings, and car exhaust, which contain nutrients like phosphorous and nitrogen. An overabundance of nutrients can accelerate the growth of algae, which is a key factor in the decline of water clarity in some waterbodies.
- *Heavy metals and toxic chemicals*: Sources include cars (brake pads, engine wear, etc), pesticides and herbicides. Maintaining and cleaning transportation vehicles can release solvents, paint, rust, and lead. These chemicals may poison organisms or cause serious birth defects.
- *Bacteria*: Sources include failing septic tanks, sewer overflows, decaying organic material, and the improper disposal of household pet fecal material. Some bacteria found in stormwater runoff can result in disease. Beach closures result from high bacteria levels.

The state Stormwater Program[74] aims to prevent or minimize the discharge of pollutants contained in stormwater runoff to waters of the state. Cities and other jurisdictions that operate large, medium, and small stormwater systems as well as specific industrial activity sites, including constructions sites that disturb more than an acre of land, must apply for stormwater permits.

73 Resolution No. 2009-0011: Adoption of a Policy for Water Quality Control for Recycled Water and the Recycled Water Policy 2013 available through State Water Resources Control Board at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/

74 SWRCB website "Stormwater Program" http://www.waterboards.ca.gov/water_issues/programs/stormwater/

SWRCB provides policy and regulatory oversight, on behalf of the federal government, drawing authority for stormwater regulation from the federal Water Pollution Control Act (Clean Water Act) and from direction within the Clean Water Act which puts the framework for regulating stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) Permit system. The state has established an online database to allow regulated entities to view reports and information on water quality control efforts related to stormwater. 75

The federal Stormwater Permit Program attempts to curtail stormwater pollution by requiring some specific industries and municipalities to obtain a permit for stormwater discharges. The permit regulates permittee activities to ensure the proper management of pollution sources. There are three types of permits required under the federal program:

- *Industrial Permits*: Stormwater discharges to surface waters from companies involved in manufacturing operations, transportation facilities where vehicles are maintained (maintenance includes fueling and washing), landfills, hazardous waste sites, and other similar operations must be covered by a stormwater discharge permit.
- *Construction Permits*: The major pollutant expected from construction sites is erosion-related, where large amounts of sediment laden water flows into storm drains. Construction activities that involve more than one acre of land disturbance must obtain a permit for discharges of storm water.
- Municipal Permits: Large cities or other municipalities must obtain a stormwater permit for discharges of urban runoff from municipal storm drain systems. The only municipality currently under a permit with the NCRWQCB is Santa Rosa, with the County of Sonoma and the Sonoma County Water Agency as co-permittees. The permit for the City of Santa Rosa requires specific practices associated with street cleaning, roadside maintenance, toxic/sewage spill responses, and public outreach, to name a few.

5.7 WATER QUANTITY

According to the Basin Plan for the North Coast (NCRWQCB 2011), the Region is abundant in surface water and groundwater resources. Although the Region constitutes only about 12% of the area of California, it produces about 40% of the annual runoff. This runoff contributes to flow in surface water streams, storage in lakes and reservoirs, and replenishes groundwater (Map 37 "Annual Average Runoff" and Map 38 "Average Annual Recharge"). The potential for greater variability in precipitation, runoff, recharge, and other hydrologic variables as a result of climate change, lends an additional degree of uncertainty to local and regional water supply forecasting. Water supply and demand for the next 20 years is assessed in Section 5.8. The potential impacts of climate change on hydrologic variables related to water supply are quantified and mapped in the Climate Change Vulnerability Assessment (Appendix N) developed for this NCIRWMP update.

5.7.1 SURFACE WATER QUANTITY

The North Coast Region contains numerous rivers, streams, and creeks, some of which flow year-round and others that are more or less seasonally- intermittent. A total of approximately 34,586 kilometers (21,491 miles) of rivers and streams drain watersheds of the Region (Map 24 "Surface Waters"). The major rivers and their tributary streams are listed in Appendix H Table 17 ("Rivers and Streams of the North Coast Region").

Surface waters are diverted to supply urban, municipal, and rural residential needs, agriculture, state and federal water supply projects, managed wetlands, required Delta outflow, instream flow, and Wild and Scenic Rivers flow. Surface water supplies in the North Coast Region are relatively dependent upon rainwater (as opposed to snowpack, though snowpack represents a significant source in, for example, Siskiyou and Trinity counties. In years when demand by water users remains stable and rainfall is abundant, only local water quality issues and the need for more adequate water-related infrastructure will limit future water supply. In years of scarce rainfall, however, surface water supplies will be stressed and several years of drought will likely produce more water supply-related conflicts. Greater use of water recycling for irrigation and other compatible uses such as the Geysers project and improvements to water recycling technology may alleviate some of the Region's reliance on adequate rainfall amounts.

5.7.2 GROUNDWATER QUANTITY

There are 63 groundwater basins/subbasins delineated in the North Coast Region, two of which are shared with Oregon (DWR, Bulletin 118). Named groundwaters for the Region's WMAs (Appendix P Table 65) and counties (Appendix P Table 73) are listed in the Appendix. These basins underlie approximately 1,022 million acres (1,600 square miles; Map 17 "Groundwater Basins and Subbasins"). There is limited large-scale groundwater development in the North Coast Region due to the small number of significant coastal aquifers. Most of the groundwater development that has occurred comes from shallow wells installed adjacent to rivers. There are, however, significant

75 See the Stormwater Multiple Application and Report Tracking System (SMARTS) at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

groundwater basins underlying the Klamath River valley along the Oregon border and the southern tip of the Region underlying Santa Rosa in Sonoma County (DWR 2011). Groundwater may provide a supplemental source in some localities (e.g. Rohnert Park in Sonoma County, which receives most but — not all — of it's water from the Sonoma County Water Agency). Despite the limits on large-scale infrastructure development, groundwater is used widely throughout the Region for individual domestic, agricultural, and industrial water supply (NCRWQCB 2011). Many rural areas rely exclusively on private wells for residential water.

As with surface water, recharge to groundwater supply is highly dependent on precipitation. The amount of groundwater available varies yearly with precipitation, infiltration, and the amount of withdrawals from groundwater basins. Withdrawals, in turn, are in part dependent on the amount of surface water available for municipalities that use both surface and groundwater for supply needs. Groundwater is a significant water source for some small rural communities that rely on residential wells for water, but the total amount of groundwater use in the Region is small compared to surface water use. In California, local agencies may opt to regulate extraction and appropriation of groundwater. Siskiyou County has developed several codes regarding groundwater. A Groundwater Advisory Committee has been appointed and is active for Scott Valley (Siskiyou County Code of Ordinances 2012). Adjudication for the Scott Valley includes a defined interrelated groundwater area.

5.7.3 RECLAIMED/ RECYCLED WATER QUANTITY

Recycled water is defined in the California Water Code to mean "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur." As previously described, water reclamation is the process of treating wastewater, storing, distributing, and reusing the water. The practice of capturing or treating water (treated wastewater, captured stormwater) for reuse in non-potable applications can reduce demand on potable surface and groundwater supplies and thereby increase local water supply security. Existing uses of reclaimed water, including for landscape irrigation and holding tanks for fire suppression, are currently being used by the City of Santa Rosa, the City of Arcata, the Town of Windsor and other entities within the Region. The Region's most significant m water reclamation project is operated in conjunction with the Geysers steamfield (Sonoma County), detailed below.

Geysers Recharge Project

The Santa Rosa Sub-regional Reclamation System reclaims water, treats it to a tertiary level, and distributes it to agricultural users, golf courses, public and private landscaping, and The Geysers steamfield. Santa Rosa's reclamation system is one of the largest reclaimed water agricultural irrigation systems in the country. For the Geysers Recharge Project, reclaimed water is piped through a 42-mile pipeline and injected into underground wells in The Geysers steamfield in Sonoma and Lake counties. Once within the wells, the water is gradually heated by geothermal activity to produce steam that is utilized to produce electricity at nearby power plants. The Geysers Recharge Project was chosen as a means to dispose of treated wastewater during the winter months, when there is no demand for agricultural irrigation. The Sub-regional Reclamation System had previously been discharging the unused water to the Russian River, but stricter water quality regulations removed this option. The Sub-regional Reclamation System is currently exploring other means of reusing or disposing of current and future amounts of reclaimed water in order to best manage water resources.

In November 2003, the Geysers Recharge Project began pumping 11 mgd of highly treated wastewater from the Laguna Treatment Plant to The Geysers steamfields, high in the Mayacamas Mountains. In January 2008, the delivery was up to 12.62 mgd helping to generate enough electricity for 100,000 households in Sonoma and other North Bay counties. The proposed Geysers Expansion Project builds on the Geysers Recharge Project and will increase recycled water deliveries to the Geysers steamfield up to 19.8 mgd or as much as an additional 3,209 million gallons per year. Santa Rosa has completed negotiations with Calpine, the steamfield operator, and has signed a contract to send more water to the steamfield (DWR 2013).

5.7.4 IMPORTED & EXPORTED WATER QUANTITY

The North Coast region does not import water, but water transfers do occur within the Region. For example, Eel River water is diverted at the Van Arsdale Dam into the Russian River (Potter Valley Project). The North Coast generally exports more water to other regions than the volume of water consumed within the Region for agricultural and urban uses. Claire Engle Reservoir (Trinity Lake) and the Trinity River Diversion (TRD) represents the only exportation of water outside of the Region[76], supplying water to the Central Valley as well as major urban centers in the San Francisco Bay Area, including the Petaluma Aqueduct (DWR 2013). Prior to construction of the TRD, average annual discharge at Lewiston was approximately 1.2 million acre-feet (maf); following construction in 1963, instream flow

76 US Bureau of Reclamations http://www.usbr.gov/projects/Project.jsp?proj_Name=Shasta/Trinity%20River%20Division%20Project

releases were set at 120,500 acre-feet (af)/yr (10 percent of the average unimpaired inflow) (DWR 2013): up to 90 percent of releases since then from Lewiston Dam have been diverted for agricultural use south of the Delta. The Trinity River Flow Evaluation (TRFE), completed in 1999 by the Hoopa Valley Tribe and US Fish & Wildlife Service, has recommended average annual releases of 594,500 af, with 47 percent to be released to the Trinity River and 53 percent to be diverted to the Central Valley[77] (USFWS and Hoopa Valley Tribe 1999).

5.7.5 DESALTED WATER QUANTITY

Currently the North Coast Region does not possess any desalination plants or have any plans for development of desalination facilities.

5.7.6 FLOODWATER/ STORMWATER QUANTITY

The North Coast Region experiences more precipitation than any other part of the state. Seasonal flooding is characteristic of much of the Region. The intensity, distribution, and duration of precipitation are strongly correlated with flood potential. Damaging floods occur relatively frequently, with particularly destructive events documented[78] in December 1955, December 1964, February 1986, spring 1995, and January 1997 and 2006 (NCRWQCB 2011, DWR 2013).

Flood and stormwater runoff volume is highly dependent on watershed land cover and management. In relatively undeveloped watersheds, only a portion of total precipitation enters the stream channel. Instead, it may be evaporated off the ground surface, intercepted by vegetation, transpired from the soil, or infiltrated deeply into groundwater aquifers. Urban elements, such as roofs, gutters, storm sewers, culverts, pipes, impervious surfaces (e.g. parking lots and roads), and cleared and compacted surfaces fundamentally change the rate and character of flood/stormwaters (Stein et al. 2012). Generally, the hydrologic changes associated with development and urbanization increases the speed with which water enters and moves through the drainage system. Urbanization has been shown to increase the magnitude of stormflows, increase the frequency of flood events, decrease the lag time to peak flow, and quicken the flow recession (Konrad and Booth 2005, Walsh et al. 2005).

According to DWR (2013), flooding is likely to become more frequent, severe, and unpredictable under climate change scenarios, as more precipitation is delivered by intense storms, and as storms drop more of their precipitation as rain rather than as snow. Storms and snowmelt may thus coincide and produce higher winter runoff from the landward (eastern) side. Meanwhile, to the west, accelerating sea-level rise will produce higher storm surges during coastal storms. In relatively developed coastal floodplains, storm related coastal flooding might coincide with high tides and stream runoff, creating particularly severe flooding. The California Water Plan (DWR 2013) provides a snapshot of the communities, structures, crops, infrastructure, and sensitive species exposed to flooding in the Region.

5.8 WATER SUPPLY & DEMAND: 20 YEAR PROJECTION

As the population of the North Coast Region continues to experience increased population growth, demand for potable drinking water will continue, making the identification of alternative sources for agricultural and landscape irrigation a high priority. Climate change may bring precipitation decreases to some parts of the Region (Thorne et al. 2012a); this will increase the need for irrigation, which may result in further impacts to surface and groundwater systems. The NCRP and NCIRWMP provide the framework for regional cooperation and collaboration to determine the optimal strategies to ensure that surface water supply is able to meet environmental and human-related beneficial uses during both surplus and drought water years.

Water Supply

Surface Waters

The amount of surface water in the North Coast Region is extremely dependent upon precipitation as described above. In very wet years, there may be a surplus, but in drought years, quantity is limited and can become a source of contention between water users. For example, the Klamath Basin has chronic water shortage problems that have led to particularly tense relations between Tribes, farmers, environmentalists, and regulators (DWR 2013). Klamath water resources have been over-allocated and are subject to competing uses, including protection of fisheries. In 2013, consistent with eight out of the last twelve years, project irrigators in the Klamath Basin again did not receive a full supply of water, and the power rates they pay continue to escalate to among the highest charged to irrigation projects in the West.[79] Both of these issues directly and adversely affect the Klamath Project

77 Trinity River Flow Evaluation final report (1999) available at http://www.fws.gov/arcata/fisheries/reports/technical/trinity_river_flow_evaluation_-_final_report_full_version.pdf

78 For a complete record of floods, refer to the California Flood Future Report (DWR, USACE 2013) Attachment C: Flood History of California Technical Memorandum at http://www.water.ca.gov/sfmp/resources/Attachment_C_History.pdf

79 The history and recent status of the Klamath dispute is provided in a formal statement to the U.S. Senate by U.S. Bureau of Reclamations, M.J. Connor, Commissioner (June 20 2013) at https://www.usbr.gov/newsroom/testimony/detail.cfm?RecordID=2402

water users and the $600 million a year their agricultural products and jobs contribute to the local economy.[80]

Two of the largest water supply reservoirs in the North Coast region are USBR's 2.437-maf Trinity Lake on the Trinity River and the USACE 380,000 acre-foot Lake Sonoma in the Russian River watershed. These facilities provide water for instream flows, recreation, hydropower, and water supply purposes. Water from Trinity Lake is exported from the North Coast region to the Sacramento River region through USBR's Clear Creek Tunnel. Lake Sonoma is operated to provide flood control and instream flows in the Lower Russian River in Sonoma County. An intrabasin water transfer system known as the Potter Valley Project has been in existence since 1908 and diverts water from the upper reaches of the Eel River at Cape Horn Dam through a tunnel to the East Fork Russian River upstream from Lake Mendocino (see Potter Valley Project" under "Project Operations" section). The water stored behind Coyote Dam (Lake Mendocino, built in 1958) is used to meet instream flow requirements and urban and agricultural needs in the lower Russian River watershed and the Santa Rosa area.

According to DWR (2013), surface water storage in the North Coast region in 2006, a wet year, was 2,060 thousand acre-feet (taf) at the end of November. In 2007, during the beginning period of the most recent drought, surface water storage at the end of November was 1,621 taf. In November 2008, reservoir storage was 1,257 taf; in 2009, it was 1,169 taf; in 2010, 1,892 taf; and in 2011, it was 2,308 taf, showing how variable the water supply can be. For comparison, reservoir storage at the end of November 1977 (the driest period in recent years) was 304 taf whereas the wettest period in recent times was in 1983 when the North Coast had 2,264 taf of storage (although less than in 2011). This water is used for urban, municipal, rural residential needs, agriculture, State and federal water supply projects, managed wetlands, required Delta outflow, instream flow, and wild and scenic rivers flow. When water supplies fall short, as they did in 2008 and 2009, the wild and scenic rivers and environmental uses receive the largest reductions. Summary of North Coast Region water inflows and outflows for 2010 are provided in the latest California Water Plan (DWR 2013).

Groundwater

The amount of groundwater supply in the North Coast Hydrologic Region varies yearly with precipitation, infiltration, and the amount of withdrawals from groundwater basins. Withdrawals, in turn, are in part dependent on the amount of surface water available for municipalities that use both surface and groundwater for supply needs.

The amount and timing of groundwater extraction, along with the location and type of its use, are fundamental components for building a groundwater basin budget and identifying effective options for groundwater management. Although some types of groundwater extractions are reported for some California basins, the majority of groundwater pumpers are not required to monitor, meter, or publicly record their annual groundwater extraction amounts. Groundwater supply estimates below are based on water supply and balance information derived from DWR land use surveys, and from groundwater supply information voluntarily provided to DWR by water purveyors or other State agencies.

The estimated average annual 2005-2010 total water supply for the Region was about one million af. Of this, groundwater supply is 364 taf and represents 35 percent of the Region's total water supply; 42 percent (60 taf) of the overall urban water use and 44 percent (301 taf) of the overall agricultural water use being met by groundwater. Although statewide, groundwater extraction in the region accounts for only about 2 percent of California's 2005-2010 average annual groundwater supply (CWP 2013) it accounts for 100 percent of the domestic supply for many rural communities in the region and is also heavily relied upon to meet local agricultural uses.

In the North Coast Hydrologic Region, there is limited large-scale groundwater development due to the small number of significant coastal aquifers. Most of the groundwater development has occurred from shallow wells installed adjacent to rivers. However, there are significant groundwater basins underlying the Klamath River valley along the Oregon border and the southern tip of the region underlying Santa Rosa in Sonoma County. Many domestic and small irrigation wells draw water from permeable zones within these deposits. Despite the limits on large-scale infrastructure, groundwater is utilized widely throughout the Region for individual domestic, agricultural, and industrial water uses. Many rural areas rely exclusively on private wells for residential water. There are also an unknown number of small dams, and water-related infrastructure, which may have a large cumulative impact on groundwater. Changes in annual groundwater supply and type of use may be related to a number of factors, such as changes in surface water availability, urban and agricultural growth, market fluctuations, and water use efficiency practices. The North Coast RWQCB's Basin Plan (NCRWQCB 2011) recommends recycling portions of urban and agricultural water to help meet water demands for quality and supply. The City of Santa Rosa, the City of Arcata, and the Town of Windsor are using reclaimed water for landscape irrigation and holding tanks for fire suppression.

80 Revised Cost Estimates for the Klamath Basin Restoration Agreement. June 17, 2011. http://216.119.96.156/Klamath/2011/06/RevisedCostEstimates.pdf

Water Demand

The North Coast Hydrologic Region had a population-weighted baseline average water use of 147 gallons per capita per day in 2010 (DWR 2013). Urban water demand is projected to increase under growth scenarios tracking with population growth. Changes in future urban water demand appear less sensitive to housing density assumptions or climate change, than to assumptions about future population growth. Agricultural water demand decreases under all but one of the future scenarios, due to reduction in irrigated lands as a result of urbanization and background water conservation.

Appendix H Table 34 ("Water Resources and Water Use for North Coast Region Basins") provides a summary of current water use and supply information for the North Coast drainage basins, surface and groundwater basins, and Hydrologic Units. In the North Coast Region, water supply to provide drinking water and support other beneficial uses is limited by water quality in some areas and by the lack of infrastructure for at least part of the year in many of the Region's rural and isolated areas.

Given that much of the North Coast Region is rural and disadvantaged (Map 2 "Economically Disadvantaged Communities"), there is a universal challenge for communities in addressing water supply as well as sewage disposal. This challenge has been identified by the NCRWQCB and the DWR, and was further documented by the number of project proponents who submitted applications to the NCIRWMP relating to sustainable potable water supply. In the context of a 20-year planning horizon for the North Coast, there are substantial issues to be addressed, in part due to the number and significance of current infrastructure needs, the high cost of upgrades, and lack of available funding and technical assistance for small and disadvantaged communities with multiple needs.

Water supplies will continue to be stressed in the next 20 years. Several communities within the North Coast are planning to address future water supply and water quality issues via their County General Plan documents. Stream water diversion for accelerating rural residential development is looming as a significant threat to salmonid recovery efforts. The NCIRWMP provides a framework for addressing this regional challenge on a watershed and local basis. A consistent theme identified by local planning documents throughout the North Coast is the need for maximizing water conservation and maximizing water recycling and reuse. Sonoma County and Humboldt counties have developed some innovative options for wastewater disposal systems (e.g. world-renowned Arcata Marsh in Humboldt County) designed to reclaim and reuse wastewater for irrigation and enhancement of wildlife habitat.

5.9 WATERS SUPPLY & WASTEWATER SERVICE PROVIDERS

Water and wastewater services within the North Coast are delivered by a wide variety of service providers, including North Coast Tribes, local agencies (e.g. cities, special districts), public utilities (as regulated by the California Public Utilities Commission), mutual water companies, homeowners associations, and businesses. Private water districts include those representing counties or portions of counties, municipalities, irrigation districts, or particular water bodies. Other systems, primarily water systems, may supply water to small communities and not be officially organized as a legal entity at all. The only federal water boundaries in the region are Redwood Valley County Water District in Mendocino and in the Klamath Lake and Tule Lake area as part of the Klamath Project, which is administered by the US Bureau of Reclamation. The U.S. Army Corps of Engineers (USACE)[81] built Warm Springs Dam and manages Lake Sonoma; and although it is not a water provider, it is a relevant federal entity managing flood control releases from a reservoir used as a water supply source by the Sonoma County Water Agency. Many North Coast residences in rural areas have virtually no water service and rely instead upon on-site "self service" such as residential wells (groundwater or shallow surface) and wastewater disposal systems (usually septic systems).

According to spatial data sources[82], nearly 300 water supply and wastewater treatment service providers

81 An explanation of the relationship between USACE and SCWA is at explain/describe the relationship. http://www.spn.usace.army.mil/Missions/Recreation/LakeSonoma.aspx; http://www.scwa.ca.gov/water-system/

82 Sources providing these data include American Water Resources Association, California Department of Water Resources, County of Humboldt, County of Mendocino, North Coast Regional Water Quality Control Board, Sonoma County Water Agency, US Bureau of Indian Affairs, and US Bureau of Reclamation

operate in the North Coast Region. The number servicing each NCRP county follows (Appendix H Table 35 "DAC Water and Wastewater Service Providers of the North Coast Region"): Del Norte (22), Humboldt (51), Mendocino (46), Modoc (11), Siskiyou (34), Sonoma (134), and Trinity (22). Most North Coast entities (82%) provide either water supply or wastewater services, but not both (i.e. these services/systems are not usually integrated). Approximately 15 percent provide integrated water and wastewater services; and less than three percent provide only wastewater services.

The size of water supply and/or wastewater service operations ranges from small, private facilities that provide water for just a few neighboring residences to large municipal suppliers and wastewater treatment facilities. Nationally, the US EPA considers the system servicing a population of less than 3,300 people to be a "small" community water system. In the North Coast, the majority of communities are by this definition "small" (or even smaller, many with populations of less than 1,000; 40 percent serve populations less than 250 people. Fewer than 12 percent of the providers serve larger communities (i.e. over 5,000 residents). Rate structures, customer base size, and the degree to which rates cover costs vary.

Approximately 60 percent of the population of the Region resides within cities, 80 percent of whom live in cities with population greater than 10,000. Another approximately 20 percent of the Region lives within the boundaries of a special district that provides water service. Therefore, approximately 80 percent of the Region receives water service from a city or special district. Many counties regulate smaller water systems, which are defined as "State Small Water Systems." A State Small Water System is defined as a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. State Small Water Systems are subject to California Waterworks Standards.

Significantly, over 70 percent of the Region's water supply and wastewater service providers are located in and serve economically disadvantaged communities (DACs). DACs fundamentally lack local resources required to update aging or failed infrastructure and/or provide for population growth and increased demand on services. NCIRWMP staff is currently initiating a needs assessment of water suppliers and treatment facilities that serve DACs[83]. Lack of infrastructure or failure of existing infrastructure is identified as the most pressing issue facing these providers and their customers. Most providers continue to need funding or financial assistance; however, raising rates to fund the replacement of aging systems is challenging[84]. Meeting water quality standards and providing necessary training have been noted by some local entities as burdensome. The NCRP conducts outreach to and provides technical resources to support water and wastewater service provider working groups being established throughout the North Coast Region.

The NCRP and its stakeholders (e.g. during interviews or via surveys) have suggested utilizing existing planning processes as vehicles to support this collaboration, including DWR's groundwater management planning process, Humboldt Bay Municipal Water District municipal meetings, Resource Conservation District trainings, and workshops offered by the County Engineers Association of California. Initial meetings with small water supply/wastewater entities identified opportunities for integration and potential economies of scale (i.e. decreasing costs per unit output) through mergers: the Ukiah Valley in Mendocino County has been identified as an area that may benefit from the consolidation of multiple districts. Local integration of small districts could provide a more coordinated, unified approach to the management of local water resources, helping address problems with failing infrastructure, such as septic tanks in the Lower Russian River or the lack of capacity in aging wastewater treatment plants.

5.10 WATER SUPPLY INFRASTRUCTURE

There are several large water supply projects in the North Coast Region (DWR 2013). These include the U.S. Bureau of Reclamation Klamath Project, the US Army Corps of Engineers Russian River Project (Lake Sonoma, as described above), the Humboldt Bay Municipal Water District Ruth Reservoir, and the U.S. Bureau of Reclamation Trinity Lake Reservoir as well as several other water supply, power generation, and flood control projects (Map 39 "Water Supply Infrastructure"). See Appendix H Table 34 ("Water Resources and Water Use for North Coast Region Basins") for a summary of the variety of water sources, infrastructure, and water uses in the Region's major basins.

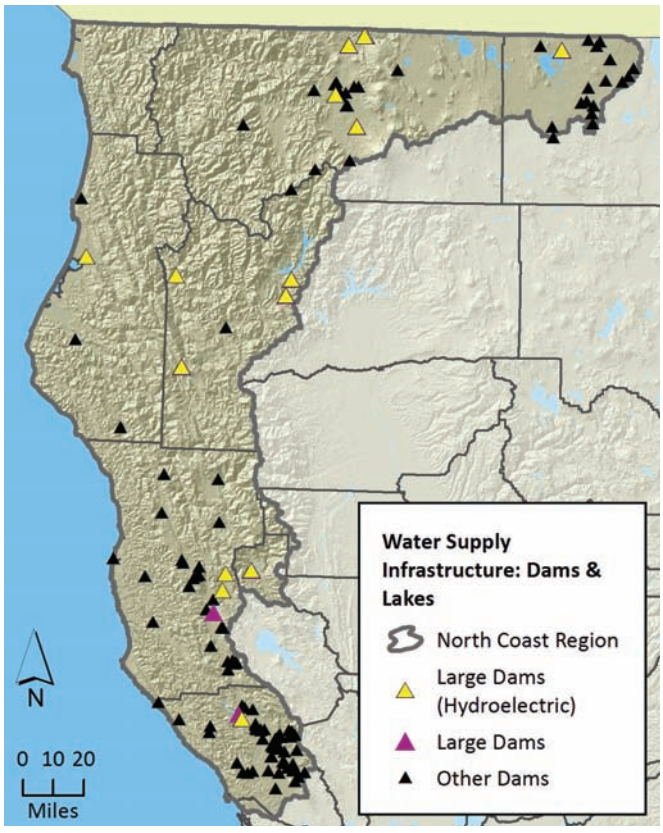
The Klamath Project includes water supply facilities in California and Oregon. The primary water supply facilities on the Oregon side are Gerber Reservoir and Upper Klamath Lake. The Klamath Project is the largest agricultural irrigation project in the Region and supplies water to about 240,000 acres, of which 62 percent is in Oregon and 38 percent is in California. To maintain adequate instream fishery flows for the lower Klamath River, water releases

83 For details on water supply and wastewater service providers, survey findings, data gaps, and infrastructure needs, see the NCIRWMP Water & Wastewater Service Provider Outreach & Support Program at http://www.northcoastirwmp.net/Content/10412/preview.html

84 The SWRCB provides a list of potentially eligible small disadvantaged community wastewater projects at http://www.swrcb.ca.gov/water_issues/programs/grants_loans/small_community_wastewater_grant/docs/sdac_masterlist.pdf

must be coordinated among the various reservoirs operated by different agencies within both states.

The California facilities include Clear Lake Reservoir, which is used to provide potable water; Tule and Lower Klamath Lake, which function as waterfowl refuges; and the Iron Gate Reservoir and Copco 1 and Copco 2 dams, which provide energy for a hydroelectric facility owned by Pacific Power and Light Company (DWR 2013). Four additional power-generating reservoirs are located in Oregon. The reservoirs in Oregon are operated on a peaking basis (i.e. distribution rate varies between peak and off-peak hours and by season) while the Iron Gate Reservoir is operated as a baseload plant (i.e. it supplies the day-to-day power needed to meet continuous demand) (NCRWQCB 2003). The challenge of maintaining adequate instream flows for endangered salmon populations and providing for the irrigation needs of farmers in an often water scarce area, has resulted in controversy and conflicts throughout the Klamath River Basin[85].



MAP 39 WATER SUPPLY INFRASTRUCTURE: DAMS & LAKES

The U.S. Army Corps of Engineers Russian River Project includes both Lake Sonoma and Lake Mendocino, which provide water for agricultural, municipal, and industrial uses, in addition to maintaining minimum stream flows to provide fish passage for salmonids and recreation (SWRCB and CalEPA 2010[86]). Lake Sonoma was formed in 1984 with the completion of the Warm Springs Dam and Lake Mendocino was formed in 1959 by the construction of the Coyote Dam on the East Fork of the Russian River. Additional flows into the East Fork of the Russian River upstream of Lake Mendocino are provided by diversions from the Potter Valley Project, a hydroelectric plant owned and operated by Pacific Gas & Electric Company. Water for the Potter Valley Project is stored in Lake Pillsbury, built in 1921, which is impounded by Scott Dam on the Eel River.

Ruth Reservoir was constructed in 1962 with the completion of the Matthews Dam on the Mad River in Trinity County. The dam is owned and operated by the Humboldt Bay Municipal Water District and serves about 60,000 customers in Humboldt County as well as supplying electric power to Pacific Gas & Electric. The dam serves as a recreational destination and wildlife habitat in addition to supplying water and energy resources (Department of Water Resources 2005).

Claire Engle Reservoir, known locally as Trinity Lake, is one of many dams supplying the Central Valley Project. It is the only exportation of water outside of the Region, supplying water to the Central Valley as well as major urban centers in the San Francisco Bay Area (USBR 2013). It was formed by the completion of the Trinity Dam on the Trinity River in 1961. The dam is also used for hydroelectric power generation and the lake provides recreational activities and wildlife habitat.

Most North Coast residences are in rural areas with virtually or literally no water service; these people must rely on their own infrastructure (i.e. groundwater wells, shallow wells, surface diversions) for their water supply needs. Increasingly, surface storage of water in relatively small reservoirs, ponds, and tanks is being implemented in the Region, particularly in areas where excess winter flows can be diverted and reused for agricultural purposes (i.e. irrigation, frost protection). In cases where diversions occur simultaneously in a watershed (e.g. for frost protection events), significant flow reductions have been documented (Deitch et al. 2009). It has become evident that drawing water from accumulated surface reserves, rather than directly from streams or groundwater, can reduce cumulative impacts of multiple water users on local water supplies and water sources.

According to DWR (2013), the total number of wells installed in the Region between 1977 and 2010 is

85 The history and recent status of the Klamath dispute is provided in a formal statement to the U.S. Senate by U.S. Bureau of Reclamations, M.J. Connor, Commissioner (June 20 2013) at https://www.usbr.gov/newsroom/testimony/detail.cfm?RecordID=2402

86 Policy for Maintaining Instream Flows in Northern California Coastal Streams at http://www.swrcb.ca.gov/waterrights/water_issues/programs/instream_flows/docs/ab2121_0210/adopted050410instreamflowpolicy.pdf

approximately 35,000. Domestic wells make up the majority of well logs (71 percent), while irrigation wells account for only about 5 percent of well logs. A higher percentage of domestic wells and lower percentage of irrigation wells point to the more rural-domestic setting and low use of groundwater for irrigation in the Region. For counties, the number of reported wells ranges from a high of about 15,800 in Sonoma County to less than 1,300 for Del Norte County. In most counties, domestic use wells make up the majority of well logs. The one exception is Humboldt County where over 60 percent of the wells are monitoring wells. Communities with a high percentage of monitoring wells compared to other well types may indicate the presence of groundwater quality monitoring to help characterize groundwater quality issues.

5.11 WASTEWATER SERVICE INFRASTRUCTURE

In almost all instances across the North Coast Region, wastewater collection and treatment systems are owned and operated by local agencies (either cities or special districts). There are some instances where wastewater systems were installed to serve a "company town" containing a lumber or paper mill and the wastewater system is owned and operated by the company. Over time, ownership of the utilities serving company towns has transitioned from private to public ownership as property has changed hands. Many rural residents rely on Onsite Wastewater Treatment Systems (OWTS) such as septic systems for household wastewater disposal. These systems are becoming increasingly regulated[87].

Public wastewater systems, often referred to as publicly owned treatment works (POTWs), must be operated to meet the requirements of the Federal Clean Water Act and the Porter-Cologne Water Quality Control Act (California Water Code, Division 7). Treatment and discharge requirements are contained in the National Pollutant Discharge Elimination System (NPDES) developed by the U.S. EPA and enforced by the North Coast Regional Water Quality Control Board (NCRWQCB). The RWQCB has adopted the North Coast Basin Plan (NCRWQCB 2011), which provides specific guidance on how the federal and state laws (including water quality standards) will be applied in the Region. The type of wastewater treatment plant or process, and the volume of wastewater treated determine the minimum Grade level of certified operators required. Many public wastewater treatment plants in the North Coast suffer from aging infrastructure and lack of capacity.

In most instances, the Region's wastewater collection and treatment infrastructure is decoupled from its water supply infrastructure: wastewater and water supply are treated independently in theory, and in practice (a notable exception is the Sonoma County Water Agency). This lack of system integration is indicated by the dearth of entities providing both water supply and waste treatment services (15 percent according to a 2013 NCRP survey; see above). However, there are a growing number of instances in which wastewater is being reclaimed (i.e. treated to remove bacteria and pollutants) for non-potable applications. For example, the Santa Rosa Subregional Reclamation System reclaims water, treats it to a tertiary level, and distributes it to agricultural users, golf courses, public and private landscaping, and the Geysers steam field. It is one of the largest reclaimed water agricultural irrigation systems in the country. For the Geysers Recharge Project, reclaimed water is piped through a 42-mile pipeline and injected into underground wells in the Geysers steam field. Once within the wells, the water is gradually heated by geothermal activity to produce a steam that is then used to produce electricity at nearby power plants. The Geysers Recharge Project is a means to dispose of treated wastewater during the winter months, when there is no demand for agricultural irrigation. The Subregional Reclamation System had previously been discharging the unused water to the Russian River, but stricter water quality regulations removed this option. The Subregional Reclamation System is currently exploring other means of reusing or disposing of reclaimed water in order to best manage water resources. Other water reuse projects exist throughout the region; however, they are relatively minor compared to the infrastructure described above.

5.12 FLOOD/ STORMWATER MANAGEMENT INFRASTRUCTURE

Winter floods between 1935 and 1945 in Sonoma County spurred the U.S. Army Corps of Engineers (USACE) to develop a flood management plan and construct Coyote Valley Dam, which impounded Lake Mendocino upon its completion in 1957 (DWR 2013). Thus, traditional flood management has been focused on flood control infrastructure projects such as floodwater storage facilities and channel systems funded and/or built by State and federal agencies. Flood management agencies[88] are responsible for operating and maintaining approximately 1,200 miles of levees, more than 110 dams and reservoirs, and other facilities within the North Coast Region (DWR 2013). The North Coast has four

87 In June 2012 the SWRCB adopted Resolution No. 2012-0032, which provides policy for siting, design, operation and maintenance of OWTS (SWRCB 2012 at http://www.waterboards.ca.gov/water_issues/programs/owts/board_adopted_policy.shtml

88 For a list of the entities that have responsibilities or involvement in flood and water resources management, and a list of major infrastructure, refer to California's Flood Future Report Attachment E: Information Gathering http://www.water.ca.gov/sfmp/resources.cfm#floodreport

major flood management reservoirs: Lake Mendocino on the East Fork Russian River, Lake Sonoma on Dry Creek, Spring Lake off Santa Rosa Creek, and Matanzas Creek Reservoir on Matanzas Creek; two smaller flood management reservoirs on Paulin Creek and Middle Fork Brush Creek; and seven other reservoirs providing non-dedicated flood-retention space. Other flood management projects include levees in the Eel River delta, levees and channel modifications on East Weaver Creek, Redwood Creek, the Klamath River, and the Mad River, and channel modifications on Santa Rosa Creek. Measures to mitigate the effects of tsunamis were part of Humboldt Harbor improvements, the Crescent City project, and Crescent City Harbor improvements.

These infrastructure systems alter or confine natural watercourses (see Hydromodification in Section 6.2.5 "Flood Protection & Management") with the intent of reducing the chance of flooding thereby minimizing damage to lives and property. This traditional approach is based on the flood control principle of conveying floodwaters rapidly to a discharge point. Activities under traditional flood management include physical modification of stream channels, dam and surface impoundments, catchments, levees, and other structures. A more current understanding of flood dynamics recommends the application of an integrated approach[89]. Integrated flood management recognizes the value of watershed management and floodplain functionality to provide multiple resource management and societal benefits (DWR and USACE 2013). Integrated management applies natural hydrologic, geomorphic, and ecological processes and ecosystems (e.g. fresh and saltwater wetlands) to reduce flood risk by influencing the cause of the harm, including the probability, extent, or depth of flooding (flood hazard).

Projects that combine flood and ecosystem restoration also can provide areas of active- and passive-use recreation, increase open space, and provide scenic value, all of which result in economic and societal benefits. For example, in Humboldt County, the Rohnert Creek Flood Control and Riparian Habitat Improvement project is a watershed-based, channel corridor-scale project with multiple objectives. The proposed project is taking a channel corridor approach in identifying opportunities to integrate habitat enhancement elements with flood reduction improvements through the 1-mile project corridor within the City of Fortuna (DWR and USACE 2013).

89 DWR Statewide Flood Management Planning Program, which is explicitly integrated with the IRWM Program, including for the North Coast Region http://www.water.ca.gov/sfmp/about-sfmp.cfm

5.13 ENERGY SUPPLY & CONVEYANCE INFRASTRUCTURE

There is an intricate link between energy use and water supply, distribution, and conservation. This fundamental relationship is known as the energy-water nexus.[90] Given the substantial relationship between water and energy, the relationship between local energy generation and local economic development, as well as the nexus between GHG emissions and watershed management, the NCIRWMP is integrating energy elements into its programmatic regional approach. Because of this relationship, the Region's many water supply and wastewater treatment facilities are afforded key opportunities to improve and integrate regional and local energy management. For example, both industries consume large amounts of power (e.g. pumping stations for water supply and aeration systems for wastewater systems) and decreased energy consumption often translates to decreased water consumption, and vice-versa. New tools and technologies may help increase efficiencies and decrease consumption of energy at these and other facilities[91].

Regulatory Framework

In August of 2008, California became one of 32 states to develop a "Renewable Portfolio Standard (RPS)." The RPS requires an increasing use of renewable energy from investor-owned and municipal utilities. It aims to source 20% of the state's energy from renewable sources such as solar, biomass, geothermal, ocean, and/or wind power by 2010, and 33% by 2020. The NCRP is considering the development of some of these (particularly biomass/biogas), as a means to achieve local energy security and job creation, while simultaneously addressing state emissions reduction and climate adaptation goals[92]. Other regulations related to greenhouse gas emission reduction, which also applies to energy facilities, are described elsewhere in the NCIRWMP (i.e. climate change sections).

Major Hydroelectric & Geothermal Energy Systems

In the North Coast Region there are dozens of hydropower/hydroelectric generation systems consisting of dams on reservoirs of various sizes, as well as one major geothermal power production

90 Learn more about the energy-water nexus in Section 1 of Sustainable Energy Practices: A Guidebook for Public Agencies (Brown and Caldwell 2009) at http://sonoma-county.org/gs/pdf/guidebook.pdf

91 Learn more about these tools and technologies in Section 4 of Sustainable Energy Practices: A Guidebook for Public Agencies (Brown and Caldwell 2009) at http://sonoma-county.org/gs/pdf/guidebook.pdf

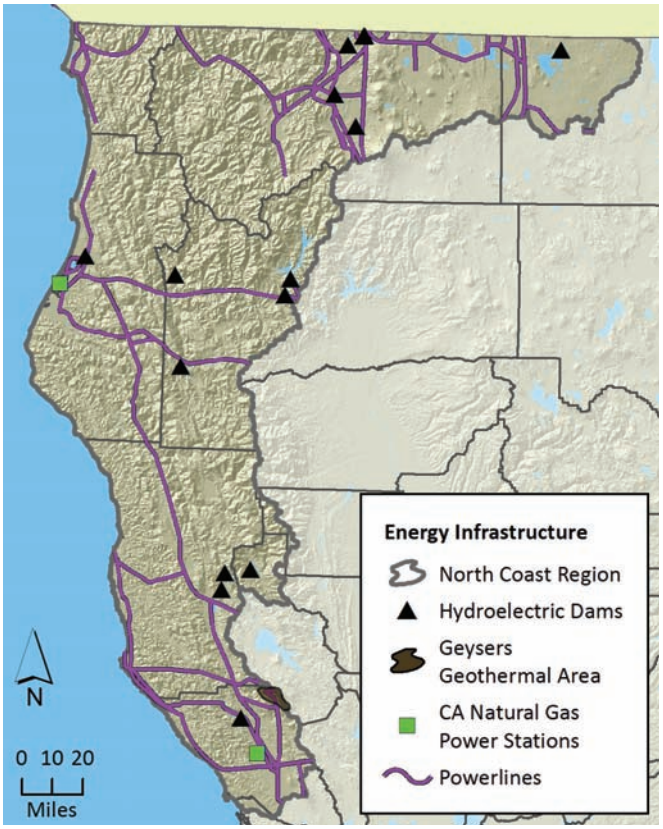
92 Please see the "NCIRWMP Energy Independence: Emissions Reduction, Job Creation, Climate Adaptation" program and report (description and link provided in Appendix O).

facility (Map 40 "Energy Infrastructure" and Appendix H Table 34 "Water Resources & Water Use for North Coast Region Basins"). These are outlined below.

- **Geysers Recharge Project** reclaims water through a 42-mile pipeline and injects it into underground wells in the Geysers steam field (Sonoma County). Once within the wells, the water is gradually heated by geothermal activity to produce a steam that is used to produce electricity at nearby power plants.
- **Iron Gate Reservoir** provides energy for a hydroelectric facility owned by Pacific Power and Light Company (DWR 2005). Three additional power-generating reservoirs are located in Oregon. The reservoirs in Oregon are operated on a peaking basis while the Iron Gate Reservoir is operated as a baseload plant (NCRWQCB 2003).
- **Potter Valley Project** provides additional flows into the East Fork of the Russian River upstream of Lake Mendocino. The project includes a hydroelectric plant owned and operated by Pacific Gas & Electric (PG&E). Water for the Potter Valley Project is stored in Lake Pillsbury, which is impounded by Scott Dam on the Eel River.
- **Ruth Reservoir** was formed in 1962 after the completion of the Matthews Dam on the Mad River in Trinity County. The dam is owned and operated by the Humboldt Bay Municipal Water District and serves about 60,000 customers in Humboldt County as well as supplying electric power to Pacific Gas & Electric.
- **Claire Engle Reservoir**, known locally as Trinity Lake, is a part of the Central Valley Project. It was formed by the completion of the Trinity Dam on the Trinity River in 1961. The dam is also used [*by whom/ name the entity]* for hydroelectric power generation and the lake provides recreational activities and wildlife habitat.
- **Warm Springs Dam** and hydroelectric facility was completed in December 1988. Sonoma County Water Agency (SCWA) owns and operates the facility under a 50-year license issued by the Federal Energy Regulatory Commission (FERC) on December 18, 1984. The 3,000-kilowatt Francis turbine generators have a power rating of 2.6 megawatt (U.S. Army Corps of Engineers, Warm Springs Dam 2010).

Alternative Energy Security Projects, Programs & Funding Sources

North Coast planning and resource conservation professionals have, during interviews with NCRP staff, provided many examples of current and potential local and regional energy efficiency/ security projects and programs in the North Coast, and pointed to a number of potential local and regional funding sources. All these existing efforts have promising points of integration with the NCIRWMP. The "NCIRWMP Energy Independence: Emissions Reduction, Job Creation, Climate Adaptation" program and report (Appendix O) provide numerous ideas for projects and funding sources specific to the Region.



MAP 40 ENERGY INFRASTRUCTURE

Current, Planned, and Potential Energy & Security Projects in the Region

- Big Flat and Rock Creek Communities (near Weaverville) are off the grid
- Biochar Initiative (using a specialized form of charcoal as a soil amendment using woody waste to sequester carbon)
- Biofuel facilities (many cities)
- Biomass facilities (i.e. forest biomass energy and manure digesters; may have potential in unincorporated areas)
- Energy efficiency (i.e. residential and facilities retrofit programs, streetlights replacement, provision of city property for electric car charging stations)

- Energy infrastructure (i.e. evaluating smart-grid transmission, replacement of substation, maintenance and repair projects)
- Fuel cells to generate hydrogen (pilot project for Blue Lake Rancheria and Tribe[93], Humboldt County)
- Geothermal power plants (i.e. geothermal project to take treated wastewater and transfer it as a heat transfer pump in Crescent City)
- Nutrient credit exchange program (Sonoma RCD, City of Santa Rosa, and NCRWQCB)
- Solar power facility (i.e. Trinity PUD runs local programs for solar installations)
- Sonoma Clean Power, a local electricity provider, allows residents to opt into purchasing their energy from local, renewable sources
- Wind power development

Potential Energy Infrastructure Funding Sources

- Bay Area Regional Energy Network financing and technical assistance
- California Energy Commission
- California Public Utilities Commission
- Federal tax rebates
- Local foundations: Headwaters, McLean, Humboldt Area Foundation
- National Resource Conservation Service
- Property Assessed Clean Energy financing
- Pacific Power and Light
- Pacific Gas & Electric
- Redwood Community Action Agency Weatherization Assistance Program
- Redwood Coast Energy Authority
- Municipal Utility Rebate, Rate, and Buyback Programs
- Redwood Coast Energy Watch
- Rural Development provides financing for energy conservation
- Sonoma County Energy Independence Program
- Sonoma County Water Agency, Energy Financing bond issuance for energy projects
- U.S. Department of Agriculture
- Willits Economic Localization local energy production and sustainable conservation

93 The Ballard ClearGen PEM fuel cell system for the Blue Lake Rancheria Tribe of Humboldt County will be the first of its kind, with the potential to double the efficiency of biomass-to-power generation. See more at http://www.renewableenergyfocus.com/view/30993/ballard-fuel-cell-system-to-use-biomass-generated-hydrogen-on-california-reservation/

The California Energy Commission (CEC) is a valuable source of information about energy in the state, and the Region. The CEC sponsors the Local Energy Assurance Planning (CaLEAP) program[94], which is available to assist local governments in preparing Energy Assurance Plans (EAPs) to help ensure that key local assets remain or become resilient to disaster events that directly impact energy production (e.g. drought) or transmission (e.g. flood). The CEC also provides information about energy use and energy efficiency standards[95]. The CEC can help with local assessment of biomass and other renewable energy potential, through its Renewable Energy Technology Initiative (RETI[96]). The CEC also commissions and maintains an extensive on-line library of technical reports that address virtually all imaginable issues and opportunities related to energy use, efficiency, and consumption in the state.[97]

Potential Energy Infrastructure Challenges

North Coast energy consumption, efficiency, and infrastructure capacity are directly and indirectly influenced by the prevailing climate and hydrology of the Region, as well as by population size and other factors. According to the California Natural Resources Agency (CNRA 2009), North Coast planners and stakeholders can expect a number of potential impacts to the Region's energy infrastructure as a result of extreme weather events, increased temperatures, and altered precipitation patterns expected from climate change (CNRA 2009). Extreme floods would cause widespread local damage to transmission lines, power stations, and other built structures. Droughts result in decreased flows and impede the ability of hydropower generating facilities to operate at or near capacity. The "largest projected damages" to energy infrastructure are expected from sea level rise inundating low lying coastal areas. Other potential challenges for energy infrastructure development in the 21st century are listed below.

Warmer Temperature Impacts

- Changes to energy production potential (e.g. hydropower)
- Changes to transmission capabilities
- Reduced transmission efficiency

94 Learn about California Local Energy Assurance Planning at https://caleap.icfwebservices.com

95 CEC "Climate Zones" with information on energy use, weather, and more http://www.energy.ca.gov/maps/renewable/building_climate_zones.html

96 CEC RETI program information at http://www.energy.ca.gov/reti/

97 Public Interest Energy Research (PIER) reports on energy, water, and climate-related issues and innovations in California (e.g. flooding, agriculture, water conservation, energy, wildfire and many more). http://www.energy.ca.gov/research/new_reports.html

- Increased energy demand for cooling
- Increased risk of brown outs and black outs

Altered Precipitation Patterns Impacts

- Changes to energy production potential (e.g. hydropower)
- Reduced summer flows requiring increased water releases, reducing drinking water reservoir volume
- Increased flood damage to transmission lines from stormwater runoff and snowmelt

Sea Level Rise Impacts

- Increased need for fortification from coastal surges to protect built infrastructure or need to relocate built infrastructure
- Increased economic costs for required fortification or relocation and system upgrades

Data gaps related to North Coast energy infrastructure primarily concern lack of information about renewable energy (e.g. wind, solar, wave, geothermal, and hydroelectric); historic and current security (e.g. transmission capacity, disaster readiness, and energy consumption); climate change impacts to energy infrastructure; energy efficiency measures; and renewable energy pricing strategies. Further research is needed to determine potential impacts to and vulnerability of the power grid in coastal and inland areas subject to flooding (or that may become subject to flooding), as well as to develop strategies to protect critical infrastructure in vulnerable areas from severe weather events.

5.14 DEMOGRAPHIC ATTRIBUTES & SOCIOECONOMIC INDICATORS

At a broadest scale, the North Coast Region can be described as rural and sparsely populated, relative to both the state and to other IRWM regions. A very high proportion of residents and geographic areas are economically disadvantaged (DAC) or severely economically disadvantaged (SDAC), with median household incomes (MHI) at least 80 percent or 60 percent respectively of the state average MHI. Poverty rates are correspondingly high. Despite these economic and other challenges, educational attainment and unemployment rate for the Region remain similar to California's. The population of Native American Indian residents is several times higher than the state average. The Region's age distribution indicates a population that is significantly older than the state's average.

Subsections below summarize select demographic and socioeconomic attributes of the Region as a whole, using the most current (2010) US Census data. Appendix P Table 76 ("Socioeconomic and Demographic Attributes of North Coast Counties") details these, allowing the reader to compare and contrast local conditions with those of other counties, the Region, and the state.

5.14.1 DEMOGRAPHIC ATTRIBUTES

5.14.1.1 Population Size, Density, & Distribution

The population of the entire North Coast Region was approximately 644,000 in 2000 (DWR 2005) and 675,845 in 2010 (US Census[98]). This total continues to represent approximately 2 percent of California's total population. Regional population is unevenly distributed (Map 41 "Population Density & Distribution"), with the majority of people concentrated in the southern portion of the Region in Sonoma (307 persons/mi^2) and Marin (485 persons/ mi^2) counties. The remainder occupies the less-densely populated northeast and southeast sections of the Region. For example Trinity County, with 13,786 residents in 2010 (up from 13,022 residents in 2000) has just 4.5 persons/mi^2; Modoc County, with 9,686 residents in 2010 (up from 2,710 residents in 2000) has the Region's lowest population density (2.5 persons/mi^2), despite occupying nearly the same geographic area as Sonoma County. Urban boundaries delineate approximately 43,132 acres in the North Coast Region, all in the Santa Rosa area of Sonoma County (US Census 2000). According to projected urban growth data developed by the California Resources Agency, Legacy Project[99] this urban boundary is expected to grow to 61,196 acres (42%) by 2020 and to 76,943 acres (78%) by 2050; all in Sonoma County (Map 5 "Urban Boundaries and Urban Growth Areas").

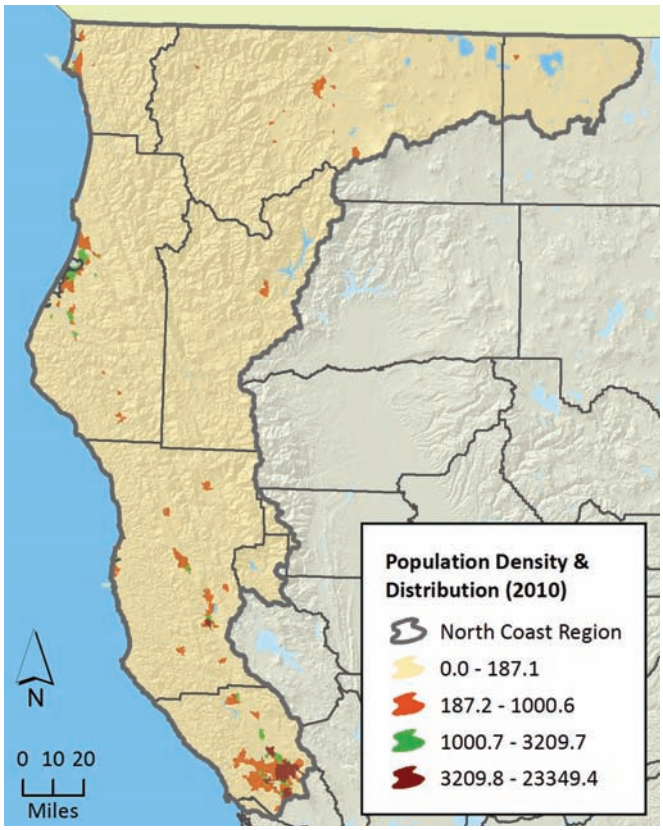
5.14.1.2 Population Growth

The North Coast Region as a whole has experienced steady population growth over the past two decades and is projected to continue positive growth through the year 2050 (CA Department of Finance 2012). Regional population growth from 2000 to 2010 was 5.4 percent, which is about half the statewide rate of 9.7 percent (Appendix P Table 77 "Historic and Projected Population Growth of North Coast Counties"). Recent projections (CWP 2013) indicate that the regional population is expected to grow to about 809,400 by year 2050, which represents approximately 21 percent increase from year 2010 totals. Due to the rural nature of much of the Region and the fact that there is a lower associated cost of living, many communities within the Region are seeing an influx of retirees (Section 5.14.1.3 "Age Distribution") from larger, more urbanized settings. This has placed pressure on existing community services, many of which

98 For census data herein, see US Census state and county "Quick-facts" http://quickfacts.census.gov/qfd/maps/california_map.html

99 Now an archive, the Project was active until circa 2003. See http://legacy.ca.gov

were already financially encumbered. Additionally, as growing rural populations encroach in the more urban settings, some of the more rural communities are becoming "bedroom communities" for the Region's commuters. There is also a rise in the migrant worker population within the Region: the trend for both Modoc and Siskiyou counties is that many of the migrant workers are becoming permanent residents, while younger non-migrant residents continue to leave the area.



MAP 41 POPULATION DENSITY & DISTRIBUTION

Despite the overall increase, North Coast population growth rates are not as high as those of the rest of the State, reflecting the rural character of the Region. In fact, all the counties of the Region that were projected to lose population by 2020 have indeed exhibited population declines. Between 2010 and 2012, population change was negative for five NCRP counties: Modoc (-3.7%), Trinity (-1.9%), Siskiyou (-1.7%), Del Norte (1-1.1%), and Mendocino (-0.5%). Only Sonoma (+1.6%) and Humboldt (+0.2%) showed any increase. The most populated area of the Region, Sonoma County, experienced a higher growth rate than the State's average in 1980 and 1990, and is estimated to continue this pattern with population increase of 14% predicted by 2020.

5.14.1.3 Age Distribution

The median age for residents in the Region is expected to approach 42 in the next decade, while California's median age is expected to remain stable at 33-34 (Department of Finance Age Projections, 2001). While the Region's overall birthrate continues to decline, estimates point toward an increasingly aging Region population. Increasingly, retirees are settling in the North Coast as they value the area's rural quality of life and high standard of living. Trinity, Siskiyou, and Modoc Counties have the largest proportion of residents age 65 and over. This may lead in these areas to an increase in the demand for health-related services and related construction of retirement, healthcare, and other facilities in these areas. In contrast, the present lack and projected decline of population age 25 and younger is indicative of a Region that is unable to provide living wage jobs that retain local youth.

5.14.1.4 Educational Attainment

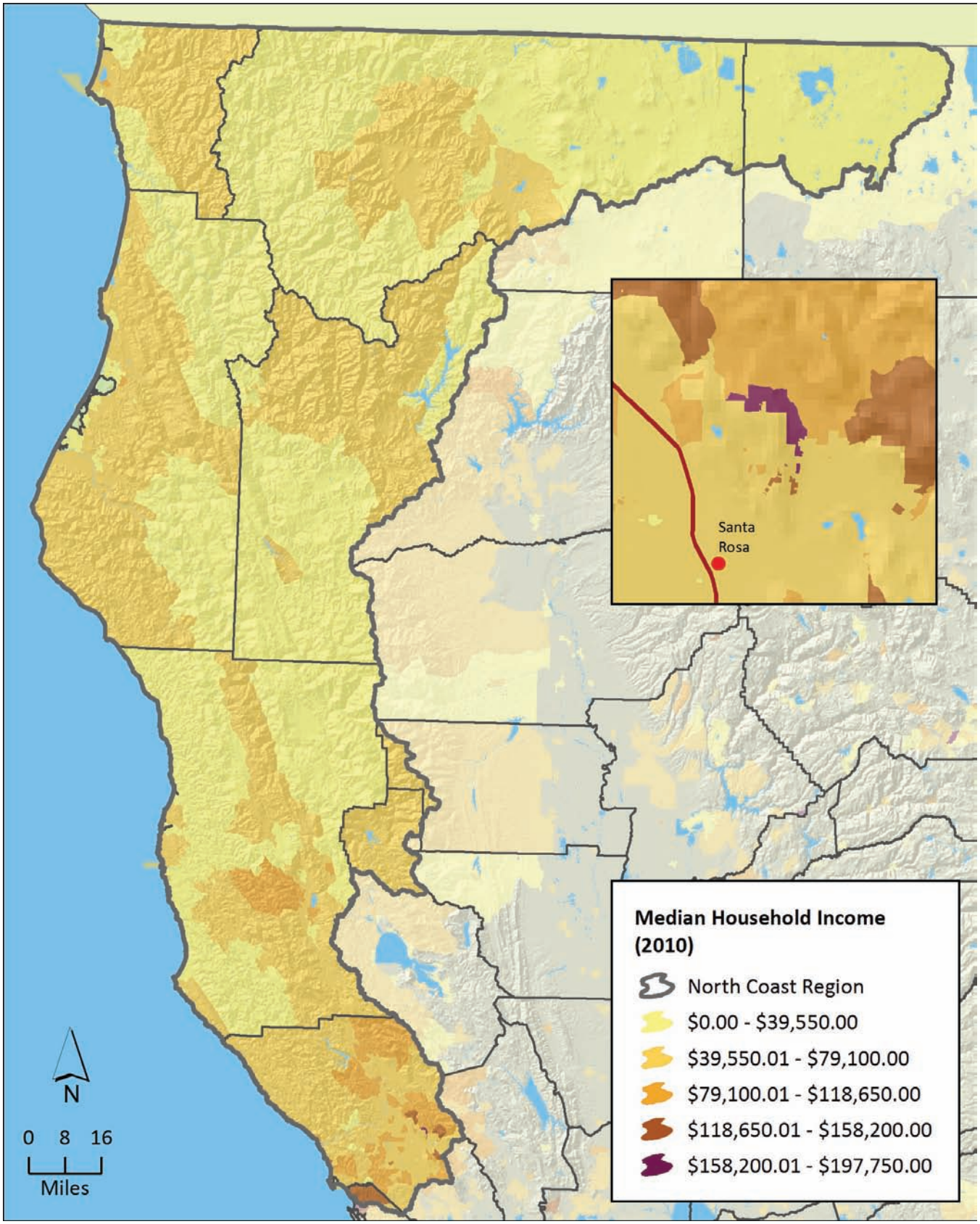
The North Coast Region has a relatively high rate of high school graduates and advanced degree recipients, matching the state's percentage of 80 percent despite the lack of proximity to major centers of learning and related infrastructure. Some counties (e.g. Trinity and Humboldt) have graduation rates above 90 percent. The North Coast Region includes numerous state, private, community, and vocational colleges that serve to support secondary educational attainment. Sonoma County has more than the state average of graduates with a Bachelor's Degree or higher (31.8% versus 30.2%), with Humboldt County (26.3%) approaching the state average. Further, intellectual capital migrates to the Region, with educated professionals drawn to the area for its high quality of life, natural surroundings, and distance from urbanized areas.

5.14.2 SOCIOECONOMIC INDICATORS

5.14.2.1 Median Household & Per Capita Income

The 2010 median household income (MHI) of most North Coast Region counties was significantly below that of the state average ($61,632 per year) (Map 42 "Median Household Income"). This statistic alone indicates that much of the North Coast Region is economically disadvantaged, as compared to the general population of the state (see "Economically Disadvantaged Communities and Populations," below). Of counties comprising the NCRP, only one (Sonoma, at $64,343) exhibited MHI above the state average. The other counties range between $35,402 (Modoc) to $44,527 (Mendocino). Like MHI, per capita income for all but one NCRP Region county is below the state average of $29,634: again, only Sonoma County ($33,119) exceeds this. By contrast, Del Norte and Modoc counties exhibit just 65 percent and 70 percent, respectively, of statewide per capita income.

MAP 42 MEDIAN HOUSEHOLD INCOME (MHI) (2010)



5.14.2.2 Economically Disadvantaged Communities

A geographic information system (GIS) was used to analyze U.S. Census block group data (2010) and DWR web-based resources for IRWM to determine economically disadvantaged status of the North Coast Region and its WMAs and counties, relative to statewide MIH according to 2010 Census figures. Two counties are completely (Modoc) or nearly completely (Siskiyou, at 97.92%) designated "DAC" or "SDAC." In total, 36% of the Region's population and 22.68% of its geographic area (2,817,669.56 acres) are considered "economically disadvantaged[100]." An additional 54.28% of the North Coast (6,743,191.12 acres) is considered "severely economically disadvantaged[101]" The total percent of the North Coast Region area that is either DAC or SDAC is 76.96% (9,560,860.69 acres). Appendix P Table 68 ("DACs of North Coast WMAs") and Appendix P Table 78 ("DACs of North Coast Counties") present area totals for each WMA and county in the Region (Map 2 "Economically Disadvantaged Communities").

5.14.2.3 Poverty Status & Unemployment

Unlike the definition of "economically disadvantaged" status referenced above, one's "poverty status" is not based on one single dollar amount (e.g. %MHI). Following the Office of Management and Budget's (OMB) Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. These poverty thresholds are the dollar amounts used to determine poverty status. If a family's total income is less than the threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically so the same thresholds are used throughout the United States. There is no adjustment to account for some parts of the country (or region) being more expensive to live in than other parts. The North Coast Region's poverty status is generally higher than the rest of the state's rate of 14.4 percent of individuals living in poverty (US Census 2010). Of the seven NCRP counties, only Sonoma County (10.7%) exhibits poverty rate below the state average. For the other counties, poverty rates are as high as 21.2 percent (Del Norte County).

The Region's 2010 unemployment rate (approximately 5%) is lower than that of the state as a whole (approximately 9%). This apparent anomaly, along with the income and poverty indicators above, may suggest that while similar numbers of inhabitants are employed, North Coast Region employees are paid less for similar work, or that the work they do, and related industries, are less profitable. Of the NCRP counties, unemployment ranges from a low of approximately 7 percent (Humboldt and Sonoma) to a high of 11.6 percent in Trinity County.

5.14.3 ECONOMIC SECTORS & TRENDS

The North Coast Region's economy has historically been one of resource extraction and agriculture. The majority of the region, except Marin and Sonoma counties, was until the last twenty years, dependent upon the timber, fisheries, and agriculture industries as primary revenue and employment generators. This has proven problematic for many communities reliant upon the timber and fisheries industries, where harvesting has declined significantly due to increased mechanization, stricter environmental laws, declines in supply due to over-harvesting and impacted environmental conditions, and increasingly competitive markets. Field crop agriculture has also suffered given the distance to market, inability to compete with production and lower costs in the Central Valley, and limited infrastructure. The overall decline in living-wage natural resources based jobs over the past twenty years has contributed greatly to the Region's overall profile as a high unemployment, low-income area (Mendocino County Joint Agriculture and Tourism Marketing Study 1997). The status of the North Coast Region's industries is assessed below utilizing 2000 US Census employment data.

Agriculture

Despite its overall decline in the regional economy, agriculture continues to be a significant industry for the North Coast area, providing 8 percent of employment, much higher than the State's 2 percent of all jobs. The agricultural sector includes timber harvesting, crops, and fisheries. Current agricultural strengths include grape growing, almonds, and organic row crops. While organic crops currently represent a small percentage of production, they are growing significantly and capture more value per dollar than traditional crops (California Department of Agriculture Crop Report 2003). It should also be noted that the growth in grapes is presently being tempered due to the general perception that there are adequate grape plantings to meet demand for the foreseeable future.

There is also a very substantial underground economy based on the illegal cultivation and sale of marijuana — much of which is illegally grown on public lands.

100 Disadvantaged status is defined as those having median household incomes less than 80 percent of the statewide annual MHI by the DWR and SWRCB. For Census 2010 data, this figure is 80 percent of $61,632: thus, incomes below $49,305 fit the definition of "disadvantaged" (DWR and SWRCB 2004).

101 The State of California Health and Human Services Agency, Department of Health Services defines "Severely Disadvantaged Community" as either places or tracts with a those with a MHI of less than 60 percent of the 2010 statewide MIH. For 2010, the cut-off is $36,979.

Because of its illegal nature, it is difficult to assign an accurate dollar value to this economic sector. The water supply and quality impacts associated with illegal cultivation of marijuana likewise are not well quantified, but anecdotal evidence from local experts indicates that these impacts are significant. The emergence of new laws regarding medical marijuana — some of which may be in conflict with federal law — may provide more precise data regarding the economic contribution of the legal elements of this agricultural enterprise.[102]

The trend for agricultural land in the past few decades has been one of transformation to urban uses. This is in part due to low crop values and the high price of surface and developable groundwater (DWR 2005), but also can be attributed to an increased demand for housing in the southern part of the Region, which is close to the San Francisco Bay Metropolitan Area. The timber industry is presently in decline; however production, profits and employment may improve with the growing demand for building products from sustainable forestry, affordable interest rates, and continued housing demand. Although land in agriculture has declined, agricultural water use has not, reflecting the replacement of large tracts of un-irrigated orchards with smaller acreages of irrigated vineyards (DWR 2005).

Construction

The construction industry, contributing 7 percent of jobs, also plays an important role in the Region, and represents slightly more jobs proportionately than that of the State. Prior to the global economic crisis beginning 2008, a widespread lack of housing supply and low interest rates had spurred housing construction throughout the Region. This had led to employment increases in construction, as well as the timber and wood manufacturing industries in the Region.

Government Employment

Government is a significant employer in most of the North Coast Region, and includes 8 percent of all employment, excluding government related non-management education jobs (which are included in the education/ social services sector discussed above). While not on a major upward swing, public agency employment is considered stable and unlikely to decline markedly in the coming decade. Government employees manage federal lands and programs, work for local jurisdictions, and manage educational institutions. Public employment is the leading industrial sector in Del Norte County, and accounts for 20 percent of total employment.

High-Tech & Information Services

High-tech industries occur in the southern part of the Region due to the proximity to the San Francisco Bay Area. Additionally, professional consulting agencies specializing in engineering, restoration, geomorphology, and other applied sciences occur throughout the Region in response to the regulatory environment, urban growth, and infrastructural development.

Manufacturing

Compared to the California average of 13 percent, the North Coast Region has particularly low manufacturing employment with only 7 percent of all jobs. The Region's manufacturing center is in Sonoma County, which shares the State's 13 percent rate for manufacturing jobs. Sonoma County is a manufacturing center for telecommunications, medical devices, and specialty food products.

Recreational Tourism

Tourism is strong in the Region, with arts, entertainment, food service and accommodations at 9 percent of Regional employment, a slightly higher rate than the State's 8 percent. Retail trade, a sector that is linked to tourism, is also thriving in the Region, and shares the state's rate of 11 percent of all employment. A recent survey of Willits Chamber of Commerce members identified that over 30 percent of members established their businesses in the area due to a positive tourism experience (Willits Chamber of Commerce Membership Survey, 2003). Recently, there is growing interest in the local, artisanal, organic food movement and associated tourism element (e.g. winery tours, cheese tasting, working-farm B&Bs, etc.).

102 The NCIRWMP recognizes that not all jurisdictions would characterize marijuana cultivation as "agriculture" or an "agricultural enterprise."

Service Sector: Education, Health, & Social Services

The service sector includes health, social services, education, government, retail, and tourism related businesses, and is the largest employer of the Region with over 62 percent of employment. Within the service sector, the education/health/social services industry cluster includes 22 percent of all employment, and exceeds that of the state's, at 19 percent. This sector reflects the predominance of hospitals and educational and governmental facilities providing significant employment in these areas.

5.14.4 ECONOMIC OPPORTUNITIES

Historically, the economies of communities in the North Coast Region relied on industries that extracted the region's natural resources — commercial fishing, mining, logging, gravel extraction, and farming. As these extractive activities have declined, the economies of these communities have been challenged to find replacements for these economic drivers. The Region's economies have evolved, however, so that natural resources can generate economic growth by providing amenities for enjoyment by local residents and visitors.

Developing a diversified, sustainable economy and filling the gap left with the decline of a resource-dependent economy is a great challenge for the Region. The relatively remote location and present lack of infrastructure (including for transportation, communications, energy, and water treatment) make it difficult to attract large-scale and high wage businesses in the 21st century. Climate change phenomena are projected to impact water supplies to varying degrees in the North Coast, further confounding sustainable economic development. Recognizing these and other challenges, the NCRP has developed a long-term financing plan for continued NCIRWMP updates, stakeholder outreach, process refinement, project implementation, and local monitoring (Section 12 "Long-Term Implementation and Financing").

The North Coast Region's competitive advantage lies in its ability to produce products and services that serve local communities or are unique to the area and do not attempt to compete with those of more developed areas. Some of these opportunities include:

- Increasing value-added food based manufacturing in order to retain agriculture businesses, expand the manufacturing sector, and capture the agriculture profit leakage that occurs when bulk crops are exported out of the Region.
- Responding to the increasing demand for "green" building products, and the area's natural advantage and experience in the timber industry.
- Building upon the area's reputation and strength as a center for renewable energy technology, e.g. biomass energy. The North Coast Region is a world-recognized center of innovation regarding energy conservation and natural resource protection and the development and manufacturing of these unique products could lead to the development of higher wage jobs.
- Continuing to develop tourism opportunities and related businesses that build upon the area's natural assets, including agricultural and eco-tourism, and reinforce the conservation of the area's natural resources.
- Expanding production of organic crops, livestock, seeds and food products
- Supporting the development of locally based industries that have historically created and retained the vast majority of North Coast Region jobs.
- Solving water related problems while the solutions are still voluntary — water is a limiting condition for economic development throughout the West.

Other areas for consideration by the Region's leadership include:

- The potential transition from the currently illegal marijuana cultivation industry to the potential future state of legal, regulated marijuana cultivation.[103]
- The potential for other areas of the state or nation to recognize the natural capital values and ecosystem services being provided by the north coast region (e.g. water, clean air, carbon sequestration, fisheries) and to provide some economic incentive for the North Coast to continue to conserve and enhance these values

5.15 SOCIAL & CULTURAL VALUES

The North Coast Region supports a diversity of social and cultural values, some shared and others divergent.

5.15.1 SHARED VALUES

The North Coast Region is composed of counties, jurisdictions, and Tribal communities that largely embrace their cultural and social diversity. Most counties include statements in their General Plans that reflect their interest in embracing diversity and expanding public awareness. Identified shared values of the North Coast Region include:

103 The NCIRWMP recognizes that not all jurisdictions would characterize marijuana cultivation as a regional economic opportunity for consideration.

- A strong connection to the land
- Interest in retaining a rural quality of life and small town culture
- Scenic beauty
- Natural resource protection
- Outdoor recreation
- Protecting historic sites
- Honoring and encouraging public awareness of diverse cultures
- Fostering a vibrant, sustainable economy

Without exception, all of the counties of the North Coast Region have included statements in their General Plans and related documents that indicate their commitment to retaining the quality of life in the area. An example is Mendocino County's Comprehensive Economic Development Strategy (2004): "We believe that economic, environmental, cultural, and social values are inseparably related. The quality of life so valued by Mendocino County residents depends upon economic opportunity for all, while preserving the rural beauty and natural resources, and a thriving, diverse community. Our adventure is to use our creativity to find the balance."

5.15.2 DIVERGENT VALUES

While most residents share the values expressed above, communities, Tribes, and individuals around the North Coast may differ in their beliefs about how those values should be implemented and by whom. The potential for conflict may be particularly acute where water is scarce or its quality impaired. For example, although both environmentalists and farmers have a deep connection to the land, they have clashed over an acceptable distribution of water. Another example of divergent values involves prioritizing the dozens of "beneficial uses of water" supported in the Region (NCRWQCB 2011). Some people may believe strongly that beneficial uses of water that are believed to maintain salmonid species (and fisheries) are the highest priority; however, others may feel just as strongly that agricultural uses, which are economically essential and retain a traditional way of life, are the most important to protect. In some of these cases, adjudication and/or intercession by the federal government has resulted where local efforts to reach conciliation have failed.[104]

5.15.3 STRATEGIES FOR COLLABORATING TO ACHIEVE COMMON GOALS

NCRP counties, Tribes, and other stakeholders clearly recognize the need for collaboration regarding water resource management. Many of these entities share long histories of successfully coordinating and balancing conservation efforts with economic development endeavors. Securing ample, clean water to support economic growth while protecting the associated wildlife, flora, communities, and industries of the Region is acknowledged as the key challenge for the NCRP. The regional population of water users is steadily growing, but environmental and financial concerns make the construction of large new surface storage projects less feasible now than in the past. As a result, there has been a paradigm shift away from the historical reliance on large surface water storage infrastructure and management (e.g. releases via reservoirs' dams). The current options for expanding water supply instead focus on local water security through diversity. Preferred techniques may include any or all of the following: small surface storage (e.g. for crop frost protection in the Russian River watershed), water recycling/reuse (e.g. for non-consumptive uses including irrigation), conservation (e.g. by upgrading built infrastructure), and conjunctive use (e.g. storing, then retrieving, excess water from groundwater). The strategies that best suit the values of a local area will vary. As these strategies are implemented (e.g. by NCIRWMP projects), there will be lessons learned and data shared, allowing for continual improvement of processes toward fulfillment of the NCIRWMP goals and objectives.

The shared commitment of NCRP members to the funding and implementation of innovative water solutions has been repeatedly documented. Below are just three examples:

- Del Norte General Plan, Water Resources Section (2003)
- This section has outlined over twenty new strategies for improving water quality, supply, species, habitat, and safety. These include encouraging the development of local Resource Conservation Districts and the coordination with other districts throughout the North Coast Region.
- Hoopa Valley Tribe Water Quality Control Plan (2012, amended from 2008)
- This Plan's language expresses the Tribe's willingness to coordinate with other jurisdictions to assure mutual benefits.
- Mendocino County Comprehensive Economic Strategy, 2005)

104 The history and recent status of the Klamath dispute is provided in a formal statement to the U.S. Senate by U.S. Bureau of Reclamations, M.J. Connor, Commissioner (June 20 2013) at https://www.usbr.gov/newsroom/testimony/detail.cfm?RecordID=2402

- This Plan states, "We want our government to coordinate effectively in providing services to our citizens and to lead jurisdictions in the direction of sustainable development. We will seek participation and collaboration from all segments of our community."

A fuller presentation of stakeholder-identified concerns with regard to water-based resources is described in Section 6 "Local & Regional Water-Related Issues." The NCRP has developed a set of strategies to address these issues. Strategies in the NCIRWMP are framed around the state's "Resource Management Strategies" (RMS), as recommended in the California Water Plan (2009). See Section 8 for more about RMS and other strategies supported by this Plan's projects. Section 7 "Project Application, Review, & Selection Process" presents the NCIRWMP project priorities and introduces the portfolio of projects that have been implementing these strategies throughout the Region since 2005.

SECTION 6.0 LOCAL & REGIONAL WATER-RELATED ISSUES

The primary water-related issues that limit the viability of North Coast ecosystems, communities, and economies are described in this section, with the regulatory context and existing efforts to address the issue outlined for each. All of the issues, which were identified by stakeholders and the NCRP, were directly addressed during the planning phase by one or more of NCIRWMP Goals & Objectives (Appendix C "NCIRWMP Objectives X Key Issues"), and are addressed during the implementation phase by one or more of the projects that comprise the diverse NCIRWMP portfolio.

6.1 PROCESS TO IDENTIFY & ADDRESS PRIORITY ISSUES

Applying a Watershed Management Approach

The NCIRWMP is fundamentally based upon a "watershed management" approach. Watershed management is the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that provide the goods, services and values desired by the community affected by conditions within a watershed boundary[105]. It is a goal of the State of California to advance sustainable watershed-based management of California's natural resources through community-based strategies. According to NCRP interviews (see below), local planners in the North Coast (e.g. Tribes, counties, municipalities, and RCDs) are successfully utilizing watershed management plans to facilitate streamflow improvement; enhance fish and wildlife populations; secure public health in economically disadvantaged communities; ensure water supply reliability; implement stream and wetland restoration; and maintain and improve agricultural operations.

Identifying Priority Issues

Through existing NCIRWM planning, implementation, and adaptive management processes, the NCRP continually identifies, considers, and addresses the major water-related issues that impact the viability of local and regional ecosystems, populations, and economies. The processes include provisions to facilitate ongoing and formal NCRP and public input on the NCIRWMP to ensure the list of issues remains current and relevant. NCRP staff and governance conduct frequent outreach (e.g. interviews, meetings, surveys, conferences) to ensure broad participation of the diverse stakeholders in the North Coast Region. A primary focal area has been identifying the water-related issues of greatest and/ or shared concern to North Coast communities, jurisdictions, and watershed stewards. In 2012 and 2013, the governing body of the NCRP and the public at large were invited to provide commentary on the NCIRWMP Phase III Annotated Outline (the framework for this current document), including the opportunity to update the list of issues. Most recently (2013–2014), specific input to identify priority water resource issues was solicited via interviews from North Coast local planners[106]; from surveys of small water supply and wastewater service providers[107]; and via discussions among stakeholders at public NCRP meetings and at the NCRP conferences (2007, 2013).

Integrating Issues Analysis with the NCIRWM Plan

The following sections in this document summarize how priority issues are further addressed by and integrated into the NCIRWMP and NCRP processes:

- Section 7 "NCIRWMP Project Application, Review, & Selection Process" describes how the identification, development, and implementation of projects is intended to be the primary method for the NCRP to address local priorities, objectives, issues, and opportunities in the North Coast Region.
- Section 8 "Resource Management Strategies — RMS" lists the RMS from the updated California Water Plan (2009 and 2013) and outlines the relationship of specific RMS to the NCIRWMP project priorities. RMS provide a broad framework for ensuring inclusion of diverse strategies that implement the NCIRWMP in alignment with statewide goals and priorities.
- Section 10 "Implementation Impacts and Benefits" provides systematic analysis (quantitative where feasible) demonstrating how the NCIRWMP-implemented projects directly ameliorate stakeholder-identified issues, and how implementation of the NCIRWMP project portfolio could result in unintended impacts to certain sectors that would require sincere attention to remedy.

105 California Department of Conservation Watershed Program and Watershed Portal (for data) at http://www.conservation.ca.gov/dlrp/wp/Pages/Index.aspx

106 NCRP Partner and Stakeholder Interview Synthesis 2013. Counties, municipalities, Resource Conservation Districts, and non-profits were represented in the interviews. (71 professional planners contacted; 41 interviewed by December 2013.) http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207

107 NCRP WSWW Outreach & Support Program Survey Synthesis 2013 (335 service providers contacted; 139 interviewed by December 2013) http://www.northcoastirwmp.net/docManager/1000009209/NCRP_Planner_Interviews_Summary_2013.pdf

6.2 REGIONAL WATER-RELATED ISSUES

Water management issues at the regional scale cover a range of water quality, watershed health and water quantity concerns that occur widely throughout the North Coast. These issues have motivated state and federal agencies to develop a suite of programs to guide, encourage, and support protection and restoration of anadromous fish habitat, beneficial uses of water (including protection and enhancement of drinking water), and pollution prevention. Although usually developed at a statewide, regional, or basin (WMA) scale, many of the programs are implemented at the local scale by local jurisdictions, watershed groups, Joint Powers Authorities (JPAs) or other cooperative coalitions, Native American Tribes, or state or federal agencies. Therefore, although regional in scope, these issues ultimately are addressed at the local scale by local entities, at times in cooperation with state and federal partners.

6.2.1 SALMONID POPULATION DECLINE

- ***THE ISSUE:*** Persistent decline since mid-1900s in populations of three North Coast salmonid species has and will continue to impact local and regional economies, and communities.
- ***GOALS & OBJECTIVES***: Goal 2 "Economic Vitality;" Objective 4 "Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas;" Goal 3 "Ecosystem Conservation & Enhancement;" Objective 5 "Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity;" Objective 6 "Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes;" Goal 4 "Beneficial Uses of Water;" Objective 7 "Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources."

Overview

The Region's native, naturally spawning populations of steelhead, Chinook, and Coho salmon have all declined dramatically in the past five decades[108] and all three are listed as threatened or endangered. Coho in particular are considered "very close to extinction," with only 2-3,000 individuals in the Southern Oregon-Northern California Coast (SONCC) ESU (NMFS 2012). Critical habitat has been designated for salmonids in the North Coast (Appendix H Table 30 "Critical Habitats of Salmonids in the North Coast Region" and Map 31 "Salmonid Critical Habitats").

The decline in salmonid population numbers since the 1940s is considered to be a result of a combination of human-caused and natural factors that occur in fresh water, in estuaries, and in the ocean. These include, but are not limited to:

- Water quality degradation, including sediment, temperature, and chemical contaminants
- Habitat loss and degradation
- Impediments to migratory fish passage
- Reduced stream flows
- Non-native invasive species
- Hatchery fish, which can introduce disease and genetic contamination
- Ocean conditions that negatively impact marine productivity

Two interrelated but distinct types of factors are affecting salmon: those occurring on land and in freshwater, and those occurring at sea. The former may be the subject of and respond positively to management efforts; the latter is, literally, beyond local solutions.

Water & Land Use

According to National Marine Fisheries Service (NMFS) Office of Protected Resources[109], water storage, withdrawal, conveyance, and diversions for agriculture, flood control, domestic, and hydropower purposes have greatly reduced or eliminated historically accessible habitat and/or resulted in direct entrainment mortality of juvenile salmonids. Modification of natural flow

108 NOAA "Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead" (2005) http://www.nwfsc.noaa.gov/assets/25/203_08302005_132955_brttechmemo66final2.pdf?CFID=32216459&CFTOKEN=14622252&jsessionid=8430f08d9cadad69fdc0215c587c6175e5d2

109 "Pacific Salmonids: Major Threats and Impacts" at http://www.nmfs.noaa.gov/pr/species/fish/salmon.htm

regimes have resulted in increased water temperatures; changes in fish community structures; and depleted flows necessary for migration, spawning, rearing, and flushing of sediment from spawning gravels; and altered gravel recruitment and transport of large woody debris. Physical features of dams, such as turbines and sluiceways, have resulted in increased mortality of both adult and juvenile salmonids and attempts to mitigate adverse impacts of these structures have to date met with limited success. Historic timber management practices caused extreme sedimentation and loss of canopy cover, which caused streams that were once suitable habitat to become marginal or unusable; these legacy impacts continue to affect North Coast streams. The implementation of Best Management Practices (BMPs) and regulations requiring riparian setbacks have lessened these negative impacts, however, timber harvest, road construction, and related activities continue to cause habitat degradation to a more limited extent. Management of timber lands by both industrial and non-industrial landowners has become a contentious issue with regard to how logging practices and road building impact watershed resources, sedimentation, and cumulative effects (NCRWQCB 2004). Additionally, native cold-water species, such as salmonids, are particularly vulnerable to potential climatic and hydrologic changes (Moyle et al 2013).

Ocean Conditions & Marine Productivity

In recent decades, scientists have demonstrated that there are (1) recurring, decadal-scale patterns of ocean-atmosphere climate variability in the North Pacific Ocean (Mantua et al. 1997, Zhang et al. 1997), and (2) correlations exist between these oceanic productivity "regimes" and salmon population abundance in the Pacific Northwest and Alaska (Hare et al. 1999, Mueter et al. 2002). There seems to be little doubt that survival rates for salmonids in the marine environment can be strong determinants of observed population abundance trends. The observed and reported increases in some salmon populations and/or fisheries (e.g. 2011/ 2012 Chinook in Klamath River) in recent years[110] may, therefore, be largely a result of more favorable ocean conditions leading to higher juvenile recruitment to North Coast streams. The predicted changes to climate could affect ocean productivity in unpredictable and uncontrollable ways. According to NMFS (2005) "it is reasonable to assume that salmon populations have persisted over time, under pristine conditions, through many such cycles in the past. Less certain is how the populations will fare in periods of poor ocean survival when their freshwater, estuary, and nearshore marine habitats are degraded."

110 California Salmon Status 2012 http://fishery.about.com/od/CommercialFisheriesseasons/a/California-Salmon-Status-2012.htm

Regulatory Context

Three salmonid species inhabit the North Coast Region streams, rivers, estuaries, and coastal waters: Steelhead (*O. mykiss irideus*), Chinook (*O. tshawytscha*), and Coho (*O. kisutch*) salmon. Populations of all three species are listed[111] as "Threatened" and/or "Endangered" and thus protected by the US and state Environmental Protection Agencies under the federal and state Endangered Species Acts; the California Environmental Quality Act; California Code of Regulations (Title 14 Natural Resources); Fish and Game Code; state Forest Practice Rules, and elsewhere. Protection of salmonid habitats is particularly addressed in section Fish and Game Code 1600–1616 (Lake and Streambed Alteration Program) and in state Forest Practice Rules (Timberland Conservation Program). Water quality and flow regulations, which also directly impact salmonids, are described elsewhere (Section 6.2.2 and Section 6.2.3).

SWRCB adopted the North Coast Instream Flow Policy on May 4, 2010. It applies to applications to appropriate water, small domestic use and livestock stock pond registrations, and water right petitions. This policy applies to water diversions from all streams and tributaries discharging to the Pacific Ocean from the mouth of the Mattole River south to San Francisco and all streams and tributaries discharging to northern San Pablo Bay. The policy area includes approximately 5,900 stream miles and encompasses 3.1 million watershed acres (4,900 square miles) in Marin, Sonoma, portions of Napa, Mendocino, and Humboldt counties.

Efforts to Address the Issue

The National Marine Fisheries Service is leading salmonid recovery nationally and coordinating efforts statewide, including in the North Coast. NMFS has released a recovery plan for Coho (NOAA 2012) with specific recovery and monitoring recommendations for the Region's watersheds; a multi-species salmonid plan will be released in 2014. NMFS considered a wealth of salmonid- and watershed- related data provided by state agencies (e.g. CDFW) and other available sources, and has recently (2014[112],) distilled them into Recovery Steps that are specific to the stream basins of the North Coast Region. Salmonid recovery efforts are being led at the state level by CDFW, which in 2004 released the Recovery Strategy for Coho

111 NOAA Northwest Fisheries Science Center Salmonid Recovery at http://www.nwfsc.noaa.gov/trt/pubs_statusreview.cfm

112 Including NOAA's "2014 Recovery Steps" outlined for North Coast basin streams at http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/2014_soncc_coho_all_recovery__actions.xlsx

Salmon.113 The Department previously published the Steelhead Restoration and Management Plan (CDFW 1996) and created the California Salmonid Stream Habitat Restoration Manual (CDFW 1994, 1998, 2010), which is used as a guide by restoration practitioners throughout California and will be utilized for the implementation of several NCIRWMP prioritized projects.

Locally, Tribes, watershed groups, and partnerships such as the Karuk, Hoopa, and Yurok Tribes, Five Counties Salmonid Conservation Program (5C), Mattole Restoration Council, and the Shasta-Scott Recovery Team are working cooperatively with regulatory agencies, landowners, and other stakeholders to implement projects that benefit salmonid habitat. Water Districts, NGOs, and local agencies (including Tribal environmental and fisheries agencies) contribute contribute to salmonid recovery via a diversity of conservation, management and restoration activities. The NCIRWMP provides a unifying framework for need identification and prioritization of these projects, a forum in which local concerns and state and federal requirements may be exchanged and disseminated, and a regional body for coordination and analysis of monitoring efforts. Recovery of listed salmonids in the Region also includes large-scale watershed-based recovery efforts that have, in some cases, contributed to conflict over agricultural water supply. The Klamath River Basin, for example, was long a focus of attention by multiple Tribal, state, and federal agencies, Tribal governments, and stakeholders. The Klamath River Basin Fisheries Task Force (KRBFT) was authorized by Congress in 1986 and is overseeing a 20-year effort to restore salmonid fishery values to the Klamath watershed (NCRWQCB 2005). The KRBFT ended in 2006 and The Klamath Basin Coordinating Council (KBCC) has been established to provide coordination and oversight for implementation of previous agreements[114].

NMFS (2012) estimates that the recovery of just Coho salmon (not to mention other protected salmonid species) could take 50 to 100 years with costs for implementing the actions estimated at roughly $1.5 billion. However, there are associated benefits: "viable salmonid populations provide ongoing direct and indirect economic benefits as a resource for fishing, recreation, and tourist-related activities. Every dollar spent on Coho salmon recovery will promote local, State, Federal, and Tribal economies, and should be viewed as an investment with both societal (e.g., healthy ecosystems and clean rivers where we and our children can swim and play) and economic returns" (NMFS 2012).

113 California Department of Fish and Wildlife. 2004. Recovery strategy for California coho salmon. Report to the California Fish and Game Commission. 594 pp. http://www.dfg.ca.gov/nafwb.cohorecovery

114 KBCC information at http://www.edsheets.com/Klamathdocs.html, which is a link from http://www.fws.gov/yreka/kri.htm

6.2.2 IMPAIRED QUALITY OF WATERBODIES

- ***THE ISSUE***: Approximately 85% of the North Coast Region's waterbodies are classified as "California Impaired Waters" per the Federal Clean Water Act, Section 303(d), due primarily to NPS pollution in the form of increased sediment and/or temperature. This degrades habitat quality for listed salmonid species, threatens drinking water supplies, and reduces overall watershed viability.
- ***GOALS & OBJECTIVES:*** Goal 3 "Ecosystem Conservation & Enhancement;" Objective 5 "Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity;" Objective 6 "Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes;" Goal 4 "Beneficial Uses of Water;" Objective 7 "Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources;" Objective 8 "Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities;" and Objective 9 "Protect groundwater resources from over-drafting and contamination."

Overview

According to the SWRCB, the present water quality within the North Coast Region generally "meets or exceeds" state and regional water quality objectives set forth in Section 3 of the North Coast Basin Plan (NCRWQCB 2011). The Basin Plan defines 28 Beneficial Uses of waters that are protected by the state. The priorities placed on particular "beneficial uses" is perhaps best determined at the local (e.g. county, municipality, Tribal) level.

In most cases the Region's water quality is "sufficient to support, and in some cases, enhance the beneficial uses assigned to water bodies" (NCRWQCB 2011). However, the Basin Plan also estimates there are 20,298 miles (32,667 km) of impaired streams in the Region. The 2010 impaired waters of the North Coast Region are listed in Appendix H Table 25 ("Section 303(d) Impaired Waters of the North Coast Region") and illustrated in Map 29 ("Impaired Water Bodies"). Each designation of "impaired" requires development and implementation of a TMDL Plan to reduce pollution loads to acceptable levels (Appendix H Table 26 "TMDL Status for Impaired Waters of the North Coast Region"). In many cases, impaired waters flow directly into protected areas, including the Marine Managed Areas (Appendix H Table 20), Wild and Scenic Rivers (Appendix H Table 21), and Critical Habitats of federal and/or state listed species (Appendix H Table 31).

Drinking and municipal water supplies are directly impacted by the "impaired" quality of regional rivers, streams, lakes, groundwaters, and other waterbodies. This is because, with a few exceptions, the state considers drinking and municipal water supplies to be potentially "all surface and ground waters." Impaired water bodies cannot, by definition, support drinking/municipal uses. Drinking water is of particular concern as it relates directly to public health. Recognizing this, the NCRP has highlighted drinking water quality as a particular concern (see Section 6.2.4 "Drinking Water Infrastructure, Supply & Safety" for more on this NCRP priority area).

Two types of water pollution sources are commonly defined: *Nonpoint Sources* (NPS) of pollution include stormwater runoff from industry and urban areas and runoff originating from roads, agriculture, timber harvest, construction sites, channel modification, and gravel mining; and *Point Sources* of pollution (including bacterial and chemical pollutants such as MTBE, PCE, dioxins, and estrogens, as well as temperature) originate from failing POTWs, large-scale agricultural operations, and industrial facilities. In the North Coast, nonpoint sources currently present a more widespread issue, because point sources are fairly discrete and have responded relatively well to targeted efforts at improvement. Nonpoint sources, particularly sediment from upland and instream erosion, and increased temperatures due to reduced flows and removal of riparian vegetation are more numerous, harder to identify, and are challenging to control.

Inadequate wastewater treatment and aging septic tanks are widespread and common sources of bacteriological contamination. Locally, shellfish harvesting beds in Humboldt Bay have been closed multiple times due to nonpoint source runoff, most often following large rain events. Mercury, a legacy pollutant from mining and other industrial activities, concentrates in fish tissue and has been found to be of concern in Lakes Pillsbury, Mendocino, and Sonoma and in the Laguna de Santa Rosa between Santa Rosa and Sonoma. There is a need to complete data sets for mercury in many other waterbodies of the Region to both identify areas of concern and to verify areas that are safer from which to fish.[115]

Additionally, fuel constituents, such as MTBE, chemicals from wood treatment at lumber mills, agricultural (i.e. silvicultural) operations, and residential applications are region-wide water quality issues. Reduced flows in rivers and streams can result in increased temperature and decreased capacity to dilute contaminant concentrations. Decreased precipitation and stream flow patterns (notable, reductions in both) are expected under most climate change scenarios.

Resolution of impaired water quality is hindered by lack of adequate funding, for nearly all North Coast local entities. Funds are needed to develop a Regional Water Quality Monitoring Plan; to conduct comprehensive sub-regional watershed and groundwater assessments; to implement upgrades that reduce POTW permit violations; and to build new facilities where the need exists, but infrastructure does not.

Regulatory Context

Comprehensive water quality planning is mandated by the Federal Clean Water Act (for navigable waters); California Water Code (for ground and surface waters); and the state's Porter-Cologne Water Quality Control Act. The Clean Water Act requires states adopt water quality standards and authorizes the preparation of wastewater management plans. Under the oversight of the USEPA Region IX, the State and Regional Water Boards have primary responsibility for maintenance of water quality in the North Coast Region, including setting water quality objectives and standards, and designating "beneficial uses" for water. The Porter-Cologne Act devises and adopts water quality control basin plans and authorizes the State Water Board to adopt, review, and revise state water policy.

In 1972 (updated in 1996), the SWRCB adopted a uniform list codifying the various "beneficial uses" for waters of the state to protect water quality and supply to retain maximum benefits for current and future generations of water consumers and stewards. Twenty-eight beneficial uses (Appendix H Table 24 "Beneficial Uses of Water in the North Coast Region, 2011") are designated within the North Coast Region,

115 Source: Davis, J.A., J.R.M. Ross, S.N. Bezalel, J.A. Hunt, G. Ichikawa, A. Bonnema, W.A. Heim, D. Crane, S. Swenson, and C. Lamerdin. 2013. Contaminants in Fish from California Rivers and Streams, 2011. A Report of the Surface Water Ambient Monitoring Program (SWAMP (p. 33 &48.) California State Water Resources Control Board, Sacramento, CA.

affording protection to its bays, estuaries, minor coastal streams, ocean waters, wetlands, inland surface waters, and groundwaters (NCRWQCB 2011[116]).

To address stormwater quality (and supply; see next section) issues, the US Congress in 1987 added Section 402(d) to the federal Water Pollution Control Act (a.k.a. Clean Water Act), which requires National Pollution Discharge Elimination System (NPDES) permits from municipalities and industries (including construction sites one acre or larger), to the maximum extent practicable and utilize technologies to achieve water quality improvement (NCRWQCB 2011). The State Water Resources Control Board (SWRCB) and the US Environmental Protection Agency (USEPA) regulate the runoff and treatment of stormwater in industrial, municipal and residential areas of the Region. Cities and other jurisdictions that operate large and medium and small stormwater systems as well as specific industrial activity sites must apply for stormwater permits.

In 2004, the NCRWQCB adopted Resolution No. R1-2004-0087, the Total Maximum Daily Load (TMDL) Implementation Policy for Sediment-Impaired Receiving Waters in the North Coast Region, which is applicable to all sediment-impaired watersheds in the Region (NCRWQCB 2004). The goals of the TMDL Implementation Policy are to control sediment waste discharges so that TMDLs are met, sediment water quality objectives are attained, and beneficial uses are no longer adversely affected by sediment.

California Water Code (Section 10920) and Senate Bill x7-6 (2009) require the establishment of statewide groundwater monitoring by locally designated "Monitoring Entities." DWR addresses this requirement through its statewide Groundwater Elevation Monitoring Program (CASGEM). DWR ranks the Region's groundwater basins and sub-basins (Map 17 "Groundwater Basins & Sub-Basins") as "high," "medium," or "low" priority. DWR currently requires compliance with CASGEM only in high and medium priority basins, and restricts many of its funding programs to these same basins (Revelle 2014). There are no high priority basins in the North Coast Region, but there are eight preliminarily designated (DWR 2013) medium priority basins (the 55 remaining basins are low or very low priority). The eight medium priority basins account for about 60 percent of the population and about 80 percent of groundwater use for the Region. They are:

- Butte Valley
- Eel River Valley
- Klamath River Valley (Tule Lake Subbasin)
- Santa Rosa Valley (Santa Rosa Plain Subbasin)
- Scott River Valley
- Shasta Valley (Shasta Valley Subbasin)
- Smith River Plain
- Ukiah Valley

In these basins, Monitoring Entities must be identified to conduct the well monitoring or state funding related to groundwater projects may be lost. This requirement may be burdensome on small, rural, economically disadvantaged, and Tribal entities, hindering rather than facilitating local implementation of beneficial groundwater projects. To help local agencies comply with CASGEM provisions, DWR has developed the CASGEM Online System[117]. The NCIRWMP provides a forum for NCRP governance and stakeholders to work with DWR toward fuller resolution of this issue.

Efforts to Address the Issue

Regional activities focus on continuing to regulate point source discharges, reducing erosion and runoff from confined agricultural and municipal areas, maintaining groundwater cleanup programs, improving public outreach and education, and promoting water reuse and recycling programs. NPS water quality issues are a primary concern and are being addressed through the TMDL process, which is developed and implemented at a watershed scale; the NCRWQCB Water Quality Control Plan for the North Coast Region; and the SWRCB Nonpoint Source Program Strategy and Implementation Plan (Appendix E "Overview of Local Water & Land Use Planning" for these and other programs). The SWRCB has indicated a preference for voluntary compliance with regulations and TMDL implementation, and many groups and programs (e.g. local RCDs, the Gualala River Watershed Council, and Rangeland Water Quality Management Plans) offer landowners technical assistance to address local NPS issues on their properties.

Land cover and land use directly impacts or supports source drinking water quality (DWR and USACE 2012). Forest cover is correlated to drinking water treatment costs: the more forest in a source watershed, the lower the treatment costs (Ernst et al. 2004).

With regard to stormwater runoff, the State Water Resources Control Board (SWRCB) and the US Environmental Protection Agency (EPA) have regulated the runoff and treatment of stormwater in industrial, municipal and residential areas. The effort falls into several distinct categories with the same goals to (1) use stormwater as a resource and to (2) reduce harmful pollutants, fertilizers,

116 See Table 2-1 of Water Quality Control Plan for the North Coast Region — the "Basin Plan" — for a listing of existing and potential Beneficial Uses in Calwater hydrologic areas, features, and/ or waterbodies. http://www.waterboards.ca.gov/northcoast/

117 DWR CASGEM Monitoring Entity Portal at http://www.water.ca.gov/groundwater/casgem/submittal_system.cfm

debris and other materials carried into storm drains, drainage systems and ultimately the Region's rivers, estuaries, and marine areas. Past efforts to manage stormwater quality and quantity have focused on controlling entry of pollutants into waters, and implementing good management practices; both these strategies remain critical. However, the approach to stormwater has shifted, emphasizing local strategies that aim not only to prevent flood-related problems, but also to provide ecosystem and community benefits (DWR and USACE 2013).

Another effort at water quality improvement is a collaboration of Tribes in the North Coast led by the Cher-Ae-Heights Indian Community of the Trinidad Rancheria (described in DWR 2013). This group was formed to assist local tribes interested in collaborating to develop an environmental assessment and implementation plan for improving ecosystems and water quality in order to meet or exceed federal and State regulations regarding water quality. Tribes currently involved in this collaboration include the Trinidad Rancheria in Trinidad, Blue Lake Rancheria Tribe in Blue Lake, Bear River Tribe in Loleta, and Big Lagoon Rancheria in Arcata. One main function of the cooperation is to assist the members in obtaining grant funding for local water quality infrastructure improvements.

Several projects in the NCIRWMP include cooperative participation by local landowners in nonpoint source pollution control. The NCRP will continue to assist the state with information dissemination and will integrate state findings, recommendations, and plans into future iterations of the NCIRWMP, allowing the SWRCB and NCRWQCB to focus resources on better assessing regional groundwater, surface water, and environmental conditions.

6.2.3 REDUCED WATER AVAILABILITY

- ***THE ISSUE:*** Increasing population size, growing water demand from agriculture and other sectors, regulatory requirements for instream flow to protect listed salmonids, the potential for more frequent and sustained droughts, and other factors are exacerbating the challenges inherent in securing an adequate water supply for the Region's many water users.
- ***GOALS & OBJECTIVES:*** Goal 3 "Ecosystem Conservation & Enhancement;" Objective 5 "Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity;" Objective 6 "Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes;" Goal 4 "Beneficial Uses of Water;" Objective 7 "Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources;" and Objective 9 "Protect groundwater resources from over-drafting and contamination."

Overview

Water available to supply the many beneficial uses defined by the NCRWQCB (2011) includes that which comprises the Region's groundwater basins, rivers, streams, lakes, reservoirs, estuaries, bays, and reclaimed waters. Local water availability is a function of the volume of these sources; applicable regulations that dictate water rights and water distribution; and future conditions that influence long-term supply and demand (e.g. population change, climate change). In some notable cases (e.g. the Klamath Basin[118]), the need to secure water supply availability has led to prolonged, sometimes vehement, disputes between stakeholders.

Instream impoundments in the North Coast Hydrologic Region have the potential to supplement water supplies, but often alter the natural pattern and range of flows in a river, reduce a water body's assimilative capacity for other perturbations, and sometimes result in unintended water quality consequences (e.g., nuisance algal blooms, including the production of toxic algae; elevated temperatures; alteration of downstream sediment delivery and sorting, etc.; DWR 2013).

Inter-basin water diversion for agricultural and human use is occurring within the Region (e.g. from the Eel watershed to the Russian River watershed). Water is transferred outside of the Region, from the Russian River to supply municipal water for the North San Francisco Bay Area, and from the Trinity River to the Central Valley for agricultural uses. The Eel River diversion at Potter Valley provides power production and incidental supplemental water to the Russian River. However, flow reduction in the Eel River has contributed to reductions in fish spawning habitat and increased water temperatures (CEED 2002). Flows from the Trinity are integral to the ecosystem health of the Lower Klamath River. The Trinity River Division (TRD) of the Central Valley Project (CVP) was completed in 1965 and has received attention from the Secretary of Interior, Bureau of Reclamation, Native American Tribes, and a broad spectrum of stakeholders. On December 29, 2000 the Secretary of the Interior signed the Trinity River Record of Decision (ROD) to require higher releases to the Trinity River from Lewiston Dam. The Westlands Water District and others filed suit to have the Trinity ROD set aside through an injunction. There have been multiple rulings from the Federal Court since that time.

118 The history and recent status of the Klamath dispute is provided in a formal statement to the U.S. Senate by U.S. Bureau of Reclamations, M.J. Connor, Commissioner (June 20 2013) at https://www.usbr.gov/newsroom/testimony/detail.cfm?RecordID=2402

In coastal watersheds throughout the Region, significant, localized water withdrawals via riparian right have impacted listed salmonids and reduced water supply security. This is particularly the case for rural water users, communities, and small municipalities. Some watersheds are approaching a local population threshold where population is high enough to create water supply problems and fisheries impacts, but too small and dispersed to create community-scale water systems. Balancing water demands while maintaining existing and improving degraded salmonid habitat is an important management challenge for the North Coast Region. By bringing all parties together in a cooperative and collaborative enterprise for the benefit of the entire region, the NCIRWMP provides an important framework for developing and implementing creative, efficient and equitable responses to these challenges.

Drought is a natural component of California's climate. Particularly severe drought years are documented for 1976-1977, 1987-1992, 2000-2002, 2007-2009, and 2013/2014. Prolonged periods of drought can increase ecosystem vulnerability to pests and invasions by non-native species. Reduced precipitation translates to reduced infiltration to groundwater basins and reduced groundwater recharge. Droughts present immediate and long-term challenges to water supply, water quality, food production, economic stability, and ecosystem function. Drought conditions also increase risk of wildfires, which impact water quality through release of sediment and alteration of hydrologic processes.

It is likely one of the major expressions of global climate change in the North Coast Region will be increasing drought and an associated decrease in water supply and water availability. According to the California Natural Resources Agency (2009), more frequent and more intense drought conditions are expected as higher temperatures cause soils and vegetation to lose water; during the past century, shifts in runoff patterns have already diminished the percentage of annual runoff that occurs during April through July. Changes in precipitation, plus higher temperatures, are likely to affect the amount of water in streams, lakes, ponds, and wetlands. More of the precipitation that does occur will fall as rain rather than as snow, and the snow that does fall will melt sooner. The state's snowpack is expected to decline, disappearing entirely at lower elevations. The lower snowpack will deliver less water to many streams during the late spring. Stream flows typically will increase in the winter and spring, and decline in late spring, summer, and fall, changing the morphology of river systems. Changes in storms, runoff, and water temperature may lower the quality as well as the quantity of water in some streams in some months. Ecosystems may change as these conditions decrease the suitability of water-related habitat for some species, and increase its suitability for others (e.g. exotic species). The resulting stress on some species, such as salmon and steelhead, may cause local extirpation in some areas.

Regulatory Context

California Water Code regulates ground and surface water supply in the state. With specific respect to drought preparedness, the Urban Water Management Planning Act (1983, CWC 10610-10656) requires that every urban water supplier that provides water to 3,000 or more customers or more than 3,000 acre-feet annually, should make "every effort" to ensure the appropriate level of reliability in water service sufficient to meet the needs of all customer types during normal, wet, or dry years. The Act introduces Urban Water Management Plans (UWMPs, which local entities across the Region have developed). Water conservation to ensure water supplies to meet growing demands is California's state policy (Water Code Sections 100 & 101). DWR and local jurisdictions partner to ensure that (1) all local jurisdictions adopt a landscape water conservation ordinance and (2) ensure that all fixtures be American Society of Mechanical Engineers (ASME)-certified. The effects of droughts are increasingly being exacerbated by additional regulatory requirements to protect listed fish species, especially wit regard to water diversion (CNRA 2009).

SWRCB Resolution No. 77-1[119] (1977) requires State and Regional Water Boards to encourage water recycling projects using wastewater that would otherwise be discharged to marine or brackish receiving waters or evaporation ponds. The resolution also specifies using recycled water to replace or supplement the use of fresh water or better water quality water, and to preserve, restore, or enhance instream beneficial uses. In subsequent decades, a number of additional regulations have been aimed at encouraging or incentivizing water and/or energy conservation to secure limited or uncertain water supplies.

SBx7-7 further requires:

1) Urban Water Management Plans (UWMP) be prepared and adopted by certain urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that provides over 3,000 acre-feet of water annually or serves more than 3,000 connections is required as part of the UWMP to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years (CWP 2013). DWR reviews updated UWMPs to make sure they have completed the requirements identified in the Urban Water Management Planning (UWMP) Act (Division 6 Part 2.6 of the Water Code §10610–10656). Thirteen North Coast urban water suppliers have submitted 2010 urban water management plans to DWR.
2) Agricultural Water Management Plans (AWMP) be prepared and adopted by water suppliers who supply more than 25,000 irrigated acres. All of the North Coast agricultural water suppliers supply fewer than 25,000 irrigated acres; as of August 2013, no AWMPs had been submitted from the North Coast Region.

The North Coast Instream Flow Policy was adopted by SWRCB on May 4, 2010. It applies to applications to appropriate water, small domestic use and livestock stock pond registrations, and water right petitions. This policy applies to water diversions from all streams and tributaries discharging to the Pacific Ocean from the mouth of the Mattole River south to San Francisco and all streams and tributaries discharging to northern San Pablo Bay. The policy area includes approximately 5,900 stream miles and encompasses 3.1 million watershed acres (4,900 square miles) in Marin, Sonoma, and portions of Napa, Mendocino, and Humboldt counties.

The Water Conservation Act (2009 SBx7-7) requires all water suppliers to increase water use efficiency in two sectors, Urban Water Conservation and Agricultural Water Conservation[120]. Under the Act, urban water suppliers to calculate their baseline water use and set 2015 and 2020 water use reduction targets. SBx7-7 supports a 20 percent reduction in the amount of water each person uses per day (i.e. per capita daily use) by the year 2020. The North Coast Hydrologic Region had a population-weighted baseline average water use of 147 gallons per capita per day in 2010. The projected conservation target is 127 gallons per capita daily use. Current baseline and target data for thirteen North Coast urban water suppliers are available on the DWR Urban Water Use Efficiency website[121]. The water conservation law has amended or repealed some sections of the state Water Code and may affect local reporting requirements under the Urban Water Management Planning Act and other government codes (CWP 2013).

The state's Recycled Water Policy (2013[122]) supports increased capture and use of recycled water from municipal wastewater sources that meets the definition in Water Code Section 13050(n): "Recycled water" means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource." The SWRCB strongly supports recycled water as a safe alternative to potable water for such approved uses.

Severe water shortages have in extreme cases resulted in the declaration of a state of emergency, which allows the governor to direct the SWRCB to suspend certain state water regulations; streamline water transfers; cease or reduce water diversions (including riparian and pre-1914 rights); or take other aggressive means to secure water emergency supplies[123]. The California water rights system is designed to provide for the orderly allocation of water supplies in the event that there is not enough water to satisfy everyone's needs. As a result, every water right holder has a priority, relative to every other water right holder. When there is insufficient water for all, water diversions must be curtailed in order of water right priority. State of drought emergency was declared in

119 Policy with Respect to Water Reclamation in California at http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/1977/rs77_001.pdf

120 Water Conservation Act of 2009 and SB X7-7 at http://www.water.ca.gov/wateruseefficiency/sb7/

121 Urban water Use Efficiency reports/ data for North Coast Region at http://www.water.ca.gov/urbanwatermanagement/2010_Urban_Water_Management_Plan_Data.cfm

122 California Recycled Water Policy (2013) at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/rwp_revtoc.pdf

123 State Water Board drought related actions are summarized at http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/droughtorders.shtml

2009 following a 2-year drought, and again in water year 2013/2014, the driest year on record for California[124].

Efforts to Address the Issue

California's "Climate Adaptation Strategy" (2009) recommends addressing water security/ water availability/drought preparedness with "a portfolio of measures implemented at the local and regional level" in a coordinated manner (i.e. via a process such as the NCRP/ NCIRWMP). These measures may include water conservation, energy conservation, water reclamation and recycling; groundwater storage; conjunctive use; rainwater collection; Low Impact Development (LID) techniques; water efficient landscape ordinances; small surface storage; and climate adaptation planning/ vulnerability identification. The NCRWQCB is supportive of efforts to provide off-channel storage for summer agricultural use as an alternative to summer instream withdrawals, but the construction of instream impoundments is not viewed in most cases as supportive of water quality goals (DWR 2013).

The volume and adequacy of local groundwater supplies represent a major data gap in the Region and the state. In many areas of the North Coast, security of groundwater supplies is of concern, in part because of the difficulty of determining the extent (and quality) of water within groundwater basins. CASGEM[125] requires local entities to assume responsibility for monitoring and reporting groundwater elevations, in order to remain eligible for water grants or loans from the state. Local planning departments in the North Coast Region (e.g. counties and municipalities) are addressing this major challenge by collaborating on groundwater monitoring programs, streamflow improvement plans, and base flow determinations in key rivers.

- In 2011, representatives from the State of California and Oregon, USBR, Tribes, and other stakeholders (Klamath Basin Coordinating Council) under Section 19.2 of the Klamath Basin Restoration Agreement developed a Drought Plan for the Upper Klamath Region. The Drought Plan identifies a number of strategies that would be used to counteract the effects of drought and extreme drought in the region. Measures that could be implemented include voluntary water conservations, additional stored water, the use of groundwater and the reduction of diversions (Klamath Basin Coordinating Council 2011).

While groundwater development is being considered by some parts of the Region as a potential future water source, both Sonoma and Modoc counties share a concern over future groundwater development. The Mendocino City Community Services District (CSD), concerned that the groundwater basin that supplies the Town of Mendocino with potable water was being over-drafted, developed a groundwater management plan that puts limits on new well development or the increase in withdrawals of existing wells (Mendocino City CSD undated). Sonoma County has recognized that groundwater is scarce in large areas of the county where intensive rural development and the installation of private wells has led to over drafting. Siskiyou and Modoc counties have voiced concerns over the large number of deep, high output wells that have been recently developed to address current water supply challenges: the long-term consequences of those wells are unknown.

6.2.4 DRINKING WATER & WASTEWATER INFRASTRUCTURE, SUPPLY & SAFETY

- ***THE ISSUE:*** Water supply and wastewater treatment infrastructure throughout the Region is aging, failing, or is inadequate to meet growing water supply, treatment, and system integration needs, resulting in inadequate water supply reliability, impaired drinking water supplies, water quality violations, and threats to public health and safety.
- ***GOALS & OBJECTIVES:*** Goal 4 "Beneficial Uses of Water;" Objective 7 "Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources;" Objective 8 "Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities;" and Objective 9 "Protect groundwater resources from over-drafting and contamination."

Overview

The North Coast Region is relatively large, rural, and rich in natural surface and groundwater sources. However, the communities tend to be geographically isolated, economically disadvantaged, and more-or-less dependent on locally provisioned water for domestic and other uses. In general, drinking water systems in the Region deliver water to their customers that meet federal and State drinking water standards (DWR 2013). In other cases, local water supplies are defined as "impaired" by the state, meaning pollutants like sediment or chemicals have rendered them unsuitable for various beneficial uses, including drinking water. Failing wastewater treatment facilities in disadvantaged communities pose a threat to public health and impair water bodies. Throughout the North Coast, there is great need to replace or upgrade failing, aging systems with

124 Governor Declares Drought State of Emergency and State Water Board Issues Curtailment Notice (January 21, 2014) http://www.somachlaw.com/alerts.php?id=264

125 http://www.water.ca.gov/groundwater/casgem/

current technology and reliable systems. A number of Publicly Owned Treatment Works (POTWs) in the Region are in chronic violation of permit compliance and currently may be under enforcement orders. For many homeowners, a lack of adequate and cost effective septic pumping options for onsite systems can discourage regular maintenance and pumping of tanks, which ultimately can harm local ground and surface waters.

Communities in the Region are serviced by hundreds of individual water supply and wastewater service providers, but many of these are understaffed and underfunded. Further, many of the systems are aging, failing, or are otherwise are inadequate to service local populations. The NCRP, via extensive surveying[126] of North Coast water supply and wastewater service providers, has identified the following critical needs to support clean drinking water and healthy communities:

1) Assistance with securing funding and navigating the process of replacing or upgrading aging or failed infrastructure
2) Assistance with general water and wastewater system infrastructure maintenance and repair
3) Technical training to support compliance with state standards, especially drinking water standards
4) Assistance identifying funding opportunities and preparing grant applications
5) Technical support to develop and maintain maps of water and wastewater systems

Regulatory Context

The state regulates water quality of surface and groundwater, including sources for drinking and municipal water supplies (e.g. California Water Code, Water Quality Control Act, Health and Safety Code, others). Under the oversight of the USEPA Region IX, the State and Regional Water Boards have primary responsibility for maintenance of water quality in the North Coast Region. This is achieved in part through establishment of specific, measurable water quality objectives for rivers, lakes, estuaries, and other waters in Water Quality Control Plans. The Water Quality Control Plan for the North Coast Region (NCRWQCB 2011) defines beneficial uses for state waters, including for drinking water.

The SWRCB (Resolution 88-63[127]) defines "sources of drinking water" as water bodies with beneficial uses designated in Water Quality Control Plans as "suitable, or potentially suitable, for municipal or domestic water supply (MUN)." Further, that "all surface and ground waters of the State" are "suitable, or potentially suitable" for MUN uses, *with the exception* of (1) contaminated waters that cannot reasonably be treated; (2) sources that do not provide sufficient water to supply a single well a sustained average 200 gallons/day; (3) water systems designated or modified to collect or treat waste, stormwater runoff, and/or agricultural drainage; (4) groundwater aquifers regulated as geothermal energy producing sources; and (5) certain site-specific cases.

Assembly Bill 885 (1999; authorized 2012) requires the state to regulate the 1.2 million Onsite Wastewater Treatment Systems (OWTS) (i.e. septic systems) operating in California. As described below and elsewhere in this Plan, these domestic systems, when inadequately maintained, can contribute to significant septic leakage; compound failures from inadequate waste treatment infrastructure; and contribute to bacterial and pharmaceutical impairment of natural waterbodies.

Efforts to Address the Issue

Since its inception, the NCRP has focused on drinking water supply and wastewater treatment in small economically disadvantaged communities. A recent program entitled the NCIRWMP Water and Wastewater Service Provider Outreach and Support Program (WSWW, described below) helps to enhance this focus and reach out to underserved rural communities who have daunting water supply and wastewater challenges.[128] In 2011, DWR awarded funding for this pilot program to the NCRP to help improve local capacity and quality of services of small water supply and wastewater providers in the North Coast Region, particularly in economically disadvantaged areas. As the NCIRWMP progresses, the NCRP will continue to involve local providers in the regional water management process and facilitate access to IRWM and other potential funding as appropriate and feasible.

Water & Wastewater Service Provider Outreach & Support Program

The NCRP received a Targeted Grant from the California Department of Water Resources (DWR) to improve the capacity and quality of service of small water supply and waste water service providers through coordination, technical assistance, trainings, integrated planning, funding opportunity identification, and education. In 2013, a survey was circulated to all public water systems serving communities in the North Coast region, including Tribal systems, cities, special districts,

126 As part of the NCIRWMP Water & Wastewater Service Provider Outreach & Support Program, survey 2012 Report & Synthesis at http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207

127 SWRCB Revised Resolution No. 88-63 http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2006/rs2006_0008_rev_rs88_63.pdf

128 NCIRWMP Water & Wastewater Service Provider Outreach & Support Program 2014 survey summary at http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207. See the program summary in Appendix O of this document.

and mutual water companies. Many of these systems provide critical services in small rural communities. The survey was intended to determine technical, managerial, and financial needs and project priorities.

Under contract with the NCRP, GHD is completing the next step in the program by creating tools and providing technical assistance to address the challenges identified through the survey process. To inform this work GHD will convene a Small Community Assistance Workshop to involve the NCRP and government agencies that support small communities and Tribes in need of this support, in an effort to build tools that facilitate efficient access to financial assistance and reduce barriers to effective water system management.

Small Community Assistance Workshop & Toolkit

In order to build a toolbox that effectively synthesizes all available resources and creates an environment that minimizes gaps and supports water providers, GHD will convene a one-day workshop with key staff from the NCRP and various government agencies involved in financing and supporting small community water and Tribal water systems. State, Tribal, and federal agencies are currently exploring options that will allow them to work more effectively together and the workshop will explore ways to build on these proposed mechanisms to enhance the level of service provided to small, disadvantaged water providers. During the facilitated workshop, GHD will guide discussions of program gaps and areas where streamlining could be facilitated by increased communication and cooperation. Based on the results of the workshop, GHD will work with administrative agencies to update and consolidate existing processes into synthesized summaries and toolbox elements to be included in the Small Community Toolbox.

Workshop topics include:

- Project Overview & Purpose of Workshop
- Needs Survey Overview
- Overview of Existing Assistance Programs
- Proposed Small Community Toolbox
- Matching Programs to Needs
- Review & Refine Gap Analysis
- Brainstorm How to Fill the Gaps

A challenge faced by many of the small treatment facilities in receiving competitive grant funds is a lack of funding to hire the engineers or consultants needed to complete the preliminary studies necessary to qualify for many grant and loan programs. The NCRP, as a coalition of regional jurisdictions, may have greater ability to obtain funding or leverage resources for such preliminary studies. The California Rural Water Association (CRWA) and Rural Community Assistance Corporation (RCAC) also can provide technical, managerial, and financial capacity building and can assist with system needs assessments, developing budgets and capital improvement programs, and rate setting. California Department of Public Health (CDPH) staff regulates water systems and is involved in funding infrastructure improvements, conducting source water assessments, and project evaluation. The State Water Resources Control Board publish documents to guide private landowners in drinking water related assessment and response[129].

6.2.5 FLOOD PROTECTION & FLOOD MANAGEMENT

- ***THE ISSUE:*** Numerous communities, economies, and ecosystems of the Region are at risk from major floods from inland and coastal sources, but local flood management planning, flood management infrastructure, and flood response capacity are in many cases inadequate to provide for public safety.
- ***GOALS & OBJECTIVES:*** Goal 6 "Public Safety;" Objective 12 "Improve flood protection and reduce flood risk in support of public safety."

Overview

Flood events in the Region have the potential to cause widespread damage to personal property, infrastructure, and human health. According to DWR (2013) resources vulnerable to flood risk in the North Coast Region include (Map 22 "Flood Zones"):

- 30,000 people exposed to flood risk (5 percent of population) in a 100-year floodplain with 40,000 people (6 percent of population) exposed in a 500-year floodplain.

129 For example, see SWRCB Guide for Domestic Well Owners (2011) http://www.waterboards.ca.gov/gama/docs/wellowner_guide.pdf

- $3 billion worth of structures (8 percent) exposed in a 100-year floodplain with $4 billion (10 percent) exposed in a 500-year floodplain.
- $80 million of crop value exposed in a 100-year floodplain (108,000 acres or 25 percent of crop acreage). Within a 500-year floodplain in the North Coast region, $90 million in crop value from 112,000 acres (26 percent of crop land) is exposed.
- 5,748 acres of Tribal lands are at risk in the 500-year floodplain.

Although potentially having negative impacts on human communities, periodic floods have played, and continue to play, a critical role in formation and maintenance of channel geomorphology and the hydrologic processes that are necessary for proper ecosystem function and watershed health across the North Coast Region. Species and ecosystems in floodplain and riparian corridors are well adapted to such events: However, past and current land use practices have transformed historic flow and sediment patterns. Forest management practices are one of the most significant issues impacting flood management in the Region (DWR 2013), as is the impacts to floodplains from development and agricultural reclamation. Maintaining the natural attenuation and function of floodplains in this hydrologic region will help to protect more than 320 sensitive species that rely on functional floodplain habitats.

In many cases, land use has resulted in the physical and functional separation of many streams and rivers from their historical floodplains. Changes in flow and sediment loads to streams and other watercourses are collectively referred to as "hydromodification." Most jurisdictions in California are now required to address the effects on water quality of hydromodification, through either a municipal stormwater permit or the statewide construction general permit (Stein et al. 2012[130]). In addition to water quality, however, hydromodification has reduced the adaptive capacity of riparian and wetland ecosystems, which impairs their ability to capture and manage stormwater runoff (CNRA 2009).

In urbanized or industrialized areas of the Region, stormwater that would normally infiltrate into soils or be captured by vegetation and topography instead are intercepted by impervious surfaces or compacted soils. In these cases, excess overland flow, or water captured in storm drains, flows directly into water systems, along with contaminants, sediment, and other pollutants. Increased runoff and the alteration of peak discharge rates may also result in stream bank erosion, modification of habitats, and increased flooding (NCRWQCB 2011). Increasingly, past and ongoing modification of surface water systems contribute to more frequent, widespread, and/or severe flood events, and associated risks to water quality and public safety.

Sea level rise contributes to flooding in select coastal portions of the Region, particularly in Del Norte and Humboldt counties (Map 23 "Sea Level Rise and Coastal Inundation" and Map 43 "Sea Level Rise in Arcata Bay, Crescent City, and Environs"). Sea level has risen along the California coast by several inches in the previous decade and models predict sea levels rising significantly this century (Map 44 "Projected Coastal Flood Extent, 2000-2099"). Rising sea level will affect roads, utilities, wastewater treatment plants, agricultural lands, outfalls and stormwater facilities and systems as well as large wetland areas in addition to towns and cities. Higher sea levels can inundate low-lying coastal areas, accelerate erosion of bluffs, beaches, and other coastal features; flood areas near the mouths of rivers and streams; increase the potential for levee failures; alter estuarine and aquatic habitats; and stimulate the intrusion of saltwater into estuaries and freshwater aquifers. When storms, winds, and high tides cause storm surges, increases in sea level that appear inconsequential at other times may lead to substantial damage to shorefront properties and infrastructure, and increase the probability of injury and death. Where land is rising due to tectonic lift, the rate of sea level rise may or may not be exceeded by the rate of coastal uplift. For example, at Humboldt Bay's North Spit, sea level is rising by 18.6 inches per century (4.73 millimeters per year), the highest rate in California. At Crescent City, 80 miles north, sea level is dropping relative to the coastline by 2.5 inches per century. The shoreline at Humboldt Bay is subsiding, whereas Crescent City's coastline is rising (DWR 2013).

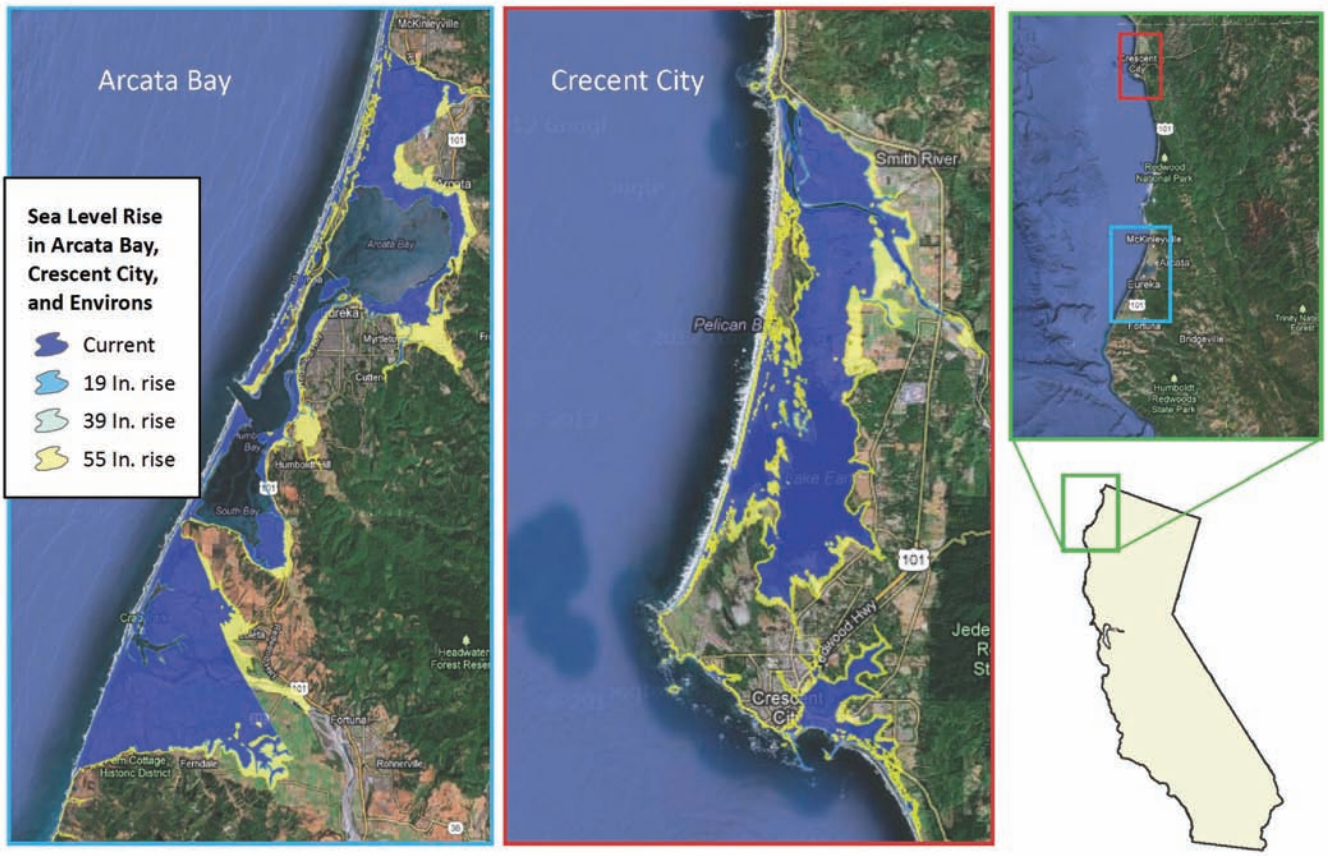
130 Hydromodification Assessment and Management California (Stein et al. 2012) http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/hydromodification/docs/667_ca_hydromodmgmtapr2012.pdf

Tsunamis are an infrequent but severe source of coastal flooding. The North Coast was struck by a tsunami in March 1964 as a result of an earthquake in Prince William Sound, Alaska. The resulting 20-foot wave hit Crescent City (Del Norte County). It damaged 289 homes and businesses; 11 people were killed; and 3 were never found. Damages were estimated at $16 million in 1964 dollars (CWP 2013). Crescent City was struck by another tsunami in March 2011. Generated off the coast of Japan, the wave struck Crescent City with an 8.1-foot wave, destroying much of the harbor and resulting in one death near Klamath. There was also major damage to docks and boats at Noyo Harbor. Estimated damage in the Region was $24 million (CWP 2013).

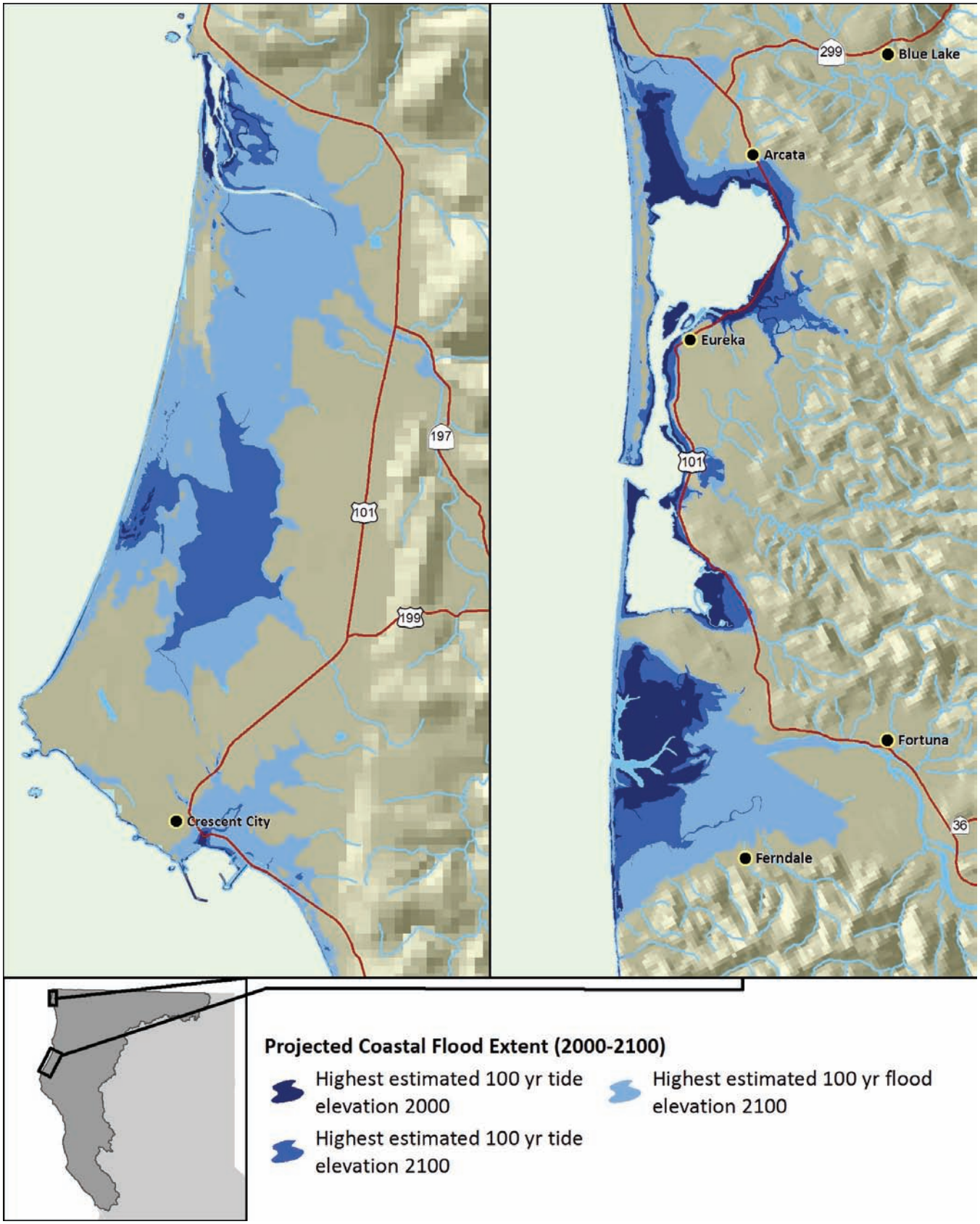
Flooding is likely to become more frequent and severe under climate change scenarios, as more precipitation is delivered by intense storms, and as storms drop more of their precipitation as rain rather than snow. Runoff in the October–March period has been increasing along with peak flood levels, as well as the variability among floods. Storms and snowmelt may thus coincide and produce higher winter runoff from the landward side, while to the west, accelerating sea-level rise is expected to produce higher storm surges during precipitation events. In relatively developed coastal floodplains, storm related coastal flooding might coincide with high tides and stormwater runoff, creating particularly severe flooding. The California Water Plan (DWR 2013) provides a snapshot of the communities, structures, crops, infrastructure, and sensitive species exposed to flooding in the Region.

Built flood control infrastructure (e.g. dams, reservoirs, retention, reclamation; Section 5.12) can unintentionally adversely impact ecosystem function, including salmonid habitat. For example, consider the Redwood Creek estuary, where the summer water quality is poor. Degradation of water quality in this estuary is directly related to the construction of the Redwood Creek Federal Flood Control Project. While these levees provide beneficial flood protection to Orick, they have significantly impacted estuary function by drastically altering the physical setting of the estuary and sloughs (RNSP 1997, NCWAP 2005). The condition of this estuary has been considered a major limiting factor to anadromous salmonid production in the Redwood Creek watershed (RNSP 1997, CDFG 2004, NCWAP 2005).

MAP 43 SEA LEVEL RISE IN ARCATA BAY, CRESCENT CITY, AND ENVIRONS



MAP 44 PROJECTED COASTAL FLOOD EXTENT (2000-2100)



Regulatory Context

A number of state laws were enacted in 2007 regarding flood risk and land use planning. These laws encourage a comprehensive approach to improving flood management by addressing system deficiencies, improving flood risk information, and encouraging links between land use planning and flood management (DWR 2013). Local responsibilities for flood management including adopting National Flood Insurance Rate Maps, conforming to the International Building Code, and enforcing building and land use restrictions.

- **AB 70 (2007) Flood Liability** provides that a city or county might be responsible for its reasonable share of property damage caused by a flood if the State liability for property damage has increased due to approval of new development after January 1, 2008.
- **AB 162 (2007) General Plans** requires cities and counties statewide to amend the land use, conservation, safety, and housing elements of their respective general plan to address new flood- related matters.

Efforts to Address the Issue

DWR was created following severe flooding across Northern California in December 1955. Today DWR's Hydrology and Flood Operations Office (formerly Division of Flood Management) performs statewide flood forecasting, flood operations, and other key flood emergency response activities. Their Division of Flood Management,[131] among several others, is carrying out the work of the Department's FloodSAFE California Program. The FloodSAFE program partners with local, regional, state, Tribal, and federal officials in creating sustainable, integrated flood management and emergency response systems throughout California. The DWR report "California's Flood Future: Recommendations for Managing the State's Flood Risk[132]" provides another powerful tool local jurisdictions may consult as they make their own flood management plans. The RWQCB is supportive of efforts to address the causes of increased flood potential. The further reduction in natural hydrologic functioning via the construction of hardened flood control channels is not viewed, in most cases, as supportive of water quality goals (DWR 2013).

Although primary responsibility for flood management might be assigned to a specific local entity in the North Coast Region, aggregate responsibilities are spread among more than 100[133] agencies with many different governance structures. Some of the larger agencies include the Del Norte County Flood Control District, Humboldt County Public Works, Mendocino County Water Agency, and Sonoma County Water Agency (DWR and USACE 2013).

Current research offers new tools to help managers assess the risks presented to local flood management from climate change and to address the flood-control constraints future climate may present (e.g. Brekke et al 2009). The Region's flood management systems (e.g. basins or reservoirs for collection and storage; dams for release of excess and to maintain minimum flows) were designed in the last century to strike a balance between water storage for dry months and flood protection in winter and spring, when heavy storms, snowmelt, and runoff can cause extensive flooding. As precipitation patterns become increasingly variable and unpredictable, it becomes more challenging for water managers to respond, particularly if they continue to base their operations on past climate and regulatory conditions.

Municipalities and other local jurisdictions in the Region are investigating or implementing Low Impact Design (LID) projects as a technique to manage stormwaters and reduce the severity of flooding locally. LID[134] is a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional stormwater management, which collects and conveys stormwater runoff through storm drains, pipes, or other conveyances to a centralized stormwater facility, LID takes a different approach. The LID approach involves using site design and stormwater management to maintain the site's pre-development runoff rates and volumes. Several entities in the NCRP have recognized the utility of LID projects to achieve floodway protection simultaneously with habitat protection and improvement.

An effective flood management program will likely include combinations of on-site measures (e.g. LID techniques, flow-control basins), in-stream measures (e.g. stream habitat restoration), floodplain and riparian zone actions (e.g. wetland restoration, setbacks), and off-site measures. Off-site measures may include compensatory mitigation measures at upstream locations

131 DWR Division of Flood Management at http://www.water.ca.gov/floodmgmt/. Also see DWR Statewide Flood Management Planning Program, which is explicitly integrated with the IRWM Program, including for the North Coast Region http://www.water.ca.gov/sfmp/about-sfmp.cfm

132 The report of the Statewide Flood Management Planning Program at http://www.water.ca.gov/sfmp/

133 For a list of the entities that have responsibilities or involvement in flood and water resources management in the North Coast, refer to the California Flood Future Report (DWR, USACE 2013) Attachment E at http://www.water.ca.gov/sfmp/resources/Attachment_E_Existing_Conditions.pdf

134 California Water Board's "Stormwater Management In California" factsheet June 2013 http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/stormwater_factsheet.pdf

that are designed to help restore and manage flow and sediment yield in the watershed (Stein et al. 2012)[135].

Local flood planning historically has been included in County General Plans, Municipal General Plans, Stormwater Management Plans, and the like. The local jurisdictions of the NCRP (i.e. Tribes, counties, municipalities) are at different stages of planning for flood and stormwater management, with some watersheds in the Region presumably more prepared for flood events than others. It is the intent of the NCRP, through the NCIRWMP and projects, to address this disparity and ensure all the Region's communities are prepared to manage and respond to floods. Section 9 "Relation to Local Water & Land Use Planning" provides an overview of flood management and other planning efforts across the Region. Analysis of this sort of information will highlight where data gaps and gaps in capacity persist.

The NCRP is developing a "Flood and Stormwater Management Report for the North Coast Region" (see Appendix O) to supplement information provided in the NCIRWMP and help local entities prepare for, respond to, and recover from the impacts of flooding while maintaining the integrity of dynamic watershed processes and ecosystem function. The report also will evaluate strategies including riparian and floodplain enhancement; conservation easements; source watershed protection; voluntary BMPs; LID standards for new and existing infrastructure; techniques for stormwater capture and reuse; and outreach opportunities.

Finding solutions to reduce residual flood risk in California is a complex task that will require a mix of both old and new tools and approaches to flood management and funding, evolution of existing planning processes and policies, sustained action, and commitment from agencies at all levels to achieve the desired result of public safety, environmental stewardship, and financial stability in the state. To accomplish these goals, the public, policymakers, and agencies at all levels (local, state, federal) must work together to address the flood risk; evolve toward integrated water management; and bring flood managers into the IRWM process as full partners with other water management agencies (DWR 2013). Achieving effective flood management further will require that hydromodification management strategies operate across programs beyond those typically regulated by NPDES/MS4 requirements. Successful strategies will need to be developed, coordinated, and implemented through land-use planning, habitat management and restoration, and regulatory programs. Substantial resources will be necessary to realize these goals; therefore, opportunities for joint funding and leveraging of resources should be vigorously pursued from the onset. This cooperative approach should replace the current fragmented efforts among regions and jurisdictions. The integrated watershed-based approach will likely take one or more permit cycles (i.e., at least ten years) to fully implement (Stein et al. 2012).

6.2.6 NON-NATIVE INVASIVE SPECIES

- ***THE ISSUE:*** Non-native plant, animal, fungal, and microbial species that have been introduced to North Coast watersheds from exotic locations outside the Region have complex, sustained, adverse effects on locally adapted species, ecosystems, water management infrastructure, and economies.
- ***GOALS & OBJECTIVES:*** Goal 2 "Economic Vitality;" Objective 4 "Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas;" Goal 3 "Ecosystem Conservation & Enhancement;" Objective 5 "Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity."

Overview

People have long benefitted from the deliberate introduction of plant and animal species from foreign locations. These species have diversified diets and supported cultural development for millennia. However, species that have been introduced from outside ecosystems (i.e. "exotic" species) can invade native systems because they are no longer controlled by their natural predators or pathogens and thus may have a competitive advantage over native species. In some cases [e.g. Giant Reed (*Arundo donax*) in riparian ecosystems, bullfrogs (*Rana catesbeiana*) in freshwater ponds and streams, or yellow star thistle (*Centaurea solstitialis*) in rangelands], the relatively rapid changes posed by invasive species can threaten ecosystem function, trophic structure, agricultural and other working lands, water delivery systems, and flood control infrastructure. With specific respect to integrated water/ land management, invasive species may consume valuable water resources; upset ecological and hydrologic processes; clog water delivery systems; reduce floodplain capacity, weaken flood infrastructure, and increase flood danger; increase wildfire risk; degrade recreational opportunities; destroy productive range and timberlands; change agricultural patterns; degrade salmonid habitat; and disrupt resource-based economies.[136]

135 Hydromodification Assessment and Management California (Stein et al. 2012) http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/hydromodification/docs/667_ca_hydromodmgmtapr2012.pdf

136 California Invasive Plant Council information at http://www.cal-ipc.org/ip/index.php

There are estimated to be 482 invasive plant species region-wide. The breakdown by county is as follows: Del Norte (171), Humboldt (323), Mendocino (304), Modoc (154), Siskiyou (231), Sonoma (363), and Trinity (160)[137]. Species frequently cited as of particular concern to North Coast stakeholders and local entities are *Arundo donax* (a.k.a. Giant Reed, Wild Cane), *Ludwigia peploides* (a.k.a. Creeping Water Primrose), freshwater zebra (*Dreissena polymorpha*) and quagga (*D. rostriformis*) mussels, warm water fishes, Sudden Oak Death (SOD[138]) (*Phytophthora ramorum*), and agricultural pests such as Glassy-Winged Sharpshooter (*Homalodisca vitripennis*), which is a vector for Pierce's disease, a lethal bacterial infection of grapevines for which there currently is no known cure. The negative effects of some of these invasives (highlighted below) are more pronounced than others.

- Arundo is robust perennial grass that is native to Asia and widely used locally for horticultural purposes. It grows up to 30 feet tall in dense bamboo-like stands. Arundo favors low-gradient riparian areas, estuaries, and coastal streams. Arundo establishment displaces native plants and associated wildlife species because of the massive stands it forms (Cushman and Gaffney 2010). Establishment may alter hydrologic processes, reduce groundwater availability, contribute sediment to streams, constrict channel flows, and/or exacerbate flooding.[139] Arundo is considered an issue of concern throughout the Region.
- *Ludwigia peploides* is a perennial freshwater aquatic plant native to Florida that forms very dense, virtually impenetrable mats that can grow up to several feet tall. Vegetation mats restrict fishing and boat access; out competes native aquatic plants; and alters aquatic ecosystem function. Ludwigia can be found in rice fields, ditches, ponds, slow moving streams, and along edges of lakes and reservoirs. In the North Coast, Ludwigia is noted as a particular concern in the Laguna de Santa Rosa (Sonoma County).[140]
- Dreissena mussels are native to Eastern Europe and Western Asia but they been introduced into aquatic ecosystems and water management systems throughout southern California. They are not yet documented for the Region. Mussels are introduced through ballast water releases by boats and translocation of contaminated boats to new areas. There is great potential for these and other aquatic mollusks (i.e. possibly New Zealand mud snail *Potamopyrgus antipodarum*) to colonize and devastate built infrastructure (e.g. by clogging pipes) if they invade Region water supply reservoirs,[141] and ecosystem function if they are established into habitats.

It is anticipated that climate change effects (e.g. warming temperatures, increasingly variable precipitation) will cause shifts in the range occupied by both native and introduced species: in many instances, this is exhibited as range expansion for the invader, and range reduction for the local species. Landscape disturbances, which often are associated with extreme climate events (e.g. wildfire, flood, drought), can favor or even be facilitated by non-native species which may exhibit greater tolerance of a range of environmental conditions that that of locally adapted species. It is common for invasive species to produce large numbers of seeds or young; to disperse or migrate effectively; and to tolerate extreme conditions so as to colonize disturbed sites well in advance of native species (CNRA 2009).

Regulatory Context

California food and agriculture regulations, numerous state codes (e.g. California Department of Fish and Wildlife Code, Harbors and Navigation Code, Public Resources Code), and Senate and Assembly legislation are meant to promote invasive species

137 For a listing of the invasive plant species in each North Coast County, see Status of Invasive Plants — California / Details by County University of Georgia. Center for Invasive Species and Ecosystem Health Early Detection & Distribution Mapping System at http://www.eddmaps.org/tools/choosecounty.cfm

138 SOD has recently been confirmed in Trinity County — http://www.suddenoakdeath.org/wp-content/uploads/2014/03/3-3-14-News-Release-Sudden-Oak-Death-Confirmed-in-Trinity-County.pdf

139 More on Arundo at California Invasive Plant Council (CalIPC) page http://www.cal-ipc.org/ip/management/ipcw/pages/detailreport.cfm@usernumber=8&surveynumber=182.php

140 More on Ludwigia at California Invasive Plant Council (CalIPC) page http://www.cal-ipc.org/ip/management/plant_profiles/Ludwigia_peploides.php

141 More on freshwater mussels at the California Department of Fish & Wildlife Invasive Species Program page http://www.dfg.ca.gov/invasives/quaggamussel/

management and control efforts. Assembly Bill 2631 (2004) proposed the creation of the California Invasive Plant Council (Cal-IPC). Cal-IPC works voluntarily with land managers, researchers, policy makers, and concerned citizens to address invasive plant species locally. Additionally, the 2010 303(d) list includes non-native invasive species as a pollutant that impairs waterbodies: in the North Coast, Bodega Harbor HA is listed as impaired by exotic species (crabs), which will necessitate the development of a TMDL.

Efforts to Address the Issue

The only truly effective means of completely managing invasive species impacts is to prevent their establishment and remove them from areas where they are established. From a practical standpoint, preventing all new occurrences of invasive species is virtually impossible: eliminating invasive species from all North Coast ecosystems would likewise be virtually impossible. Instead, the NCRP aims to support targeted efforts to combat the spread of or reduce the expressed impact of local outbreaks of high priority invasive species that do harm to aquatic wildlife, water resources, and/or water management systems. Effective management of established invasive species will require collaborative, cross-jurisdictional efforts focused at the local watershed scale, and may best be integrated as part of existing land and water management efforts underway by counties, municipalities, and Tribes in the Region. Best Management Practices[142] for the prevention and mitigation of invasive species are established and can help guide NCIRWMP local project planning and implementation.

Several organizations in the North Coast are actively working to remove invasive species using a watershed approach. North Coast RCD's provide a valuable source for NCRP interface with private landowners who might be interested in removal of invasive species on their properties. Weed Management Areas[143] are another local resource with potential to help address invasive plants. WMAs are county-based groups composed of diverse stakeholders interested in weed control and focused on mapping, education, and on the ground control projects.

The California Department of Fish & Wildlife Aquatic Invasive Species Program144 addresses cases of invasive algae, invertebrates, and fishes in streams, bays, wetlands, and coastal areas. There are numerous resources available to help prioritize and implement invasive species programs locally. The USDA Agricultural Resources Library provides a comprehensive "Invasive Species Resources" list with web links to dozens of agency, academic, and private programs, projects, and tools to help North Coast entities to confront invasive species of priority to them, in a manner that is compatible with existing planning and implementation efforts. A small selection is listed below, with the area of focus provided in parentheses (e.g. Management, Monitoring, Publications, etc.)[145].

Federal Resources

- Noxious and Invasive Weeds *Bureau of Land Management California State Office* (Species of Concern, Management)
- Invasive Species *US Geological Survey Western Ecological Research Center* (Species of Concern; Contacts; Parks; Management; Monitoring)
- Exotic and Invasive Weeds Research Unit *US Department of Agriculture Western Regional Research Center* (Species of Concern; Contacts; Organizations; Publications; Management)

State Resources

- Non-Native Invasive Species and Clean Boating Program *California Coastal Commission* (Species of Concern)
- Aquatic Weed Control Program and Quagga & Zebra Mussel Information *California Department of Boating and Waterways* (Species of Concern; Monitoring)
- Invasive Species in California and Nuisance and Exotic Wildlife Species *California Department of Fish and Wildlife* (Species of Concern; Management)
- Marine Invasive Species Monitoring Program *California Department of Fish and Wildlife Office of Spill Prevention and Response* (Species of Concern; Monitoring)
- Plant Health and Pest Prevention Services *California Department of Food and Agriculture* (Species of Concern; Contacts; Organizations; Publications; Laws and Regulations; Management; Monitoring)
- European Grapevine Moth program *California Department of Food and Agriculture* (Management; Monitoring)
- Exotic Pest Projects Environmental Monitoring *California Environmental*

142 US Department of Agriculture Best Management Practices "Managers Toolkit" at http://www.invasivespeciesinfo.gov/toolkit/preventionbmp.shtml

143 For a listing and map of weed management areas in the Region, see Cal-IPC at http://www.cal-ipc.org/WMAs/

144 CDFW Aquatic Invasive Species Management Plan (2008) at http://www.dfg.ca.gov/invasives/plan/

145 US Department of Agriculture National Invasive Species Resources Center website provides a comprehensive listing and links to programs for California at http://www.invasivespeciesinfo.gov/unitedstates/ca.shtml

Protection Agency (Pesticide Regulation, Species of Concern; Management)

- CalWeedMapper and California Invasive Plant Inventory *California Invasive Plant Council* (Species of Concern; Contacts; Organizations; Management)
- Ballast Water Program *California State Lands Commission* (Species of Concern; Laws and Regulations; Management)

Academic & Non-Governmental Resources

- RIDNIS Project Reducing the Introduction and Damage of Aquatic Nonindigenous Species through Outreach and Education *University of California Cooperative Extension Environmental Science and Policy* (Species of Concern; Management; Monitoring)
- California Statewide Integrated Pest Management *University of California Agriculture and Natural Resources* (Species of Concern; Contacts; Organizations; Publications; Management; Monitoring)
- Invasive Plants *California Native Plant Society Conservation Program* (Species of Concern; Contacts; Organizations; Management)
- California Oak Mortality Task Force (Species of Concern; Contacts; Management; Monitoring)
- Aquatic Invasive Species Vector Risk Assessments *California Ocean Science Trust* (Species of Concern; Management)
- Cal-IPC/ Invasive Species Council of California (Species of Concern; Management)
- Invasive Weeds of Humboldt County *[likely also compiled for other WMAs in other North Coast counties]*

6.2.7 CLIMATE CHANGE VULNERABILITY & UNCERTAINTY

- ***THE ISSUE:*** The observed and predicted alteration of historic patterns in regional climate could alter local air temperature, precipitation, and hydrologic patterns, and contribute to sea level rise and flooding, to the detriment of the North Coast's natural resources, water supply, surface and groundwater quality, built and natural infrastructure, ecosystem function and adaptability, population and species viability, economic vitality, and quality of life.
- ***GOALS & OBJECTIVES:*** Goal 5 "Climate Adaptation & Energy Independence;" Objective 10 "Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors;" and Objective 11 "Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation."

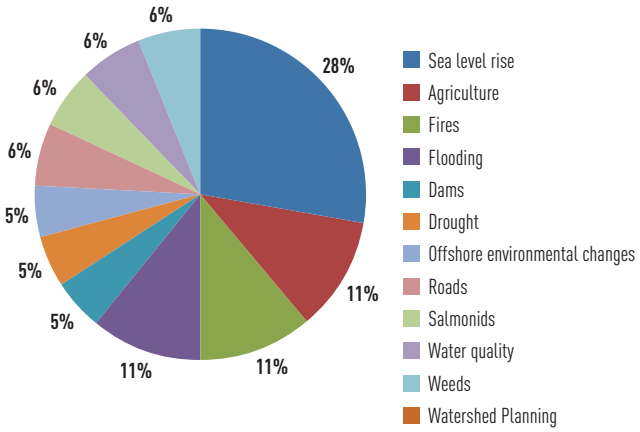


FIGURE 4 CLIMATE CHANGE VULNERABILITIES

Overview

Interviews with North Coast planning entities reveal concerns about a variety of climate-related vulnerabilities that already are recognized locally (Figure 4 "Climate Change Vulnerabilities"): identified vulnerabilities include sea level rise (28% response), followed by agriculture, fire, and flood (11% response each). Science-based research specific to California confirms the state's ecosystems, households, businesses, farms, and communities are vulnerable to numerous impacts of climate change.[146] This vulnerability is especially apparent as changes in climate are predicted to affect the quantity, quality and spatial distribution of California's water resources. There is widespread agreement among scientists about climate observations: [147]

1) Climate change is partially the result of human activities that emit heat trapping carbon dioxide, methane, and other greenhouse gases (GHGs) into the atmosphere. Past emissions will continue to influence climate and additional GHG emissions will accelerate these changes.
2) California has experienced loss of life and severe economic damage, as well as ecological,

146 California Climate Change Center. 2006. Our Changing Climate: Assessing the Risks to California. For a more detailed assessment of research about climate change and California, see the California Climate Change Portal, Explaining Climate Change Video Series developed by the National Research Council at http://www.climatechange.ca.gov/

147 Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis, and Climate Change 2007: Impacts, Adaptation, and Vulnerability. http://www.ipcc-wg2.org/ See especially Chapter 14 of the latter, "North America," at http://www.gtp89.dial.pipex.com/14.pdf

social, and cultural disruption from storms, drought, and other weather-related extremes.

3) Climate change impacts are expected to intensify weather and climate events in severity, duration, and variability.

Despite lack of agreement in the Region about the pace, causes, and solutions to anthropogenic climate change, there is unanimous shared concern in the NCRP about severe climate-related phenomena and associated water management implications. NCRP stakeholders and local planners consistently identify two water- and climate-related challenges as priority for the NCIRWMP. These are (1) flooding/stormwater management and (2) drought/water availability, and the adequacy of infrastructure to deal with both. These are emphasized throughout the NCIRWMP and via NCRP processes.

Effects of Climatic & Hydrologic Changes on Water Management

The North Coast currently faces challenges in meeting the water-related demands of an ever-growing population and increasingly regulated natural resources. In California, the observed trend toward increased hydrologic variability and more frequent severe weather events (Weare 2009) is expected to intensify in the 21st century. According to the California Natural Resources Agency (2009), the state "can expect to experience more frequent and larger floods and deeper droughts. Rising sea level will increase salinity in near-coastal groundwater supplies." However, according to one study, California's water supply and management system appears physically capable of adapting to significant changes in climate and population, albeit at a significant cost, requiring major changes in operation of groundwater storage capacity, water transfers, and adoption of new technologies (Tanaka et al. 2006).

Listed below are some expected impacts to regional water management systems during the 21st century[148].

Water Management Impacts Due to Increased Temperatures

- Reduced water supply from snowpack accumulation
- Earlier snowmelt runoff leaving less stored for dry months
- Reduced water quality due to increased water temperature
- Increased evaporation/evapotranspiration rates from plants, soils, and waterbodies
- Moisture deficits in non-irrigated agriculture, landscaping, and natural system
- Increased agricultural irrigation demand to avoid crop losses and due to a longer growing season
- Increased urban water use, at the possible expense of agriculture water

Water Management Impacts Due to Precipitation Changes

- Reduced surface and groundwater supply due to decreased precipitation
- Increased proportion of precipitation falling as rain instead of snow
- Increased intensity of rainfall events with more frequent and/or more severe flooding
- Increased frequency and persistence of droughts
- Reduced water quality due to higher water temperature, lower flow, and more concentrated sediment load

Water Management Impacts Due to Sea Level Rise

- Increased stress on coastal levees and other flood management infrastructure
- Increased saltwater intrusion into estuaries, bays, and coastal groundwater sources
- Reduced water quality due to saltwater intrusion
- Increased freshwater releases from upstream reservoirs to hold back salinity intrusion, reducing freshwater supplies
- Reduced freshwater supplies
- Reduced viability of coastal agriculture due to increased soil salinity

New analyses using fine-resolution hydrologic and climatic datasets suggest that, in this century, all North Coast counties and watershed basins (WMAs) will experience (1) increased temperature, (2) reduced precipitation, and (3) rising seas (Thorne et al. 2012a), all of which may exacerbate flooding and drought (Purkey et al 2008). The magnitude of change will vary widely across the Region (Appendix N, Maps N1-N23); however, the direction of change is clear. This will have widespread and direct effects on the viability of the Region's natural and built systems and sectors.

Effects of Climatic & Hydrologic Changes on Sectors

It is beyond the scope of the NCIRWMP to outline all the possible interactions between climate, hydrology,

148 California Climate Adaptation Strategy, Draft. CNRA 2009 at http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf

and water management. However, the potential effects of climate change on three representative North Coast sectors (fisheries, agriculture, and energy) are introduced below. See the "Climate Change Vulnerability Assessment for the North Coast Region" (Appendix N) for more, including an overview of the specific impacts and climate drivers to all 11 "natural" and "built" sectors[149] comprising the Region's water management infrastructure. The report also provides a preliminary listing of the 11 sectors, ranked by vulnerability (a combination of sensitivity and adaptive capacity). For a related assessment of vulnerabilities identified by and for Tribal communities, please refer to the "Tribal Communities Climate Change Vulnerability Matrix[150]."

Fisheries

Freshwater fishes are highly vulnerable to climate change (Moyle et al. 2013). Species requiring cold water (e.g. all salmonids, particularly Coho salmon) are most vulnerable. Changes in global climate have altered and continue to alter local hydrologic conditions. These hydrologic changes are accelerating the declines observed in many fish species, especially in regions (like much of the North Coast) that experience arid or Mediterranean conditions (Moyle et al 2011, Moyle et al 2012). Under present climate change scenarios, most native fishes in the Region would experience population declines and restricted distribution. These impacts are not limited to freshwater environments, of course: coastal and marine systems are also expected to experience major changes, with negative effects expected for marine organisms and habitats (Harley et al. 2006). As they require both freshwater and marine habitats, salmonids will likely experience stresses in both environments.

Agriculture

Vineyard establishment and management have significant implications for terrestrial and freshwater conservation, which may be significantly impacted by climate change. Climate impacts to vineyards are relevant to the entire North Coast and to NCRP planning because they may be illustrative of conservation implications of shifts in other agricultural crops (Hannah et al. 2013). Mediterranean climate regions are most suitable for viticulture, but at the same time have very high levels of biological diversity, endemism (species occurring nowhere else), and habitat loss. Potential impacts of climate change on historical patterns of viticulture suitability are predicted to be "substantial" by 2050 (Hannah et al. 2013). Climate change has the potential to drive changes in viticulture that will impact the Region's ecosystems and threaten native habitats: damage to freshwater habitats is generally highest where water is already scarce (Vorosmarty et al. 2010). Changes in viticulture practices could affect land use (e.g. establishment of vineyards at higher elevations, leading to conversion of upland areas) and/or water use (e.g. increased water use for irrigation and crop protection, leading to freshwater conservation conflicts). Damage to freshwater habitats is generally highest where water is already scarce (Vorosmarty et al. 2010).

It is possible that some types of crops grown in certain areas could benefit from projected climate and hydrologic changes, but this would be the exception rather than the rule. Additionally, farmers may be able to convert their crops to different cultivars or other types of crops that are better adapted to projected conditions. The California Energy Commission's California Climate Change center provides more information about the effects of climate on California agriculture (Jackson et al. 2012). The NCRP report "Climate Change and Agriculture in the North Coast of California" provides information specific to the North Coast Region (described below).

Energy Infrastructure

According to the California Climate Adaptation Strategy (CNRA 2009), the "largest projected damages" to energy

149 The CCVA sectors include, but are not limited to, the seven sectors recommended by the California Climate Adaptation Strategy (CNRA 2009), as required by DWR IRWM Guidelines for climate analysis in an IRWM Plan.

150 Review and comment on the draft "Tribal Communities Climate Change Vulnerability Matrix" at http://www.waterplan.water.ca.gov/docs/tac/TribalVulnerabilityMatrix_FinalDraft_Aug2013.pdf

infrastructure are expected from sea level rise inundating low lying coastal areas. Flooding of inland infrastructure is also a concern. Other potential challenges for energy infrastructure development in the 21st century are listed below (see Section 5.13 "Energy Infrastructure).

Due to Warmer Temperatures

- Changes to energy production potential (e.g. hydropower)
- Changes to transmission capabilities
- Reduced transmission efficiency
- Increased energy demand for cooling
- Increased risk of brown outs and black outs

Due to Altered Precipitation Patterns

- Changes to energy production potential (e.g. hydropower)
- Reduced summer flows requiring increased water releases, reducing reservoir volume and hydropower potential
- Increased flood damage to transmission lines, from storm runoff and snowmelt

Due to Sea Level Rise

- Increased need for fortification from coastal surges or relocation of built infrastructure
- Increased economic cost for required fortification, relocation, and system upgrades

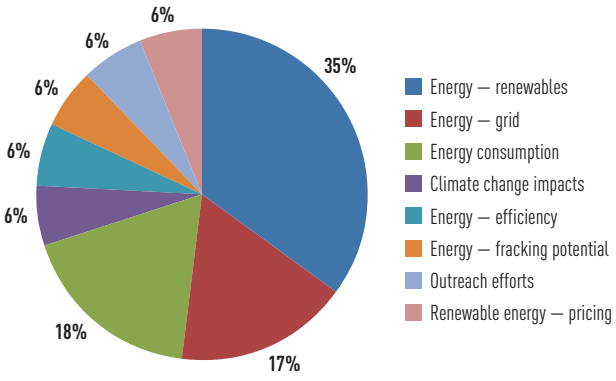


FIGURE 5 DATA GAPS: ENERGY EFFICIENCY

Distribution and Magnitude of Climatic & Hydrologic Changes

As described and illustrated throughout Section 5 ("Region Description"), the geographic, climatic, and hydrologic variability among and between the North Coast planning area watersheds is vast. Therefore it is unwise to extrapolate statewide or even region wide climate predictions down to the local level. Some localities are likely to experience significant climate change effects and hydrologic responses (e.g. sea level rise in coastal zones; reduced stream flows inland) while other locals likely will experience climatic and hydrologic regimes that remain within historic levels of variation. The fine-scale spatial distribution and magnitude of the predicted changes in precipitation, temperature, and other climatic and hydrologic variables across the North Coast Region is illustrated in Appendix N ("Climate Change Vulnerability Assessment"). Associated data tables (Appendix N Table 57 "Projected Changes to Climate and Hydrology of North Coast Counties" and Appendix N Table 58 "Projected Changes to Climate and Hydrology of North Coast WMAs") allow comparison of historic and projected conditions between counties and watershed basins of interest. The 15 climatic and hydrologic variables assessed for the NCIRWMP are (after Thorne et al. 2012a):

- **Actual Evapotranspiration (AET)**: Potential evapotranspiration calculated when soil water content is above wilting point, i.e. when water is not limited
- **Climatic Water Deficit (CWD):** Potential minus Actual Evapotranspiration (an estimate of drought stress on soils and plants; a surrogate for water demand based on irrigation needs, so changes in CWD effectively quantify the supplemental amount of water needed to maintain current vegetation cover (natural or agricultural)
- **Excess Water (EW)**: Amount of water remaining in the system, above evapotranspiration; precipitation minus potential evapotranspiration
- **Maximum Monthly Temperature, July (Tmax):** The modeled daily maximum and minimum are averaged to give daily average; the maximum daily average in a calendar month becomes the monthly maximum; this is averaged over a 30 year period to determine TMax for each month of the year, and for the water year.
- **Minimum Temperature, January (Tmin)**: The modeled daily maximum and minimum are averaged to give daily average; the minimum daily average in a calendar month becomes the monthly minimum; this is averaged over a 30 year period to determine TMin for each month of the year, and for the water year.
- **Potential Evapotranspiration (PE):** Water that could evaporate or transpire from plants if available; the water that can evaporate from the ground surface or to be transpired by plants
- **Recharge (RCH):** Amount of water exceeding field capacity that enters bedrock, occurs at a rate determined by the hydraulic conductivity

of the underlying materials, excess water (rejected recharge) is added to runoff.

- **Runoff (RUN)**: Amount of water that becomes stream flow, summed annually. Modeled as amount of water that exceeds total soil storage and rejected recharge.
- **Snowfall (SNOW):** Amount of snow that fell summed annually, calculated as amount of precipitation if air temperature is below 1.5 degrees C.
- **Snowmelt (MELT):** Amount of snow that melted summed annually, calculated by a model derived from the snowpack
- **Snowpack (PCK):** Amount of snow accumulated per month summed annually, or if divided by 12 average monthly snowpack. This is calculated as prior month's snowpack plus snowfall minus sublimation and snow melt.
- **Soil water storage (STOR):** Average amount of water stored in the soil annually, calculated as precipitation plus snowmelt minus actual evapotranspiration, recharge, and runoff.
- **Sublimation (SUBL):** Amount of snow lost to sublimation (snow to water vapor) summed annually.
- **Total precipitation (PCP):** Total monthly precipitation (rain or snow), also summed by water year, averaged over 30 year ranges.

Planning for Uncertainty

According to the California Natural Resources Agency (2009), "The climate patterns that these [water and flood management] systems were based upon are different now and may continue to change at an accelerated pace. These changes collectively result in significant uncertainty and peril to water supplies and quality, ecosystems, and flood protection." Most data and models indicate that climate change is occurring relatively gradually and will continue to do so. There is a chance, though, that significant changes will occur far more rapidly. Prudent planning for climate change should explicitly account for the possibility that abrupt changes will occur, perhaps with catastrophic consequences. Even if changes do occur slowly and conservative models prove accurate, there is inherent and undeniable uncertainty involved in documenting, forecasting, and interpreting climatic and hydrologic data.

There will be no single "one-size-fits-all" solution to climate changes; solutions will need to be tailored to local conditions (climatic, financial, and ideological, for a start). A recommended approach to "uncertainty" in climate change planning, as for other situations that lack full resolution of data, is to: (1) respond directly to confident projections (and identify less confident projections as data gaps); (2) utilize an adaptive management approach that calls for frequent input and refinement of processes; (3) allow flexibility with a range of potential response actions that suit local conditions; (4) implement long-term monitoring; (5) prioritize ecosystem adaptability in restoration efforts; and (6) continually update and refine analyses using data specific to the Region and of the finest resolution possible (Thorne et al. 2012a).

Regulatory Context

In 2006, California's legislature passed Assembly Bill 32 (AB 32), the Global Warming Solutions Act, which mandates the California Air Resources Board achieve significant reductions by 2020 in greenhouse gas emissions from stationary (i.e. not vehicular) sources such as power stations and refineries. AB 32 also establishes a carbon trading market (i.e. "cap-and-trade") to stimulate financial incentives to reduce emissions. The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) further supports the State's climate action goals to reduce emissions through coordinated transportation and land use planning

Efforts to Address the Issue

The State of California has taken the lead nationally and globally in developing actions and policies to reduce the emission of GHGs in an effort to slow changes to climate and to reduce the risk of abrupt threshold changes that would have catastrophic effects. The NCRP recognizes that "reducing emissions" may be achieved by focusing on energy conservation, water conservation, local energy production, and green jobs creation, all of which result in energy savings and GHG emission reductions and thus contribute to state goals.

Preliminary efforts by California agencies to incorporate climate change scenarios into existing planning and management frameworks are described in Anderson et al. (2008). Four state agencies have focused extensively on issues related to the nexus of water and climate: DWR and SWRCB have direct interests in water resources, while the California Energy Commission and Public Utility Commission have indirect interests. DWR released Phase I of its Climate Action Plan in 2012, detailing how the state can reduce GHG emissions by 50 percent below 1990 levels by 2020, and reduce emissions by 80 percent below 1990 levels by 2050.[151] NOAA has been particularly involved in assessing the public safety impacts of coastal flooding, particularly

151 DWR Climate Action Plan (2012) at http://www.water.ca.gov/climatechange/CAP.cfm

sea level rise[152] and has published a handbook for coastal managers to help with local adaptation efforts.[153] NOAA data also contribute to climate change tools available at the online dataset NatureServe.[154]

The NCRP is investigating how observed and projected climate change impacts are expected to affect Northern California waters, communities, and economies, including identifying and assessing potential responses to these impacts. NCRP-commissioned reports (links available in Appendix O of this Plan) investigate climate change implications in depth:

- "Climate Change — Issues and Initiatives" provides an overview of expected changes to weather and climate in Northern California, as well as response initiatives including Assembly Bill 32 (AB 32), Executive Order S-3-05, and the Western Climate Initiative.
- "Climate Change and Agriculture in the North Coast of California" identifies project-level agricultural BMPs that will reduce GHG emissions and increase soil carbon sequestration and economic incentives and policy specific to agriculture.
- "Climate Change Vulnerability Assessment (CCVA) for the North Coast Region" outlines a process framework for identifying and ranking the vulnerability to projected climate change impacts of the Regions built ("gray") and natural systems, and proposes an initial list of vulnerabilities to guide development of local and regional strategies to adapt to impacts and/ or mitigate GHG emissions. A CCVA developed separately from the NCRP effort, addresses climate concerns specific to Tribes[155].
- "Energy Independence, Emissions Reduction, Job Creation, and Climate Adaptation Initiative" describes the NCRP-preferred approach of addressing state and regional "climate change" needs with a promising program aimed at aggressively promoting local green energy independence and job creation.

Numerous municipalities, counties, Tribes and other local jurisdictions in the Region are looking towards development and implementation of climate action plans and GHG inventories to accommodate climate change adaptation and mitigation programs. When asked about local resources that will be vulnerable to climate change impacts in the next 50 to 100 years, coastal interviewees responded that sea level rise; impacts to agriculture, especially related to crop phenology changes; increased risk of forest fires and their environmental consequences; flooding events due to greater storm intensity; ocean ecosystem changes; drought; salmonid populations; and water quality impacts would be most susceptible.

Data gaps with respect to climate change, particularly local impacts, are lacking (Figure 6 "Data Gaps: Climate Change"). New data have become available to elucidate fine scale historic and projected climate and hydrologic conditions in the Region (e.g. Thorne et al. 2012a, based on USGS data). This significantly improves the ability of local planners to describe and monitor their area; however, many North Coast communities lack the technical capacity or resources to use this information in meaningful ways.

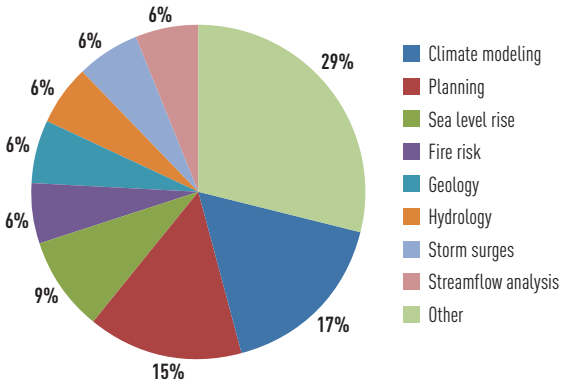


FIGURE 6 DATA GAPS: CLIMATE CHANGE

In addition to academic institutions and state agencies, efforts by county, municipal, Tribal, and other local entities can contribute significantly to knowledge about North Coast resources and issues. Local collaborations in the Region are resulting in successful and informative ventures with direct applications to the NCIRWMP.[156] Regionally, counties and municipalities have placed emphasis on the need to conduct site-specific adaptation and emergency response planning, particularly with respect to sea level rise, storm

152 NOAA Climate Program Office at http://cpo.noaa.gov/Home/AllNews/TabId/315/ArtMID/668/ArticleID/80/Global-Sea-Level-Rise-Scenarios-for-the-United-States-National-Climate-Assessment.aspx

153 NOAA 2010 planning guide for state coastal planners at http://coastalmanagement.noaa.gov/climate/docs/adaptationguide.pdf

154 Nature Serve online tool for habitat climate change vulnerability, using NOAA Coastal Services Center data, at http://www.ebmtools.org/demonstration-habitat-climate-change-vulnerability-index-hccvi-pat-comer-natureserve.html;

155 Review and comment on the draft "Tribal Communities Climate Change Vulnerability Matrix" at http://www.waterplan.water.ca.gov/docs/tac/TribalVulnerabilityMatrix_FinalDraft_Aug2013.pdf

156 Examples include Climate Action Plans, local scale vulnerability projects (e.g. North Bay Climate Adaptation Initiative, Regional Climate Protection Authority, and Pepperwood Preserve), GHG inventories, flood management projects, agricultural sustainability, carbon sequestration, wildfire planning, and hazard mitigation. From the NCRP Partner and Stakeholder Interview Synthesis 2013. Counties, municipalities, Resource Conservation Districts, and non-profits were represented in the interviews. (71 professional planners contacted; 41 interviewed by December 2013.) http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207

surges, and extreme precipitation events that will result in coastal and inland flooding, causing damage to critical, low-lying or shoreline infrastructure.

6.3 LOCAL WATER-RELATED ISSUES

The NCIRWMP employs a voluntary, watershed-based approach to address region-wide issues at the local scale. This section briefly describes some of the issues identified as of particular concern to North Coast watershed basins (WMAs), counties, Tribes, and economically disadvantaged communities. The specific manner in which these issues are addressed locally will depend in large part on the current water and land use planning context: different jurisdictions and communities are at different stages in planning and implementing solutions to the issues important in their area (e.g. through Municipal and County General Plans, and Tribal Plans). The NCRP has worked closely with Tribes, local planning departments, RCDs, and others to develop a planning synthesis for the Region that will highlight (1) where local programs and resources are adequate to address the local issues versus (2) where planning activities are still needed, or significant data gaps remain (Section 9 "Relation to Local Water & Land Use Planning").

Additional NCRP resources that assess the relationships between local economic status, local planning status, and local watershed condition are available through the NCIRWMP:

- Assessment of issues related to rural water supply, drinking water quality, wastewater, infrastructure, and economic need: see "NCIRWMP Water Supply & Wastewater Provider Outreach & Support Program" (Appendix O)
- Assessment of issues related to land and water use, see "North Coast Land Use & Regional Planning Report" (Appendix O)
- Assessment of issues related to funding challenges and specific financing needs, see Section 12 "Long-Term Financing & Implementation" and the "NCRP Financing Plan" (Appendix K)

6.3.1 ISSUES FOR NORTH COAST WATERSHED MANAGEMENT AREAS

Within the Watershed Management Initiative developed by the North Coast Regional Water Quality Control Board and the 2013 Draft California Water Plan developed by the DWR, specific issues are identified and discussed for each of the North Coast's six watershed management areas (WMAs). Issues associated with these WMAs vary considerably in response to the level of urbanization and activities conducted. Challenges faced within each WMA are discussed below. See Appendix P.1 for data tables that summarize a suite of descriptive statistics for each WMA.

Eel River Watershed Management Area

Water Quality

The primary issues associated with water quality in the Eel River WMA (Map 10) include water diversion, timber practices, protection of drinking water supply, recreation, and the salmonid fishery, which is the largest in Humboldt County (DWR 2013). Impacts to the salmonid fishery include erosion, sediment transport, high water temperatures and reduced flow.

A health advisory for mercury has been issued for Lake Pillsbury; mercury is a toxin that bio-accumulates in fish tissue. The City of Willits has had chronic problems with turbidity, taste, and odor in water supplied by the Morris Reservoir and with high arsenic, iron, and manganese levels from groundwater sources. Another issue of concern is the increasing number of small communities experiencing chronic water quality problems related to failing infrastructure. Additionally, fuel constituents such as MTBE impact recreational water use at Ruth Lake.

Surface water quality has been impacted by blue-green algae, which is associated with low summer flows and increased nutrients. In July 2013, The Humboldt County Department of Health and Human Services issued a health advisory warning people and dogs to avoid contact with algae in the Eel and Van Duzen other North Coast rivers (The Times-Standard 2013).

Water Supply

In recent years, fishery interest groups have claimed that the diversion into the Russian River at Cape Horn Dam has adversely affected salmonid populations in the Eel River. The Federal Energy Regulatory Commission (FERC) in 2004 approved Pacific Gas & Electric's

(PG&E's) hydropower relicensing for the Potter Valley Project and its associated water diversions to the Russian River. Fishery groups are currently litigating this decision, so future reallocation of water from the Eel to the Russian River is not yet resolved. However, in December 2013, FERC granted a variance allowing PG&E to reduce required releases into the Eel from Cape Horn Dam below the tunnel that diverts Eel River water to the Potter Valley hydroelectric plant. Releases into the East Branch of the Russian River below the plant were also reduced. Although the Round Valley Indian Tribes and Friends of the Eel River concurred that reductions should occur, these groups do not support continued diversions to the Russian (Graziani 2014[157]).

An issue of growing concern is the number of illegal water diversions via small dams and ponds, particularly for illegal marijuana cultivation. In 2008, an award winning science project by a Willits student attempting to determine why Alder Creek no longer flowed year-round documented 21 illegal water diversions (Williams 2011[158]). In 2012 in a remote tributary of the Eel thirty-seven square miles in size, state scientists counted 281 outdoor marijuana farms and 286 greenhouses containing an estimated 20,000 plants which were mostly watered by surface water diversions, siphoning approximately 18 million gallons each year, usually during the summer, when it is most needed for environmental instream flows (Mozingo 2012). The amount of unregulated marijuana grow sites has "exploded" since 2007, with hilltops leveled to make room for the crop and the sites steadily increasing in size (Barringer, 2013). Local and state ability to address this problem is hampered by the drug's unclear legal status; although approved by the state for medical use, it is still illegal under federal law, leading to a patchwork of growers, some of whom operate within state laws while a growing body operates entirely outside the law. These grow sites not only severely reduce instream flow for salmonid habitat, but the fertilizers used to enhance plant growth and pesticides used to deter woodrats further impact habitat, not only for fish and other aquatic animals, but also for the endangered fisher and other mammals who ingest either the poison or the poisoned rats (Mozingo 2012[159]).

In 2014, amidst growing concerns associated with the ongoing drought, the State's top public health officials identified the City of Willits as the most vulnerable in the state, providing immediate relief in the form of emergency water supply and infrastructure repair/ supplementation (Bernstein, 2014[160]).

Flood Risk

Flood exposure occurs along the Eel River (DWR 2013).

Humboldt Bay Watershed Management Area

Water Quality

Within the Humboldt Bay WMA (Map 11), the Eureka Waterfront was historically the site of numerous industrial facilities including lumber mills, bulk oil storage and handling facilities, wrecking yards, and railroad yards. These operations produced both soil and groundwater contamination with heavy metals, petroleum products, and pentachlorophenols (PCPs). The Waterfront is currently undergoing cleanup and redevelopment. The City of Eureka is coordinating the redevelopment with several responsible parties including Union Pacific Railroad, Simpson Timber Company, Chevron, Unical, and Tosco oil companies, and a few others. The City is also cleaning up two brownfield sites on the Waterfront.

In addition, Humboldt Bay supports a significant commercial oyster industry and is a popular area for recreational shell fishing. Contaminated stormwater runoff during high intensity rainfall is a continued threat to commercial and recreational uses of the bay. Considerable monitoring is required from the commercial shellfish industry under a conditional harvest regulation to ensure a safe product; after heavy precipitation, contamination at times causes closure of the shellfish harvesting beds in the Bay.

Water Supply

Erosion is undercutting some of the Ranney collectors (horizontal wells adjacent to or under the stream bed) in the Mad River, which supplies the Humboldt Bay Municipal Water District, which serves the cities of Eureka, Arcata, and Blue Lake and the McKinleyville, Humboldt, Manila, and Fieldbrook-Glendale Community Services Districts.

Flood Risk

Flood exposure occurs in the Humboldt Bay area; at Humboldt Bay's North Spit sea level is rising by 4.73 mm per year, which is the highest rate in California (DWR 2013).

157 Graziani, Virginia. 2014. PG&E gets OK to continue low flow releases into Eel, Russian Rivers. Redwood Times Garberville News, February 19, 2014. http://www.redwoodtimes.com/news/ci_25172341/pg-e-gets-ok-continue-low-flow-releases.html

158 Williams, Linda. 2011. Thirsty marijuana grows sucking Eel River dry. Lake County Record-Bee, November 3, 2011. http://www.record-bee.com/ci_19261467

159 Mozingo, Joe. 2012. Pot farms take dirty toll. Los Angeles Times, December 23, 2012. http://articles.latimes.com/2012/dec/23/local/la-me-pot-enviro-20121223

160 Bernstein, Sharon. 2014. Health experts warn of water contamination from California drought. Reuters Edition: U.S., February 18, 2014. http://www.reuters.com/article/2014/02/19/us-usa-california-drought-idUSBREA1I06P20140219

Klamath Watershed Management Area

Issues in the Klamath WMA (Map 12) primarily focus on maintaining both cold water and warm water fisheries while maintaining the viability of agricultural and timber uses of the watershed. Addressing the issues in this watershed is complicated by the fact that approximately half of this WMA is located upstream within the state of Oregon. Entities involved in the issues of the Klamath include five federal agencies, two states, eleven counties and seven Native American Tribes.

Groundwater

Groundwater extraction is currently not regulated and is emerging as a water management issue in the Klamath basin. A large number of high output wells were developed in the Klamath River basin in response to the drought emergency in 2001, when the USBR cut off surface water deliveries from the Klamath Project to the Tule Lake subbasin area. In the following decade, ongoing water shortages resulted in additional surface water reductions and the implementation of groundwater substitution in nine of the ten years. In 2001, an estimated 70,000 acre-feet (af) was extracted from a deep irrigation well that draws water from a fractured basalt portion of the aquifer underlying the Tule Lake subbasin that is located along the western edge of the Tule Lake subbasin. This was an increase from 8,500 af in 2000 (DWR 2013). In 2002 and 2003, groundwater pumping dropped to about 22,000 af/year and then increased to 32,000 af in 2004 before dropping back to an average of about 14,000 af/year in 2005 and 2006. Pumping amounts were not recorded for 2007 and 2008, and no groundwater substitutions took place in 2009, although an estimated 8,500 af of non-transfer related pumping occurred. In 2010, a drought year, groundwater extraction volume increased to 51,000 af. The hydrograph for this well shows that the overall rate of basin recharge has not been able to keep pace with the post-2001 increase in groundwater extraction, and the decline of 17 feet over 12 years in response to groundwater substitution has resulted in impacts to shallow wells, increased risk for future subsidence, and brings into question the sustainability of land use practices requiring greater than about 40,000 af/year of groundwater extraction (DWR 2013).

Another well located near Grenada in the Shasta Valley Groundwater Basin shows seasonal effects of conveyance ditch losses and well withdrawals. Typically, groundwater levels are highest during late winter to early spring months from recharge during the rainy season, but this well is consistently 5- to 10-feet higher in fall relative to spring. This reversed trend is thought to be due to summer recharge from conveyance ditch losses and percolation of agricultural irrigation water during the summer season. When the dry season is over and agricultural irrigation stops, the conveyance system is dewatered and nearby groundwater levels decline.

In addition to water supply issues, groundwater quality is of concern in the Modoc basin; there are high total dissolved solids and alkalinity in the groundwater that is associated with lake sediments of the Modoc Plateau groundwater basins.

Surface Water

Surface water issues in the watershed include the dependence of the Klamath Basin Wildlife Refuges for surface water flow for ecosystem health to support two endangered species of sucker fish in Klamath Lake that require maintenance of a minimum lake level. The issues in this WMA came to a head in 2001 (a drought year) when the Bureau of Reclamation severely restricted flows, which negatively impacted farmers and the Klamath Basin Wildlife Refuges, and again in 2002 when approximately 33,000 adult salmon died in the lower part of the Klamath due to poor water quality and reduced water flows (DWR 2005, 2013). In 2013, the Bureau of Reclamation proposed augmentation of lower Klamath flows to reduce the likelihood and severity of any fish die-off due to reduced instream flows; this proposal was finalized on August 6 to maintain a targeted minimum flow of 2,800 cfs in the lower Klamath River between August 15 and September 21, 2013, a critical period for salmonid migration and survival (Bureau of Reclamation 2013[161]).

Also in 2013, the Klamath Tribes exerted their newly affirmed senior water rights to the upper Klamath Basin water, adding their claims to others in an increasingly contentious and over-allocated basin (The Oregonian 2013[162]). This resulted in the shutting off of irrigation water in the upper Klamath Basin to allow the tribes to

161 US Department of the Interior Bureau of Reclamation. 2013. 2013 Lower Klamath River Late Summer Flow Augmentation from Lewiston Dam. Web page. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=14366

162 The Oregonian. 2013. Running on empty in the Klamath Basin. The Oregonian, July 21, 2013. http://www.heraldandnews.com/members/forum/wire_commentary/article_2393e9aa-f19d-11e2-b393-0019bb2963f4.html

use their water rights to protect threatened fish species (The Associated Press 2013[163]). In 2014, currently the driest year on record for some areas of the state, the consensus is that the Scott River will go dry without an influx of precipitation. Many fear that the river will go dry even without diversions for crop irrigation (Smith 2014[164]).

Surface water quality has been impacted by blue-green algae, which is associated with low summer flows and increased nutrients. In July 2013, The Humboldt County Department of Health and Human Services issued a health advisory warning people and dogs to avoid contact with algae in the Klamath River and other North Coast rivers (The Times-Standard 2013[165]).

Flood Risk

Flood exposure occurs along the Scott River (DWR 2013).

North Coast Rivers Watershed Management Area

Water Quality

The North Coast River WMA (Map 13) includes multiple coastal rivers and watersheds. Primary issues in this area include implementation of timber harvest forest management plans to control sedimentation and temperature, as well as the development of TMDL waste reduction strategies for sedimentation. Following are issues of concern for some individual watersheds that fall within this WMA: (1) The Mattole River watershed is noted for being prone to excessive landsliding due to slope instability, high levels of rainfall, timber harvesting and timber-related roads; (2) The harbor at Fort Bragg must be frequently dredged due to large deposits of sediment from the Noyo River; and (3) The adoption of the Garcia River, the first river on the North Coast to have a TMDL "Action Plan," into NCRWQCB Basin Plan, has been a source of controversy because of timber harvest and forest road building restrictions.

Surface water quality has been impacted by blue-green algae, which is associated with low summer flows and increased nutrients. In July 2013, The Humboldt County Department of Health and Human Services issued a health advisory warning people and dogs to avoid contact with algae in the Mattole River, Big Lagoon, and Freshwater Lagoon and other North Coast rivers (The Times-Standard 2013).

Water Supply

In the Town of Mendocino, surveys in the mid-1980s showed that about 10 percent of wells go dry yearly with about 40 percent going dry during droughts (DWR 2013).

Flood Risk

Flood exposure occurs around Crescent City Harbor. Sea level rise at Crescent City is, however, not occurring as quickly as elsewhere on the North Coast, in fact, tectonic uplifts are causing sea level to drop relative to the coastline by 2.5 inches per century (DWR 2013).

Russian River/ Bodega Watershed Management Area

The Russian River/Bodega WMA (Map 14) is the most highly urbanized of the six WMAs in the Region. Key issues include impacts to salmonid fisheries through sedimentation, riparian habitat degradation, fish passage barriers and stream modification; water supply for domestic, municipal and agricultural uses; point source discharges to both surface and groundwater from municipal and industrial sources; and nonpoint source pollution from failing septic systems, as well as urban and agricultural run-off.

163 The Associated Press. 2013. Judge rules against upper Klamath Basin ranchers. Contra Costa Times California, July 16, 2013. http://www.contracostatimes.com/california/ci_23670893/judge-rules-against-upper-klamath-basin-ranchers

164 Smith, David. 2014. Siskiyou looks to drought task force; USDA offers $20 million to impacted ag. The Siskiyou Daily News, February 6, 2014. http://www.siskiyoudaily.com/article/20140206/NEWS/140209731/1001/NEWS

165 The Times-Standard. 2013. Blue-green algae health advisory issued. The Times-Standard, July 26, 2013.

Water Quality

In the lower Russian River watershed, stormwater runoff is thought to be contributing to high ammonia and low dissolved oxygen (DO) levels in the Laguna de Santa Rosa. Mercury in fish tissue is of concern in Lakes Mendocino and Sonoma, and the Laguna de Santa Rosa. Bacterial contamination from failing septic tanks in western Sonoma County — especially Monte Rio and Camp Meeker — are implicated in restrictions on water contact recreation in the lower Russian River. Additionally, organic chemical contamination of groundwater has led to municipal well closures in the cities of Sebastopol and Santa Rosa.

Present day impacts of gravel mining are a contested issue in the watershed; instream mining is associated with aggradation, increased sedimentation, channelization, and loss of gravel. As recently as 2012, environmental groups have challenged gravel mining in the Russian River, but dropped their lawsuit in exchange for near-term reductions in the level of instream mining and greater input on annual operations (Wilkison 2012[166]).

Water Supply

While plentiful in wet water years, during dry years, water supply can become limited in the Russian River watershed. As in other watersheds in the North Coast, competing beneficial uses can lead to contention between stakeholder groups. For example, winegrape growers typically use surface water diversions during early spring to protect newly budding vines from late freezes during a critical period for threatened and endangered salmonids. After two documented incidences of salmonid die offs due to depleted streams during spring 2008 (Family Water Alliance, Inc. 2012[167]), the SWRCB drafted and then enacted (2011) the Frost Protection Regulation for the Russian River watershed, which requires that diversions are in accordance "with a board-approved water demand management program (SWRCB 2011)." This regulation caused great concern among the agricultural community, which stands to lose large sums of money when vines are damaged from late frosts. It was legally challenged and on September 26, 2012, a Mendocino County Superior Court judge declared the regulation constitutionally void (Kronick, Moskovitz, Tiedemann, & Girard 2012[168]). The regulation is currently not enforced. However, the County of Sonoma Agricultural Division is working cooperatively with growers to maintain an inventory of frost protection systems to assist with water use management along the tributaries and requires all vineyard and orchard sprinkler frost protection systems within the Russian River watershed to be registered with the Agricultural Commissioner prior to use (County of Sonoma Agricultural Commissioner 2014[169]). Farmers in the watershed have implemented a number of alternative measures to protect against frost, including installation of wind machines and creation of offstream ponds (Adler 2013[170]).

Trinity River Watershed Management Area

In addition to the diversion of Trinity River waters to the Central Valley Project, issues of concern in the Trinity River WMA (Map 15) include water temperature, sedimentation and competing land and water uses. Additionally, ongoing restoration projects to ameliorate impacts from historic land use practices continue to cause controversy among stakeholders. For example, a coalition of environmental groups, fishing guides and landowners have requested that two pending channel rehabilitation projects — the Bucktail and Lower Junction City projects — be delayed pending further studies, however, the Yurok Tribe wants these projects to move forward.

166 Wilkison, Brett. 2012. Settlement OK'd ending lawsuit over Russian River gravel mining. The Press Democrat, October 2, 2012.

167 Family Water Alliance, Inc. 2012. Frost Protection Regulation Challenged. Green Ribbon Reports, FWA's Newsletter, Summer 2012. http://www.family-wateralliance.com/farm_summer_12_frost_protection_challenged.html

168 Kronick, Moskovitz, Tiedemann, & Girard. 2012. Judge Declares Russian River Frost Protection Regulation Constitutionally Void. JDSUPRA Business Advisor, September 27, 2012. http://www.jdsupra.com/legalnews/judge-declares-russian-river-frost-prote-53650/

169 County of Sonoma Agricultural Commissioner. 2014. Frost Protection for Vineyards & Orchards. Web page. http://www.sonoma-county.org/agcomm/frost_protection.htm

170 Adler, Steve. 2013. Farmers work to protect grapes, river levels. Ag Alert, the Weekly Newspaper for California Agriculture, April 24, 2013. http://www.agalert.com/story/?id=5447

Water Quality

The NCRWQCB Basin Plan establishes temperature objectives for the Trinity River; water diversions have reduced summer flows, increasing temperatures in the summer to the point where the water is lethal to salmonids and potentially disrupting physical cues for anadromous fish migration (DWR 2013). The Trinity Lumber Company in Weaverville has a history of discharging wood treatment chemicals (DWR 2013 ibid), further impairing water quality and potentially disrupting physical cues necessary for successful salmonid migration.

Historic and current logging and road building activities have contributed to sedimentation and degradation of the watershed. Historic mining practices have contributed pollution at a number of sites within the basin and to mercury releases into the Trinity Lake. Additionally, fuel constituents such as MTBE impact recreational water use at Trinity and Lewiston Lakes. Further, contamination from failing septic tanks along the Trinity River below Lewiston Dam and leaking underground storage tanks are also of growing concern.

6.3.2 ISSUES FOR NORTH COAST COUNTIES

At the county level, policies provide a local framework for the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) process, and control zoning, open space and parks, gravel and rock quarry management, and flood control. On an implementation basis, counties control road and bridge management, stormwater and flood control, small dam management, transportation, and fire control. However, a lack of codified stormwater management policies in smaller incorporated cities has resulted in inconsistent application of BMPs and measures for stormwater control. Also, maintenance of implemented stormwater management measures is not consistently monitored in these smaller municipalities. Therefore, there can be wide variation in more rural areas of the Region in the extent to which stormwater management for water quality and water quantity (i.e. excess runoff) are addressed. There are, however, several cooperative multi-stakeholder groups that include local jurisdictions and address water management issues. For example, the 5C Program has cooperatively drafted a road grading maintenance manual that has been used by most of the five counties (Del Norte, Humboldt, Mendocino, Siskiyou and Trinity) cooperating in the Program (see Appendix E "Overview of Local Water & Land Planning").

The primary issues and challenges affecting North Coast counties, as identified through the NCIRWMP process, are described below. See Appendix P.3 "Profiles of Counties" for statistics that help characterize the issues represented in these counties.

6.3.3 ISSUES FOR NORTH COAST TRIBES

Tribal Water Rights on the Klamath and Trinity Rivers

Historically, the fishery resources of the Klamath and Trinity rivers have been the mainstay of the life and culture of the Hoopa, Karuk, and Yurok Tribes. The salmon fishery is central to Hoopa culture and its economy. The lower 12 miles of the Trinity River and a stretch of the Klamath River flow through the Hoopa Valley Reservation, established in 1864 (DWR USACE 2013).

The Trinity River Division of the CVP was authorized in 1955 and completed in 1963. The Trinity River Division Act authorized the TRD (Trinity River Diversion). The TRD is the only source of water imported by the CVP to the Central Valley from within the region. Congress included area-of-origin protections for the Trinity River, including one establishing flow release procedures for Trinity River fish and wildlife preservation and propagation. The USBR informed Congress that it would divert approximately 50 percent of Trinity River water into the Sacramento River. However, until the 1992 enactment of the CVPIA, Pub. L. 102-575, the USBR consistently diverted 90 percent of the Trinity River water. That procedure not only created undue reliance on water resources in the Central Valley, but it also devastated the Trinity River fishery (Hoopa Valley Indian Tribe, California Tribal Water Summit 2009).

In March of 2013, the state of Oregon backed the Klamath Tribes' claim to have the oldest water rights in the upper Klamath Basin. The findings filed with the Klamath County Circuit Court in Klamath Falls gives the Tribes a new dominant position in the long-standing battles over sharing scarce water between fish and farms in the Upper Klamath Basin. Farmers and ranchers who draw irrigation water from rivers where the tribes now have the oldest claim could be restricted in drought years. Tribes are watchful of impacts and infringements on Tribal adjudicated water rights, those confirmed by negotiated

agreement, and those water rights "perpetually" "reserved" as affirmed in Winters v U.S. (1908, "Winters Doctrine"). The Winters Doctrine affirmed that when an Indian reservation is created, the water necessary to fulfill the reservation's purpose is reserved. Tribes retain rights to the amount of water necessary to fulfill the reservation's purpose. Federally reserved water rights, including those reserved for Indian reservations have priority over other water rights. This Doctrine was extended in 1976 to include groundwater use on or near reservation lands (Cappaert v. United States, 1976).

Natural Resources Protection, Marine Issues, and Co-Management

Natural resources traditionally utilized by Native American people in the Region have special significance as cultural resources; access to these resources is often limited. Ackerman Creek in the Russian River Hydrologic Unit is impacted by the invasive non-native *Arundo donax*, which destabilizes stream banks, negatively impacts biological diversity, and increases sediment delivery. *Arundo* displaces native grass and herb species that support culturally important plants for the Pomo Nation. Currently, access to these plants (and by extension the opportunity to engage in traditional activities) is limited. In the Eel River WMA and throughout the state, there is a dearth of safe, accessible locations for Native American acorn harvesting. This activity is an important social and cultural tradition. Additionally, subsistence harvesting and marine management remain an issue for North Coast Tribes.

Salmonid population declines are a major Tribal issue. In Nissa-kah Creek, for example, steelhead populations have declined to the point that subsistence fishing is no longer possible for Tribal members who would like to return to a more traditional diet that includes steelhead trout and salmon. In general, this is the case throughout the North Coast Region: salmonid populations have declined to a point where they cannot support Tribal subsistence sport, and commercial fishing and ecotourism needs. In the Mattole watershed, salmonid population numbers have reached a point that some believe salmonids could be extirpated from the system. Loss of these fish would not only have economic and ecological impacts, but also severely impact Tribal cultures that were traditionally reliant on salmonid fisheries.

Tribes recognize and are concerned about the likely impacts of climate change on natural resources, community health, and local planning efforts. Recently, California Tribes worked with DWR staff to develop a climate change vulnerability matrix focused on the following seven sectors: water supply, agriculture, forests, ecosystems, public health/safety, infrastructure, and coastal resources.[171] North Coast Tribes were integral in the NCRWQCB adoption of Native American Cultural (CUL) and Subsistence Fishing (FISH) beneficial uses. California Tribes and Environmental Justice organizations are working with the SWRCB on the consideration of statewide adoption of these CUL and FISH beneficial uses.[172]

6.3.4 ISSUES FOR ECONOMICALLY DISADVANTAGED COMMUNITIES

Economically disadvantaged communities (DACs, Tribes with limited resources, and rural areas) in the North Coast Region of California (Map 2) are disproportionately affected by inadequate wastewater and water supply infrastructure; failing and sub-standard systems create public health risks, negatively impact aquatic systems and create economic hardships for these rural areas (Section 5.14.2 "Socioeconomic Indicators"). Many of these facilities were built decades ago to serve much smaller communities and service providers are geographically

171 Review and comment on the draft "Tribal Communities Climate Change Vulnerability Matrix" at http://www.waterplan.water.ca.gov/docs/tac/TribalVulnerabilityMatrix_FinalDraft_Aug2013.pdf

172 http://www.epa.gov/region9/tribal/rtoc/fall13/final/2013-10-01-final-letter-tribal-adhoc-beneficial-use-group.pdf

isolated, serve economically disadvantaged communities, are understaffed, and lack current technological advancements, making infrastructure improvements difficult to finance. Through a cost-share agreement within the North Coast IRWMP planning grant, NCIRWMP staff is has initiated a needs assessment of water and wastewater providers and treatment facilities that serve economically disadvantaged communities.[173]

Water management challenges that disproportionally affect North Coast DACs include:

- Relative lack of access to clean drinking water supplies
- Limited social, institutional and financial capital in local communities constrains capacity to find and exploit new economic opportunities, maintain services and infrastructure, and adapt to the predicted impacts of climate change
- Declines in the natural resources economy over the last two decades, and associated declines in processing, manufacturing and ancillary service sectors, has led to extremely high and multigenerational poverty
- While great wealth was harvested from the Region's waters, fields and forests, much of that wealth was not retained in local communities, resulting in a lack of financial resources to reinvest in community infrastructure and increase social capital.
- Counties with high levels of federal lands often lack sufficient tax base to provide comprehensive services for local residents or to maintain built infrastructure to protect ecological values. Continued declines in federal land management spending and the loss of "County Payments" from the federal government in lieu of timber receipts may compound this issue.

6.4 STRATEGIES TO ADDRESS NORTH COAST ISSUES

The NCIRWMP framework, implementation projects, and PRP-approved processes work together to assure the NCRP effectively and accountably addresses all the priority issues of North Coast stakeholders with a tailored, "one-size-does-not-fit-all" approach. This is achieved by employing the NCIRWMP's cooperative, collaborative approach to complex problem solving while respecting local knowledge, authority, and jurisdictional authority.

Members of the NCRP (including those in the governing body) have a history of pursuing collaborative opportunities to address local water resources issues. Private partnerships, cooperative arrangements, information sharing, and resource leverage have been a fixture of the NCRP process. For example, the Counties of Del Norte, Humboldt, Mendocino, Siskiyou, and Trinity have been collaborating since 1997 in the Five Counties Salmonid Conservation Program in a "proactive, positive response to the federal listings of salmon as Threatened species." Trinity County is cooperating with the Hoopa Valley and Yurok Tribes and several state and federal agencies in the Trinity Management Council and Siskiyou County has long been involved in negotiations with stakeholders and local, state, federal, and Tribal agencies regarding Klamath River water quantity and quality. The Hoopa Valley Tribe Water Quality Control Plan expresses the Tribe's willingness to coordinate with other jurisdictions to assure mutual benefits. The success of the Pacific Coastal Salmon Recovery Initiative and resulting benefits to North Coast counties are additional results of participation in this regional coalition. The Pit River Tribe and Modoc County have entered into an interagency cooperation with the Bureau of Indian Affairs to address water shortage, agricultural overuse and imapcts to water quality, groundwater depletion degrading instream flows and infringement on the tribes adjudicated water rights. There are numerous other examples of past, present, and planned strategic collaborations intended to address the water-management needs of the North Coast Region.

173 The NCIRWMP Water and Wastewater Service Provider Outreach & Support Program at http://www.northcoastirwmp.net/Content/10411/NCIRWMP_Water_and_Wastewater_Service_Provider_Outreach__Support_Program.html

Local and regional strategies to address the issues identified in the NCIRWMP are framed around the state's "Resource Management Strategies" (RMS) categories, as recommended in the California Water Plan (2013[174]). See Section 8 for more about RMS and other strategies supported by the NCIRWMP project portfolio. Section 10 ("Implementation Impacts & Benefits") presents a formal assessment of the likely benefits and potential impacts of implementing the NCIRWMP projects throughout the Region.

174 California Water Plan, 2013 update (DWR, USACE 2013) at http://www.waterplan.water.ca.gov/cwpu2013/prd/index.cfm

SECTION 7.0 PROJECT APPLICATION, REVIEW & SELECTION PROCESS

This section describes the process steps and guidelines developed by the NCRP Policy Review Panel (PRP) and ad hoc committee, and utilized by the PRP and Technical Peer Review Committee (TPRC) to identify, rank, and select priority projects to implement the NCIRWMP. The current (Spring 2014) NCRP Project Review and Selection Process Guidelines (NCIRWMP Guidelines[175]) standardize the process and are subject to continual review and refinement per recommendations of the PRP, TPRC, NCIRWMP staff, and the DWR's IRWM Grant Program Guidelines. See Appendix I for more information about NCIRWMP implementation projects that have been planned and/or implemented to date [Spring 2014], and Appendix J for a "Project Impact & Benefit Analysis" summary.

The NCRP process and implementation of NCIRWMP priority projects identified through the planning process address economic and ecological impacts at their source and generate lasting benefits that will materialize in the local, regional, and statewide economy. In a bottom-up manner, these projects have been planned and proposed to address a suite of local needs identified by North Coast stakeholders through the NCRP process. Projects are implemented at the basin scale by local entities in accordance with local jurisdictional planning. Implemented projects are monitored and evaluated according to methods outlined in Section 11 "Performance Monitoring & Evaluation," in order to facilitate accountability of ongoing projects, share lessons learned, and measure the success of completed projects and, by extension, the NCIRWMP and process.

To be included in the NCIRWMP and to qualify for related funding opportunities, projects proposed for PRP and TPRC approval must demonstrate how project implementation will contribute to achieving one or more of the specific NCIRWMP Goals & Objectives outlined in Section 4. Projects must also align with the priorities of local, Tribal, regional, state, and federal stakeholders, as well as the state's IRWM Program Preferences.[176] These and other North Coast priorities (Section 1.5) provide the foundation for ongoing refinement of the 2014 NCRP Guidelines.

These and other North Coast priorities (Section 1.5) provide the foundation for ongoing refinement of the 2014 NCRP Guidelines. For example, during the most recent review of the NCIRWM Plan, the lack of consideration of Resource Management Strategies (RMS) during project review was noted. The next iteration of the review process (which occurs prior to a project solicitation) will include each project's relation to pertinent RMS in the project evaluation and prioritization process. For example, when considering projects that increase water supply reliability, those projects that incorporate multiple RMS — such as Agricultural Water Use Efficiency, Surface Storage, and Matching Water Quality to Use — not only enhance the desired water supply reliability but also provide multiple benefits. The stated RMS also strengthen the regional economy, support DACs, protect water quality, and protect environmental beneficial uses such as provision of instream flow for salmonid rearing and migration. These factors are already considered during project prioritization on an informal basis, however, in the future, project application and review will formalize consideration of RMS.

7.1 PROJECT APPLICATION, REVIEW & SELECTION PROCESS

7.1.1 OVERVIEW OF PROCESS STEPS

The NCRP project application, review and selection process is an ongoing, multi-step progression that involves the participation of the NCRP PRP, TPRC, project proponents and other regional stakeholders. The process and Guidelines are continually revised as needed and as opportunities for input are presented. The details of some project selection steps have been revised since Phase I and Phase II NCIRWMP (see Section 7.1.3 "Ongoing Improvement of Process Steps & Guidelines"), but these seven steps continue to form the foundation for identifying, evaluating, and recommending projects for inclusion in the NCIRWMP and related funding applications.

STEP 1 — Preliminary Project Information Upload

Project proponents are provided with information about IRWM guidelines and funding opportunities via the NCRP website, email listserve, workshops and other media. Project proponents upload Preliminary Project Information to the NCRP website on an

175 The 2014 NCRP Project Application, Review & Selection Process Guidelines http://www.northcoastirwmp.net/docs.php?oid=1000009634&ogid=1000002551

176 2012 DWR IRWM Guidelines specify "Program Requirements" for "Project Review Process." These require consideration of each proposed project's (1) contribution to NCIRWMP objectives and statewide priorities, (2) contribution to RMS (from CWP 2009) implementation, (3) contribution to climate change adaptation, (4) contribution in reducing GHG emissions as compared to project alternatives, (5) specific benefits to critical DAC water issues, (6) technical and economic feasibility, (7) project cost and financing, (8) project status, and (9) strategic considerations. See Section 7.3.

ongoing basis; project proponents submit a signed MoMU; and staff publishes eligible NCRP Projects.

STEP 2 — Project Solicitation & Supplemental Project Information Request

At the direction of the PRP and when there is a funding opportunity, a call for proposals will be announced to North Coast stakeholders. Staff will develop and make available Project Solicitation application materials based on the NCRP priorities and the funding source solicitation and requirements. The project application materials will include an application, detailed instructions and a clear description of scoring guidelines and evaluation criteria, all of which will be reviewed by the TPRC and PRP and approved by the PRP. Project applicants will provide application materials to NCRP staff via email. A Microsoft Word version of the NCRP project application will be made available for reference, for application development and for submittal to NCRP staff. Staff will provide outreach, education and technical assistance via workshops and informal meetings by phone, internet and in person.

STEP 3 — Individual TPRC Review & Scoring of Project Applications

Staff compiles and provides application materials to the TPRC for review and scoring using approved evaluation forms. TPRC members individually review and score the NCRP Step 1 project applications for technical merit based on criteria as defined by the funding solicitation, NCRP PRP-directed guidelines, and the professional expertise and judgment of the TPRC. TPRC members provide individual scores to NCRP staff for compilation. TPRC members review all projects referred to them unless they recuse themselves due to a potential conflict of interest.

STEP 4 — Group TPRC Review of Project Applications & Scores

Staff compiles all preliminary scores assigned by individual TPRC members to determine a preliminary average project score. TPRC members and staff meet to discuss each project and may make adjustments as necessary to their individual scores based on the group discussion. Any necessary background information or project-level clarification is provided to the TPRC by NCRP staff, which may ask clarifying questions of project proponents on TPRC's behalf. Staff compiles all updated TPRC individual scores to determine an updated average project score and ranks proposed projects. TPRC review meetings are open to project proponents and the general public with time allotted for public comment. All meeting deliberations, project scores, applicant and public input and recusals are recorded and made available via the NCRP website.

STEP 5 — TPRC Selection of Draft Portfolio of NCRP Priority Projects

During the group project review meeting, the TPRC selects a draft portfolio of NCRP Priority Projects, including draft budget totals for each project. This selection is based on technical project scores, project scalability, potential funding allowance, the overall balance of projects based on the PRP's defined guidelines for project selection (e.g. for regional equity and balance of grey and green project types), and the ability of the project portfolio to meet NCIRWMP goals. The TPRC also recommends a list of contingency projects, which are approved to replace one or more of the priority projects, if necessary (i.e. if a project becomes unable to proceed, or if additional appropriate funding becomes available).

STEP 6 — PRP Review, Consideration and Final Approval of Draft Portfolio

During a public NCRP meeting, the PRP reviews and makes adjustments as appropriate to the draft suite of NCRP Priority Projects recommended by the TPRC and approves a final suite of NCRP Priority Projects to forward to the funding entity. The PRP makes their final decision based on TPRC recommendations, PRP guidelines, funding requirements, and other factors that they believe represent the best interest of the North Coast Region. Final approved NCRP Priority Project lists are made publicly available through posting to the NCRP website. Project review scores and review meeting materials are made available to the project proponents and, as requested, to the general public.

STEP 7 — Priority Project Application Materials for Regional Proposal(s)

NCRP Priority Project proponents may be asked to provide additional project information to include in a competitive regional application. Additional information may include, but not be limited to, a detailed work plan, budget, schedule, economic cost/benefits analysis, monitoring & performance measures, and technical documentation to support the project. Where feasible, NCRP staff provides technical assistance to those project proponents who request it.

7.1.2 ROLES OF THE PRP, TPRC & STAFF

As described above, NCRP governance (i.e. PRP and TPRC) and staff fill complimentary but distinct roles in carrying out the review and selection of NCRP implementation projects. The role(s) of each is detailed below (see Section 2.1 "North Coast Resource Partnership" for more on these entities).

Policy Review Panel

The PRP is the governing and decision-making body for the NCRP and NCIRWMP. The composition of the PRP and decision-making process is defined in Section 5.4 of the NCIRWMP Memorandum of Mutual Understandings (MoMU; see Appendix M "NCRP Governing Documents"). The role of the PRP in the NCRP project review and selection process is to set the policy, decision-making criteria, and framework for the process and to ensure that the process is fair, open, and transparent. As the decision-making body, the PRP provides direction about how the project evaluation and selection process aligns with the NCIRWMP priorities by defining project review and selection guidelines and scoring criteria. Taking into account review and recommendations from the TPRC, the PRP approves all projects for inclusion in the NCIRWMP and approves the Region's highest priority projects for grant submittals.

Technical Peer Review Committee

The TPRC is advisory to the PRP and evaluates and makes recommendations based on technical expertise and scientific data. The role of the TPRC in the project review and selection process is to evaluate projects for technical merit based on their professional judgment and expertise, as well as on guidelines developed by the PRP and set by the funding solicitation. The TPRC prepares a draft suite of priority projects for review by the PRP. Scoring criteria and evaluation outcomes from the TPRC are available for public review. The criteria for evaluating applications and assigning scores are detailed in the NCRP Guidelines.

NCRP Staff

The role of NCRP staff during the project application, review and selection process is to facilitate and ensure the integrity of the process. Staff develops and coordinates project application materials; performs outreach and makes information available to the PRP, TPRC and stakeholders; clarifies outstanding issues; makes sure decisions are understood; maintains records; consolidates and summarizes TPRC review of project grant applications, and performs fact checking of state guidelines and criteria as necessary.

7.1.3 ONGOING IMPROVEMENT OF PROCESS STEPS & GUIDELINES

The NCRP is committed to transparency, stakeholder inclusion, and continual improvement at all stages of Plan and project development and implementation. An accounting of recent refinements to the NCIRWMP Phase III project application review and selection process is below. These were most recently compiled and approved as the NCRP Guidelines (2014).

Refinements to Project Application, Review & Selection Process Guidelines

At the July 2011 NCRP meeting, the PRP directed the formation of the NCRP Project Review and Selection Ad Hoc Committee (composed of PRP and TPRC members plus staff) to evaluate the existing approach to project evaluation and ranking and to develop a draft approach for consideration at future NCRP PRP meetings. An on-line survey was posted and interviews were conducted of Ad Hoc Committee members, TPRC members, and project proponents to review information about the existing process and to solicit recommendations toward process improvement.[177] With this information as the basis, the Ad Hoc Committee developed, and the PRP approved in 2012, a set of formal NCRP Guidelines; although broadly vetted and well developed, these guidelines remain subject to continual improvement and refinement by the NCRP and the public (see Section 2.7 "Plan Update & Public Input"). A bulleted chronology of the most recent (2012 to present) process developments is below.

- January, 2012 NCRP Meeting: Report out of Ad Hoc Committee actions and a summary of survey/interview responses; PRP considered potential guidelines that the TPRC would use as a basis for project proposal scoring; and discussed and provided direction on elements of the proposed Project Application, Review and Selection Process Guidelines

177 The interview summary and summary of recommendations can be found at http://www.northcoastirwmp.net/docs.php?ogid=1000002175

- January to July, 2012: Ad Hoc Committee and staff drafted and refined the NCRP Guidelines based on PRP/TPRC input; developed portions of the project application; and developed review and selection process steps based on the 2012 Draft IRWM Guidelines and Proposition 84 Implementation PSP (released in July)
- July, 2012 NCRP Meeting: Report on Ad Hoc Committee actions; PRP and TPRC reviewed and provided direction regarding draft of the NCRP Project Application, Review, and Selection Process Guidelines
- July to September, 2012: Ad Hoc Committee and staff refined the final draft of the NCRP Guidelines based on PRP/TPRC input and Draft IRWM Guidelines and Proposition 84 Implementation PSP (DWR 2012)
- September 17 to October 12, 2012: The draft NCRP Guidelines was posted to the website for public review and comment; refinements were made by staff based on public input
- October, 2012 NCRP Meeting: PRP reviewed and unanimously approved the final 2012 NCRP Guidelines
- November 1, 2012: NCRP project solicitation begins for Proposition 84, Round 2 Project Implementation grant
- March 29, 2013: Proposition 84, Round 2 NCRP Project Implementation grant application submitted by NCRP
- In April 2013, the Ad Hoc Committee recommended the following proposed language be added to the current (2012) Project Evaluation, Review, and Selection Process Guidelines
  - » The project application should require project proponents to demonstrate that they have notified counties and Tribes re: proposed projects in the proposed project impact area of a particular watershed or relevant area of County or Tribal interest;
  - » Project applicants should be required to demonstrate coordination and outreach to potentially interested stakeholders in the relevant watershed, sub-watershed or project impact area; and
  - » NCRP staff are formally directed to support project proponents in coordinating and potentially integrating projects in the same watershed or project area (e.g., informing project proponents of opportunities to partner or gain economies of scope and scale by combining projects) where timing allows and in accordance with the source funding proposal process and eligibility requirements.
- In March 2014, the ad-hoc committee reviewed and refined sections of the Project Review and Selection Process Guidelines based on input from the TPRC project review de-brief meeting and the Draft 2014 IRWM Guidelines and Draft 2014 Drought Proposal Solicitation Package.
- In April 2014, the PRP reviewed and unanimously approved the 2014 NCRP Project Review and Selection Process Guidelines.
- April 29, 2014: NCRP project solicitation begins NCRP 2014 Drought Project Proposal Solicitation

7.1.4 PRIORITY CONSIDERATIONS

The intent of the PRP-directed NCRP Guidelines is to provide an acceptable method to solicit, identify, and evaluate projects proposed for NCIRWMP-related funding. The NCRP Guidelines allow the PRP to objectively compare and confidently select planning or implementation projects that promote NCIRWMP goals and objectives, while allowing for local flexibility in addressing specific statewide program preferences and funding requirements. The PRP includes the following priority considerations in its decision-making process and scoring criteria (these are in addition to considerations of the DWR IRWM Guidelines, which are described in Section 7.3 below):

Regional Representation

The PRP will make every effort to ensure geographic representation by including projects from each of the six WMAs; seven counties; and from the north, central, and southern Tribal areas of the North Coast Region (Map 45 "NCIRWMP Project Locations in the North Coast IRWM Region"). This guideline will apply only to those projects which are eligible for funding under the NCRP and other state and federal requirements, and which have met the technical criteria established by the PRP and evaluated by the TPRC.

Economically Disadvantaged Community (DAC)

As part of its commitment to respecting the local autonomy and local culture of each NCRP member, the group has opted out of using some common terminology, such as "Environmental Justice," that can have multiple meanings and may be considered inflammatory to some members. The North Coast is a rural region where economic disparity is the main driver. Thus, there is a strong focus on Severely Economically Disadvantaged

Communities and DACs within the region and the PRP has regularly and consistently supported efforts to address economic disparity as the predominant mechanism to address environmental justice. Project review and NCIRWMP Plans consistently and comprehensively address economic disparity through implementation of projects that serve these communities. These projects are regularly weighted as described below.

In an effort to build capacity and extend services to communities that are under-served and/or limited by economic barriers, the TPRC will include screening criteria that will confer additional weight to projects that, in addition to meeting other NCIRWMP criteria, will benefit North Coast DACs. The PRP reserves the right to prioritize DAC projects, based on a project's ability to mitigate threats to public health, watershed health, and the economic and public health benefits that project implementation would bring to these communities.

Programmatic Integration and Balance of Project Type

The PRP requires that proposed projects effectively implement NCIRWMP goals and objectives and, further, address specific federal, state, regional, and local priorities (see Section 1.5 "North Coast IRWMP Priorities"). Projects that address specific priorities identified by the PRP may be prioritized by the PRP (examples may include, but are not limited to, biomass-related projects, effective instream flow approaches, energy retrofits, or drought/ flood preparedness).

Diversity in project "type" (including, for example, built infrastructure projects and natural system restoration projects) will be achieved at the project portfolio level. That is, small and/ or individual projects are not required to demonstrate integration of all priorities, yet they must contribute to a comprehensive suite of projects that achieve a multi-benefit, integrated program. Programmatic integration and project type diversity will be achieved over time and through multiple rounds of funding. Projects that propose to provide multiple benefits will be prioritized, when all else is equal.

7.2 PROJECT FUNDING HISTORY

A brief description of NCIRWMP project planning and implementation funding sources and awards (beginning in 2005) is provided below (See Appendix K Table 48 "Summary of Funding and Financing to Date" for details). Grants have been managed through the County of Humboldt Office of Natural Resources Planning. Potential future funding for long-term NCIRWMP planning and implementation is discussed in Section 12 "Long-Term Financing & Implementation." Specific reports produced for the NCRP as part of NCIRWMP-associated grants are presented in Appendix O.

NCIRWMP Funding Awards: 2005 to 2014

Proposition 50[178], NCIRWMP Planning Grant (2005)

- Award Amount: $500,000
- Award Description: This grant allowed for North Coast regional planning and pilot local planning efforts and also provided funding for revisions of the Phase I NCIRWMP document.

Proposition 50, Implementation Grant, Round 1(2006)

- Award Amount: $25,000,000
- Award Descriptions: This grant funded implementation of 21 IRWM projects throughout the North Coast Region. Sub-grantees include city governments, Resource Conservation Districts, Community Service Districts, state agencies, and non-profits throughout the Region.

Proposition 50, Implementation Grant, Round 2 (2007)

- Award Amount: $2,079,000
- Award Description: This supplemental grant provided support four priority Integrated Coastal Watershed Management (ICWM) projects via the NCIRWMP.

Proposition 50, Implementation Supplemental Funding (2010)

- Award Amount: $2,176,860
- Award Description: This grant continued support for the four priority ICWM projects.

CEC Energy Efficiency and Conservation Block Grant[179] (2010)

- Award Amount: $959,117
- Award Description: This grant provides funding for projects that propose to deliver lasting financial benefits to California consumers and the economy through promotion and facilitation of energy efficiency.

Proposition 50, DAC Assistance[180] Grant (2011)

- Award Amount: $500,000

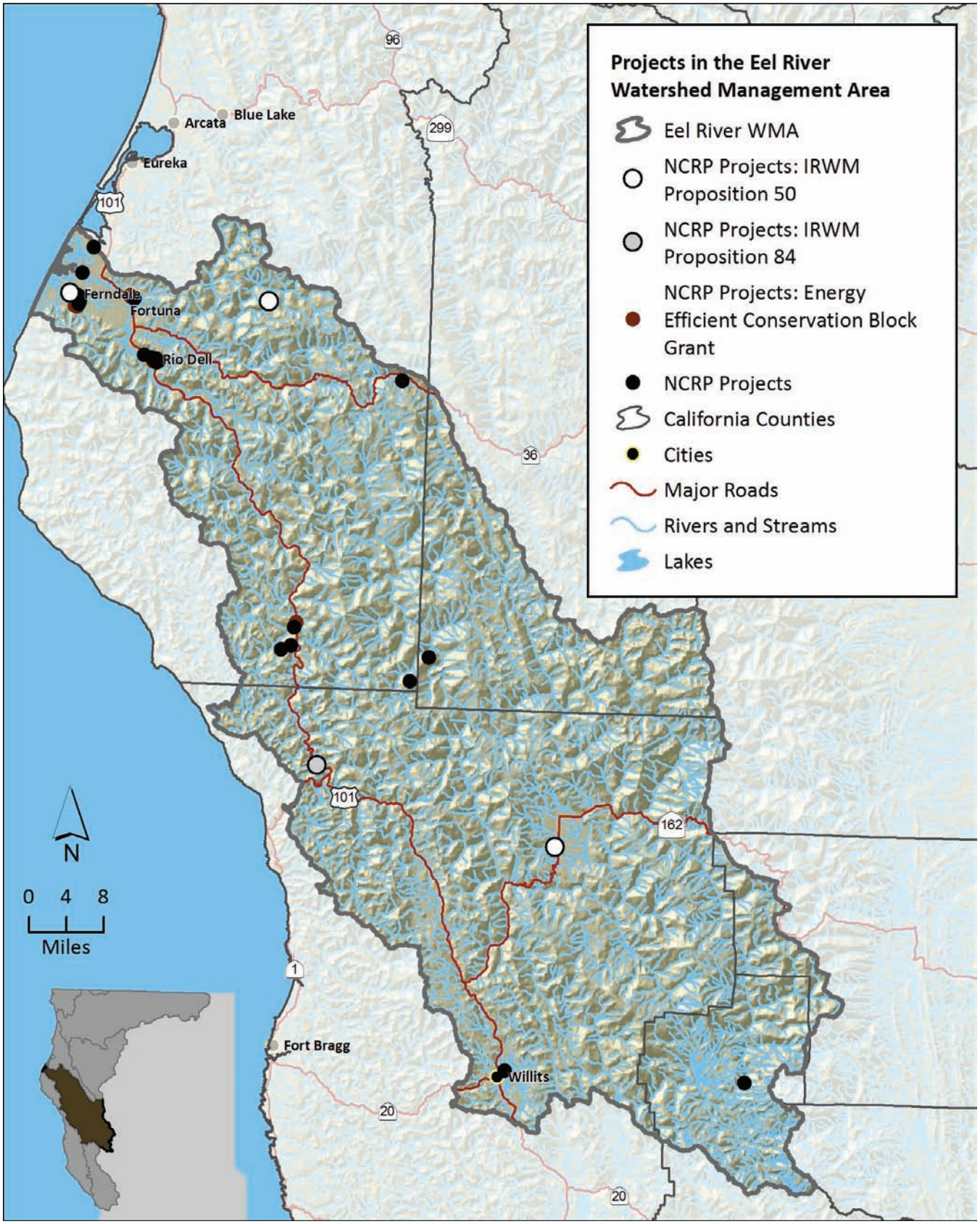
178 Proposition 50 Planning and Implementation grants information at http://www.water.ca.gov/irwm/grants/archive.cfm

179 CEC grant program information at http://www.energy.ca.gov/recovery/blockgrant.html

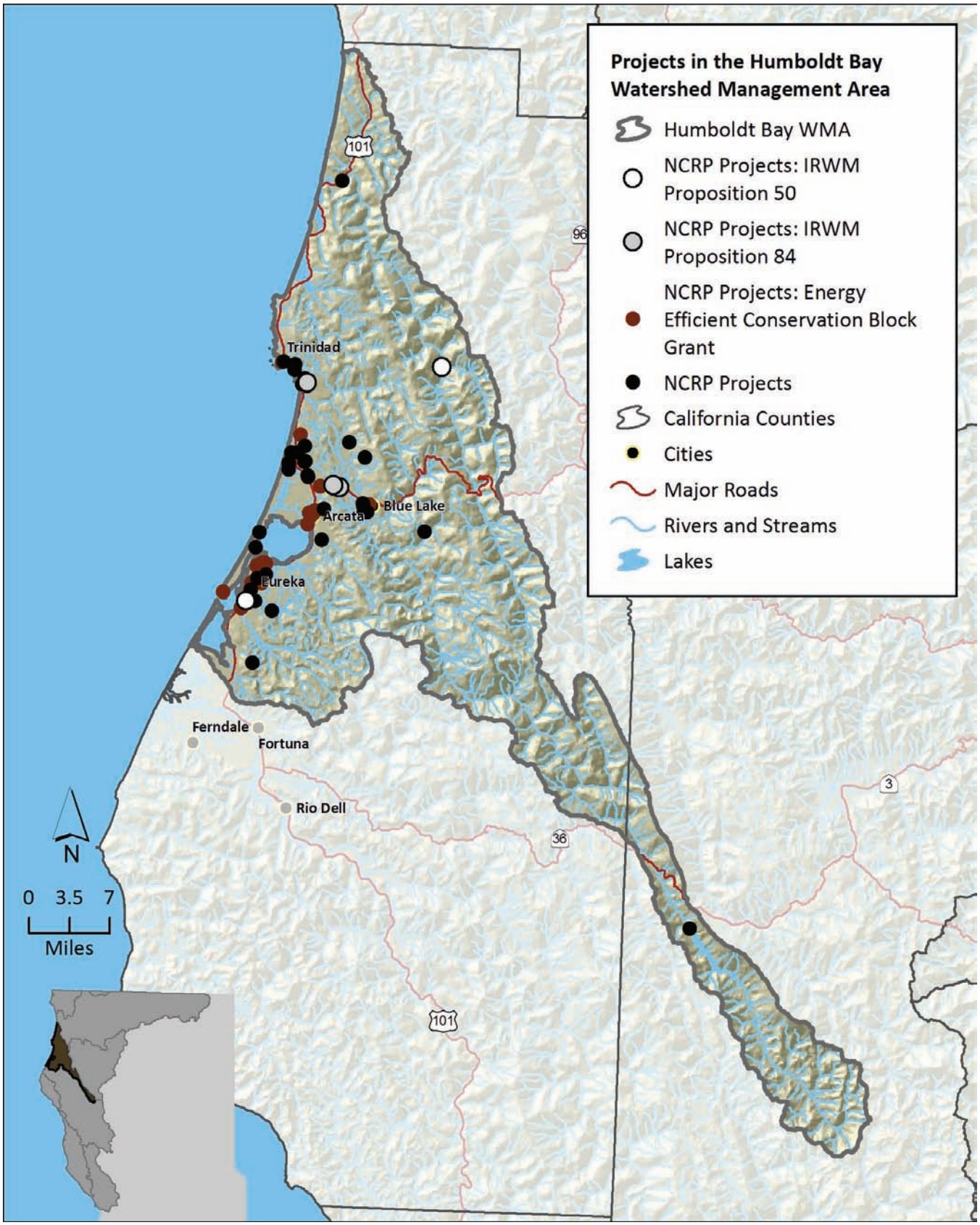
180 Overview presented at http://www.northcoastirwmp.net/docManager/1000008718/DAC_PRP_Presentation_7-16-12_JPM.pdf

MAP 45 NCIRWMP PROJECT LOCATIONS IN THE NORTH COAST IRWM REGION

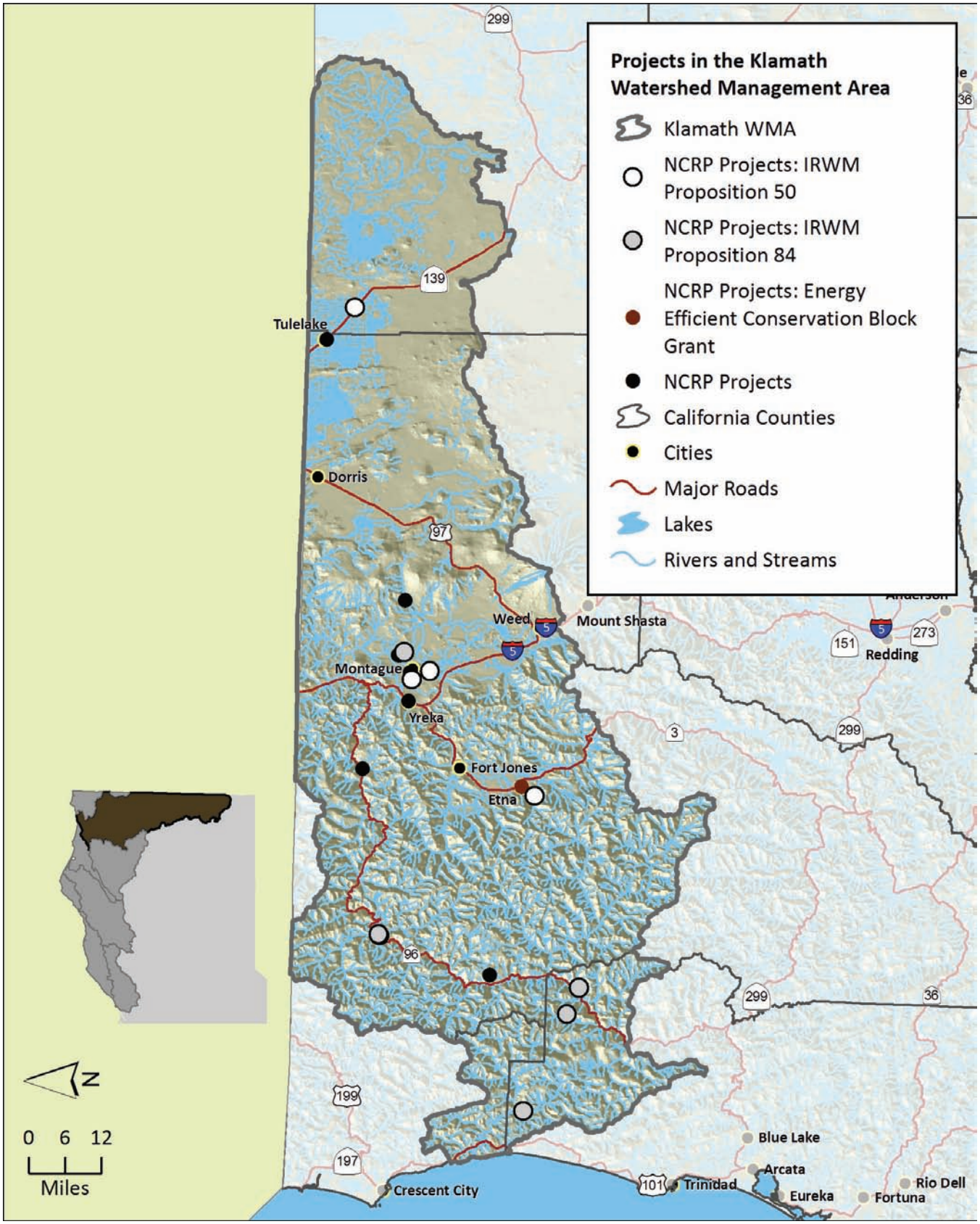
MAP 46 PROJECTS IN THE EEL RIVER WATERSHED MANAGEMENT AREA



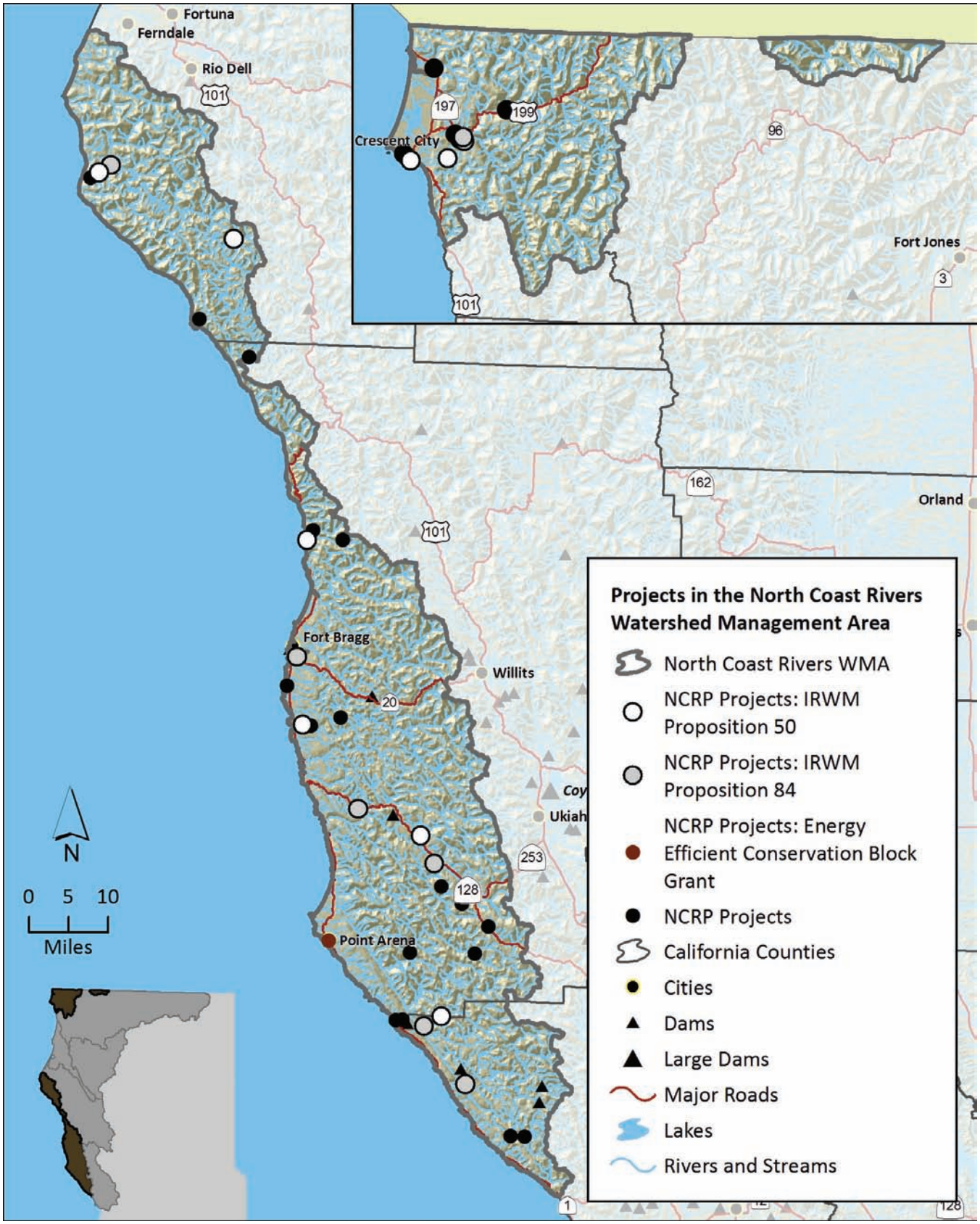
MAP 47 PROJECTS IN THE HUMBOLDT BAY WATERSHED MANAGEMENT AREA



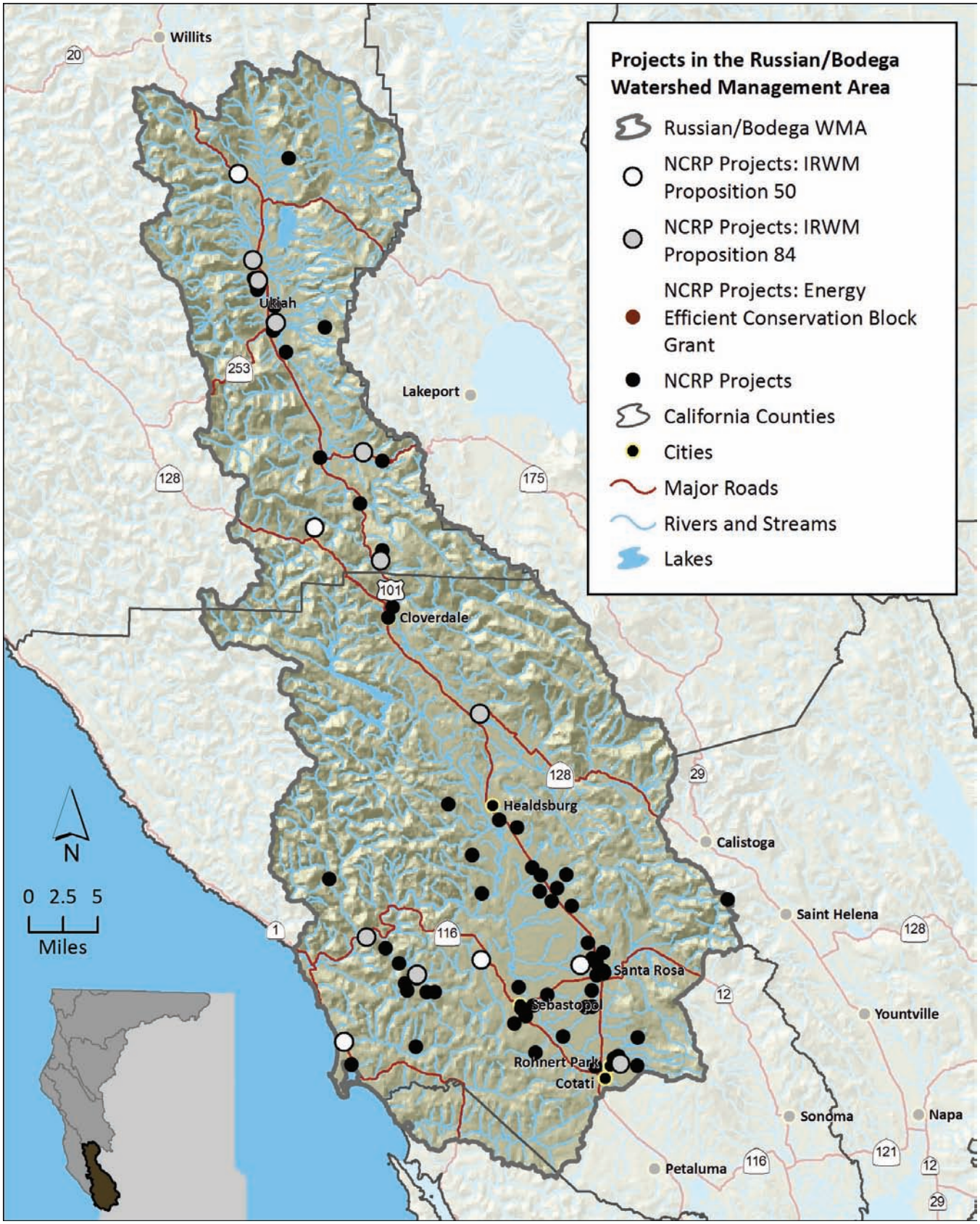
MAP 48 PROJECTS IN THE KLAMATH WATERSHED MANAGEMENT AREA



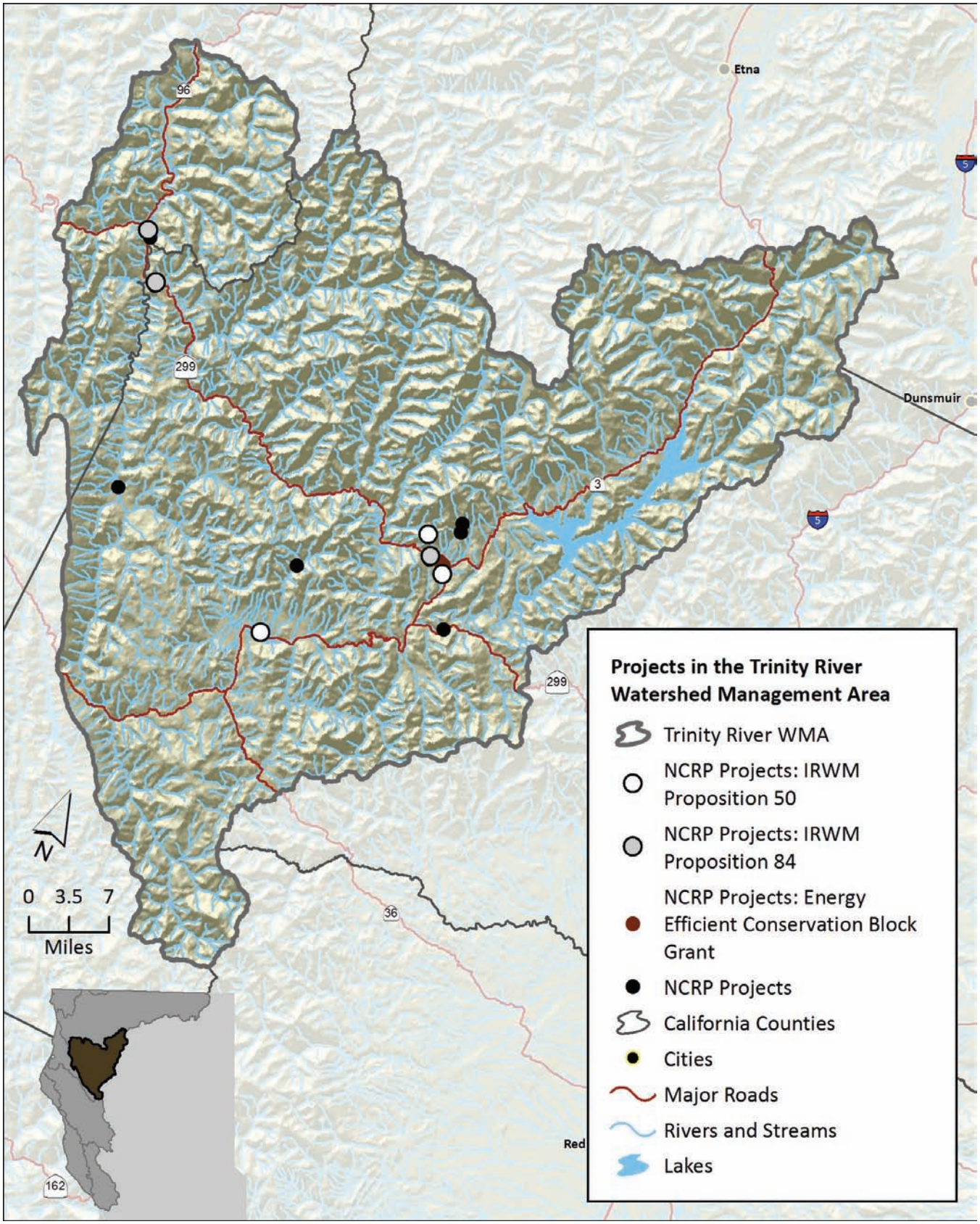
MAP 49 PROJECTS IN THE NORTH COAST RIVERS WATERSHED MANAGEMENT AREA



MAP 50 PROJECTS IN THE RUSSIAN/ BODEGA WATERSHED MANAGEMENT AREA



MAP 51 PROJECTS IN THE TRINITY RIVER WATERSHED MANAGEMENT AREA



- Award Description: This grant is DWR directed funding intended for local assistance planning funds to support water quality and supply objectives of small wastewater and water supply entities in disadvantaged communities. Pilot project is the NCIRWMP Water Supply & Wastewater Services Provider Outreach & Support Program.

Proposition 84, NCIRWMP Planning[181] Grant (2011)

- Award Amount: $1,000,000
- Award Description: This grant allowed for "Phase III" North Coast regional planning and pilot local planning efforts and also provided funding for revisions of the Phase II NCIRWMP document.

Proposition 84, NCIRWMP Implementation[182] Grant, Round 1 (2011)

- Award Amount: $8,222,000
- Award Description: This grant continues funding for implementation of Round 1 projects, providing funding for 18 NCIRWMP projects throughout the Region.

Strategic Growth Council, Sustainable Communities[183] Grant (2012)

- Award Amount: $1,000,000
- Award Description: This grant provides funding for projects that propose to improve air and water quality, natural resource protection, and public health.

Proposition 84, NCIRWMP Implementation Grant, Round 2 (2013/2014)

- Award Amount: $5,386,000
- Award Description: This grant continues funding for implementation of Round 2 projects, providing funding for 13 NCIRWMP projects throughout the Region.

Proposition 84, NCRP 2014 Drought Project Grant (2014)

- Award Amount: tba
- Award Description: This grant provides expedited funding for implementation of drought-related and preparedness projects.

Proposition 84, NCRP 2015 Implementation Grant, Round 3 (2015)

- Award Amount: tba
- Award Description: This grant continues funding for implementation of Round 3 NCRP projects.

OTHERS

- *In development*

7.3 PROJECT INTEGRATION WITH NCIRWM PLANNING

NCIRWMP project selection and implementation is integrated with (1) NCIRWMP goals, objectives, issues, and overarching priorities; (2) state IRWM program requirements (DWR 2012); (3) California Water Plan Resource Management Strategies (RMS) and (4) implementation Impact/ Benefit Analysis. To maximize efficiencies, the PRP, TPRC, and staff seek to coordinate local projects that occur, or are proposed to occur, in the overlapping or corresponding planning watersheds of the Region.

All counties, Tribes, current Proposition 84 project proponents and potential Drought project proponents will adopt the Phase III NCIRWMP by September 9th, 2014. For future implementation efforts, project proponents must formally adopt the most recent version of the NCIRWMP prior to or simultaneously with project submission.

Per 2012 IRWM Guideline requirements for Plan contents, several NCIRWMP Appendices (bullets below) specifically address:

- Contribution of projects to NCIRWMP objectives and statewide [and local] priorities
  - » Appendix A "NCIRWMP Objectives X Statewide Priorities & Local Project Priorities"

181 Proposition 84 Planning Grant information at http://www.water.ca.gov/irwm/grants/archive.cfm

182 Proposition 84 Implementation Grant information at http://www.water.ca.gov/irwm/grants/implementation.cfm

183 SGC SCG information at http://www.sgc.ca.gov/planning_grants_archive.html

  - » Appendix B "NCIRWMP Objectives X Statewide Goals & Local Project Goals"
- Contribution of projects to RMS (from CWP 2009) implementation
  - » Appendix D "Local Priorities & Resource Management Strategies"
- Contribution of projects to climate change adaptation
  - » Appendix N "Climate Change Vulnerability Assessment"
- Contribution to projects to reducing GHG emissions (climate change mitigation) as compared to project alternatives
  - » Appendix I for project selection guidelines and listing of project prioritization criteria used by the PRP and TPRC that are related — directly or indirectly[184] — to reducing GHG emissions in the North Coast Region
  - » Appendix J "Project Implementation Impacts & Benefits Analysis" accounts to the degree possible for anticipated project impacts on regional GHG loads[185]
  - » Appendix O reports (1) "Climate Change — Issues and Initiatives," (2) "Climate Change and Agriculture in the North Coast of California," and (3) "Energy Independence, Emissions Reduction, Job Creation, and Climate Adaptation Initiative"
- Specific benefits to critical DAC water issues
  - » Appendix O report "NCIRWMP Regional Strategy for Small Disadvantaged Water and Wastewater Providers"
- Specific benefits to North Coast Tribes
  - » Section 2.1 "North Coast Resource Partnership — North Coast Tribes" describes Tribal representation in NCRP governance and processes
- Technical and economic feasibility,[186] cost, and financing
  - » Appendix I "NCIRWMP Project Information"

7.4 PROJECT IMPACTS & BENEFITS

A critical step associated with NCRP project implementation a robust assessment of "Impacts & Benefits" demonstrated or proposed to result from implementation of the PRP-approved NCIRWMP project portfolio (Section 10 "Implementation Impacts & Benefits").

Priority project implementation enhances local and regional ecosystem and economic resiliency and fosters collaborative human connections within and between those working throughout the Region's watersheds and communities. The growing suite of NCIRWMP projects (the "project portfolio") contributes directly to the Region's existing network of watershed programs. Watershed-based approaches have proven effective in confronting challenges and resolving issues throughout the Region.

NCIRWMP processes and projects work at multiple scales to meet local water needs in alignment with and in support of statewide water management priorities. Implementation projects in the Region work in concert to improve water quality and water supply in the North Coast watersheds, correcting for past damages that contribute ongoing impacts to the Region's ecological and economic health. Completed projects have initiated important restoration, remediation, and educational activities designed to control sediment, restore riparian habitat, augment water supplies, support ecosystem function, and mitigate for climate change.

Locally implemented projects have addressed regional issues such as salmonid decline, water supply, and water quality via local activities, through NPS pollution reduction, water storage, water and energy conservation, education of public and policy makers, invasive species removal, and habitat restoration. Other projects have improved water quality through wastewater treatment plant repair and renovation, road repair and decommissioning, and stormwater and floodwater management. Additionally, wastewater treatment plant renovations with a water recycling component and water storage tank projects improve local supply reliability while enhancing environmental and other beneficial uses. These projects decrease the amount of water diverted from streams or that must be trucked into remote areas during the dry summer months, resulting in beneficial effects on regional water supply reliability, air quality, and climate change

184 The North Coast lacks the resources to conduct a comprehensive GHG emission assessment and quantification for all proposed and completed projects. However, TPRC and PRP members consider GHG emissions reduction (i.e. climate mitigation) during proposal review and project selection. For example, projects offering water (thereby energy) efficiencies may be prioritized over otherwise-equivalent projects that do not propose to deliver these efficiencies. Projects that improve riparian habitat and carbon sequestration also may be flagged as contributing to climate mitigation.

185 See specific energy reduction projects in the NCIRWMP portfolio; NCRP is considering how to account for energy savings of implemented projects (e.g. quantify GHG, water, energy, money savings)

186 While recognized by the PRP as distinct and separate elements of project proposal review, both technical and economic feasibility are, in practice, considered in conjunction with each other by the TPRC during the proposal scoring process.

amelioration. Infrastructure-based projects, while directly improving local water quality and supply, also benefit watershed health including ensuring adequate habitat for North Coast salmonids. In these cases, where water and energy efficiencies are maximized in project planning and implementation, the conservation of natural resources and the local reduction of GHG emissions will inevitably result.

7.5 PROJECT MONITORING & EVALUATION

Project monitoring and Plan performance evaluation is incorporated into various NCIRWM processes; the NCIRWMP document (Section 11 "Performance Monitoring & Evaluation"); and project data management (Section 13 "Data Management & Information Sharing").

Regular monitoring by project proponents (not by the NCRP) of measurable indicator data determines the degree to which projects meet their stated goals, and the degree to which their goals align with NCIRWMP goals and objectives. NCRP staff, in support of facilitated evaluation, has provided the following categories to organize and standardize collected of project data:

- Salmonid Habitat Improvement
- Watershed and Habitat Improvement
- Water Quality Improvement — Supply Reliability
- Drinking Water Quality Improvement
- Groundwater Protection
- Energy Independence
- Public Safety
- Economic Benefits

7.6 PROJECT MAPS, SUMMARIES, & OTHER INFORMATON

NCIRWMP staff compiles information related to proposed and completed projects. Most of these materials are available online in electronic format on the NCIRWMP website.[187]

7.6.1 MAPS OF PROJECT LOCATIONS

Following are maps of each of the six North Coast WMAs indicating the location of NCIRWMP implementation projects to date:

- Map 46 "Projects in the Eel River Watershed Management Area"
- Map 47 "Projects in the Humboldt Bay Watershed Management Area"
- Map 48 "Projects in the Klamath Watershed Management Area"
- Map 49 "Projects in the North Coast Rivers Watershed Management Area"
- Map 50 "Projects in the Russian/Bodega Watershed Management Area"
- Map 51 "Projects in the Trinity River Watershed Management Area"

7.6.2 NCIRWMP PROJECT PORTFOLIO INFORMATION

See Appendix I ("NCIRWMP Project Information") for the following materials that characterize the projects that implement the NCIRWMP, including:

- Project Application, Review & Selection Guidelines
- Priority Project Summaries
- Project Lists and Scores
- Project Budgets and Schedules
- Project Environmental Compliance

187 NCIRWMP Implementation Projects page http://www.northcoastirwmp.net/docs.php?ogid=1000001674

SECTION 8.0 RESOURCE MANAGEMENT STRATEGIES (RMS)

This section outlines the Resource Management Strategies (RMS) that DWR has developed to implement the California Water Plan (DWR 2009, 2013). An RMS is a project, program or policy that helps local agencies and governments manage their water and water-related resources. The purpose of including RMS in the NCIRWMP is to document the range of strategies considered by the NCRP to meet the Goals and Objectives of the NCIRWMP (Appendix D "Local Project Priorities X Resource Management Strategies"), and to ensure diversification of the water management strategies and projects as a way to mitigate for uncertain future circumstances, per requirements in the DWR IRWM Guidelines (DWR 2012[188]). Following is a listing of RMS that do and do not apply to the NCIRWMP, as well as a brief discussion of potential synergies that can be gained by combining multiple RMS.

8.1 RMS THAT ARE ADDRESSED BY THE NCIRWMP

DWR has defined 34 RMS in the 2013 update of the California Water Plan. It is critical that the proposed RMS complement the operation of existing local water systems. Water managers in different parts of the Region likely will have different perspectives on the applicability and cost-effectiveness of RMS for meeting local, regional, and statewide priorities (DWR 2013). The NCRP has determined that 29 RMS have high potential for successful application in the North Coast. Only five RMS do not apply to water management in the Region. The RMS below are grouped around issues identified in Section 6. Although this section presents RMS as separate elements, in practice various RMS are often connected to each other, as well as to other activities such as local land use planning (DWR 2012).

A subset of fifteen RMS is identified in the 2013 California Water Plan as having "great potential to benefit water quality in the North Coast Hydrologic Region." Every one of these is subsumed into the NCIRWMP-appropriate RMS list.

- Agricultural Lands Stewardship
- Agricultural Water Use Efficiency
- Conjunctive Management and Groundwater Storage[189]
- Ecosystem Restoration
- Flood Risk Management[190]
- Forest Management
- Groundwater and Aquifer Remediation[160]
- Land Use Planning and Management
- Pollution Prevention
- Recharge Areas Protection[160]
- Surface Storage — Regional/Local[191]
- Urban Stormwater Runoff Management
- Urban Water Use Efficiency
- Water-dependent Recreation
- Watershed Management

The 29 RMS that the NCRP considers applicable in the North Coast Region and relevant to the NCIRWMP are listed and described below.[192]

Natural Resources and Land Management

1) **Agricultural Lands Stewardship**: Farm and ranch landowners (the stewards of the state's agricultural land) producing public environmental benefits in conjunction with the food and fiber they have historically provided while keeping land privately managed.
2) **Ecosystem Restoration**: Restoration of modified natural landscapes and biological communities.
3) **Forest Management**: Focuses on forest management activities, on both public and privately owned forested lands, whose goals specifically include improvement of the availability and quality of water for downstream users.
4) **Land Use Planning and Management**: More efficient and effective land use is linked to several resource management strategies including

188 The DWR IRWM Guidelines state (p. 20) "The IRWM Plan must document the range of RMS considered to meet the IRWM objectives and identify which RMS were incorporated into the IRWM Plan. The effects of climate change on the IRWM region must factor into the consideration of RMS."

189 Caveat per DWR 2013: Shallow groundwater use is of crucial human and ecological importance in the North Coast Region

190 Caveat per DWR 2013: The RWQCB is supportive of efforts to address these causes of increased flood potential. The further reduction in natural hydrologic functioning via the construction of hardened flood control channels is not viewed, in most cases, as supportive of water quality goals.

191 Caveat per DWR 2013: The RWQCB is supportive of efforts to provide off-channel storage for summer agricultural use as an alternative to summer instream withdrawals. But, the construction of instream impoundments is not viewed, in most cases, as supportive of water quality goals

192 RMS are described in detail in the DWR's Water Plan Update 2013 http://www.waterplan.water.ca.gov

watershed, water use efficiency, flood management, parks and recreation, climate change adaptive management, and agricultural lands stewardship.

5) **Recharge Areas Protection**: Recharge areas are those areas that provide the primary means of replenishing groundwater. Protection of recharge areas requires a number of actions based on two primary goals: (1) ensuring that areas suitable for recharge continue to be capable of adequate recharge rather than being covered by urban infrastructure, such as buildings and roads, and (2) preventing pollutants from entering groundwater to avoid expensive treatment that may be necessary prior to potable, agricultural, or industrial uses.

6) **Watershed Management**: The process of creating and implementing plans, programs, projects, and activities to restore, sustain, and enhance watershed functions.

Water Supply Reliability

7) **Agricultural Water Use Efficiency**: The use and application of scientific processes to control agricultural water delivery and use to achieve a beneficial outcome. It includes an estimation of net water savings resulting from implementing efficiency measures as expressed by the ratio of output to input, resulting benefits, and strategies to achieve efficiency and benefits.

8) **Rain-fed Agriculture**: When all crop consumptive water use is provided directly by rainfall in real time. Due to the unpredictability of rainfall frequency, duration, and amount, there is significant uncertainty and risk in relying solely on rainfed agriculture.

9) **System Reoperation**: Changing the existing operation and management procedures for a water resources system to improve existing facilities to meet existing system needs more efficiently and reliably, or to prioritize one system need over another.

10) **Urban Water Use Efficiency**: Reduction of urban water use by Demand Management Measures and Best Management Practices to secure water supplies.

11) **Water Demand Reduction**: Related to RMS that improve urban and agricultural water use efficiency and in other ways contribute to regional water conservation through reduction in per capita demand, rather than through increased supplies.

Water Supply Increase

12) **Conjunctive Management and Groundwater Storage**: The coordinated and planned use and management of both surface water and groundwater resources to maximize the availability and reliability of water supplies in a region to meet various management objectives. Involves the efficient use of both resources through the planned and managed operation of a groundwater basin and a surface water storage system combined through a coordinated conveyance infrastructure.

13) **Groundwater Basin Monitoring per CASGEM**: Participation in statewide CASGEM

monitoring to ensure groundwater elevations are adequate for the North Coast.

14) **Municipal Recycled Water**: The recycling of municipal wastewater treated to a specified quality to enable it to be used again. Focus is water from municipal plant; does not include gray water, untreated industrial water, or agricultural water.

15) **Surface Storage (Local/ Regional):** The use of human-made, aboveground reservoirs to collect water for later release when needed. Focuses on regional and local surface storage alternatives but does not include the major surface storage investigations of the State and federal CALFED Bay-Delta Program (CALFED)

16) **Precipitation Enhancement/Fog Collection**: This RMS has not been used in California as a management technique, but occurs naturally with coastal vegetation. New technologies may have success capturing measurable amounts of water from fog by using a louvered device with slats set vertically for rapid draining.

Water Quality Protection and Improvement[193]

17) **Drinking Water Treatment/Distribution**: Providing a reliable supply of safe drinking water is the primary goal of public water systems in the Region, which must develop and maintain adequate water treatment and distribution facilities. In addition, the reliability, quality, and safety of the raw water supply are critical.

18) **Groundwater/Aquifer Remediation**: Removing foreign constituents to improve the quality of degraded groundwater for beneficial use. Drinking water supply is the beneficial use that typically requires remediation when groundwater quality is degraded.

19) **Matching Water Quality to Use**: Recognizing that not all water uses require the same level of water quality ensures proper use of limited potable water sources; use of high quality water sources for drinking and industrial purposes and lesser quality water can be adequate for some uses.

20) **Pollution Prevention**: Reducing or eliminating waste at the source by modifying production processes, promoting the use of non-toxic or less toxic substances, the implementation of practices or conservation techniques including activities that reduce the generation and/or discharge of the pollutants, and the application of innovative and alternative technologies which prevent pollutants from entering the environment prior to treatment. Can also include new equipment designs or technology, reformulation or redesign of products, substitution of raw materials, updating or improvements of existing management practices, continued maintenance of previously implemented management practices, training and education/outreach, and improved collaboration.

21) **Salt/Salinity Management**: To reduce salt loads that impact the Region; in some areas this is a key component of securing, maintaining, and recovering usable water supplies.

22) **Sediment Management**: To stabilize and/ or restore the watershed for sediment production mimics natural sediment production, without eliminating it, and thus provides the various ecological and beneficial uses.

23) **Urban Stormwater Runoff Management**: A broad series of activities to manage both stormwater and dry weather (e.g. excess landscape irrigation water flows to the storm drain) runoff. Traditionally, urban stormwater runoff management was viewed as a response to flood control concerns resulting from the effects of urbanization; today the stormwater is viewed as a potential water source.

Flood Risk Management

24) **Flood Risk Management**: Contains four approaches within a single RMS, to respond to the complexity of integrated flood management, including nonstructural, restoration of natural floodplain functions, structural, and flood emergency management.

Climate Change Adaptation and Mitigation[194]

25) **Continually Evaluate Vulnerabilities and Impacts:** Revisit and revise the NCIRWMP Climate Change Vulnerability Assessment to support development of appropriate adaptation and mitigation strategies.

26) **Integrate Ecosystem Resilience with DAC Resilience**: Recognizing the connection between ecosystem function and economic vitality and promote strategies that benefit from this connection.

193 Please reference the NCIRWMP Regional Strategy for Small Disadvantaged Water and Wastewater Providers; link available in Appendix O.

194 These strategies are not included in the California Water Plan; these and additional strategies developed by the NCRP to address climate change are listed in NCIRWMP Energy Independence, Emissions Reduction, Job Creation, and Climate Adaptation Initiative and North Coast Energy Independence Strategies (link provided in Appendix O).

New RMS for 2013

Three RMS have been added to the 2013 California Water Plan, new since the 2009 iteration, and are now included in the NCIRWMP. These are:

27) **Outreach and Engagement**: Outreach and engagement for water management in California is the use of tools and practices by water agencies that allow public groups and individuals to contribute to good water management outcomes.

28) **Water & Culture**: Increasing the awareness of how water management affects cultural values, uses, and practices — and how these have an effect on water management — helps inform policies and decisions.

29) **Water-Dependent Recreation**: Recreation activities in or on water, including fishing, swimming, skiing, snowboarding, waterfowl hunting, motor boating, surfing, and kayaking, wildlife viewing, picnicking, biking, camping, and hiking.

8.2 RMS THAT ARE NOT ADDRESSED BY THE NCIRWMP

Five RMS (below) recommended by DWR are considered by the NCRP to be not applicable to water management strategies for water supply in the North Coast at this time. The Region has a high incidence of rainfall and generally exports more water than is consumptively used (DWR 2013). Therefore, RMS that are focused on water conveyance, transfer, or state water storage efforts are not included in NCIRWMP strategy development. Likewise, there has not been sufficient demand or investment in desalination of seawater as an alternative water source, so this RMS is also not included in the NCIRWMP.

1) Conveyance — Delta
2) Conveyance — Regional/Local
3) Desalination
4) Surface Storage — CALFED/ State
5) Water Transfers

8.3 BENEFITS OF IMPLEMENTING MULTIPLE RMS

The NCRP has always recognized that the management of a natural resource, especially water, requires integration of various management efforts through a watershed-based planning framework. The integration of multiple RMS (e.g. through NCIRWMP projects being implemented throughout the Region) is necessary to provide long-term benefits to the Region's communities, ecosystems, and economies; these benefits cannot be secured by application of a single management strategy. Section 1.4.6 ("Integration") describes how this concept is central to North Coast IRWM planning. Section 10 "Implementation Impacts & Benefits provides a quantified assessment of the individual and cumulative benefits of RMS employed by North Coast implementation projects (summarized in Appendix A Table 6 "Matrix of Local Project Priorities and Resource Management Strategies").

SECTION 9.0 RELATION TO LOCAL WATER & LAND USE PLANNING

The NCRP's stakeholder-driven approach to regional resource management acknowledges and incorporates the unique issues, information, and planning approaches of local areas within a framework that integrates statewide water resource-planning priorities. Regional planning does not replace or supersede local planning;[195] rather regional planning should appropriately incorporate local planning elements (DWR 2012). Integrating land use into water planning allows the NCRP to provide local land planners with access to pertinent water information from the NCIRWMP (e.g. regarding floodplain management, stormwater runoff management, or water conservation), and for local land planners to share pertinent land use information with the NCRP (e.g. regarding land use changes that affect water resources, General Plan updates, and water supply needs). In this way, land use and water management decisions, which usually are under the purview of separate agencies but are inextricably linked, may become better coordinated.

This Section and associated Appendix tables address the required IRWMP Standards for documenting the Region's existing land use and water management plans and their relationship to the NCIRWMP (DWR 2012). In an effort to support the integration concept that is fundamental to this Plan, the NCIRWMP combines the complementary IRWMP Standards for land and water planning into a single section herein, as opposed to approaching each as a separate unit. Land and water planning are linked in various local and statewide programs[196] and it is the aim of the NCIRWMP to align with these existing programs, as feasible. Section 9 contains a compilation of planning efforts conducted by entities in the Region (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region") that provide an updated synthesis of existing efforts that are congruent with and provide potential applications to the NCIRWMP[197].

Text and tables herein are intended for informational and facilitative purposes only; nothing in this Section is intended to interfere with or supersede the planning efforts of local entities (e.g. counties, municipalities, Tribes, RCDs).

In order to conduct efficient water resource management per the goals of the NCIRWMP, the NCRP continues to (1) recognize the fundamental functional links between land and water (Section 5 throughout), (2) identify and integrate existing plans and programs related to water resources management, and (3) facilitate resolution of overlapping boundaries and potential for conflict among local jurisdictions (e.g. Tribal, county, Resource Conservation District) and Watershed Management Areas (WMAs).[198]

9.1 APPROACH TO SYNTHESIZING WATER & LAND USE PLANNING

Retain Local Autonomy and Jurisdictional Authority

The NCRP intends that:

- The NCIRWMP framework supports regional planning while recognizing that "one size does not fit all"
- The NCIRWMP framework respects local autonomy, jurisdictions, and planning processes
- The NCIRWMP acknowledges and incorporates the existing studies/reports in the Region that have been produced/are being planned by local and state entities, some of whom are working to consolidate their reports to identify local needs/data gaps
- The NCIRWMP helps, rather than hinders, local planning entities with local priority-planning activities that are in alignment with NCIRWMP objectives

195 As previously stated in Section 1.4.1 "Planning Approach, Statement of Purpose" the language of which was approved by the NCRP Policy Review Panel in April 2014.

196 For example, consider DWR's integrated "Land & Water Use Estimates" including for agricultural land and water use at http://www.water.ca.gov/landwateruse/anlwuest.cfm and data collection at http://www.water.ca.gov/landwateruse/lwudatacoll.cfm

197 The planning synthesis is organized around 12 primary "Planning Subjects," which are the major topic on which a local plan is focused. These subjects are inclusive of and subsume the NCIRWMP objectives, but are not equivalent to the objectives. Plan subjects are Climate Change, Conservation, Economics, Ecosystem Function, Energy, Environmental Quality, Groundwater, Land Use Planning, Salmonid Recovery, Social, Watershed Planning, Water Supply, and Water Quality (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region").

198 Addressed via Section 9.2.2.10 "Watershed Management and Restoration" and Section 9.2.2.11"Multi-Purpose Program Planning" and herein).

- NCIRWMP participants voluntarily comply with AB 32[199] and SB 375[200] and implement the intent of SB 732[201] for the planning, selection, and implementation of NCIRWMP projects to improve air quality and reduce conventional energy use
- The NCIRWMP framework has a strong inherent emphasis on local planning, data gathering, issues analysis, project identification, prioritization, and implementation
- Land use planning should be developed by counties (i.e. not stipulated in the NCIRWMP or by the state), all of which have developed their own land use plans, planning processes, and planning priorities

To this end, the Siskiyou County Board of Supervisors would like to strictly limit their participation[202] to regional opportunities to fund specific projects related to energy independence, water and wastewater infrastructure and broadband infrastructure. The Siskiyou County Board of Supervisors wishes to retain its independent sovereignty and jurisdiction over land use policies and General Planning and does not want to participate in regional planning or harmonization regarding climate change, habitat assessment and "protection of priority conservation areas, "model ordinances or modular planning elements, "Regional Greenprints," or the valuation of "ecosystem services."

North Coast Tribes are separate and independent sovereign nations within the territorial boundaries of the United States. The sovereignty of Tribes has been acknowledged in the U.S. Constitution. This sovereignty is inherent and flows from the pre-constitutional and extra-constitutional governance of the Tribe. Early federal policy and U.S. Supreme Court case law recognizes that Tribes retain the inherent right to govern within political boundaries (Worcester v. Georgia, 1832) and that power to interact with Tribes is vested in the federal government. (Cherokee Nation v. Georgia, 1831). This established governmental structure recognizes the sovereign and political independence of Tribal nations and its members. This right is also recognized by the State of California. Pursuant to the Executive Order B-10-11, the State "recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority of their members and territory."

The North Coast is the ancestral territory of North Coast Tribes. North Coast Tribes' jurisdiction goes beyond the gathering, fishing, and hunting rights, which each individual Tribal member retains. It is the intent of the NCIRWMP to document (but not endorse) the fact that each of the North Coast Tribes exerts their jurisdictional authority according to their own traditional policies, laws, mandates and capacity.

Resolve Jurisdictional Issues with Watershed-Based Planning

The NCIRWMP framework facilitates the utilization of a watershed-based planning approach to address multiple stakeholder concerns. The use of local *physical boundaries* alleviates pressure on local *jurisdictional boundaries* in order to address sometimes-conflicting interests (Section 5.1 "Internal Boundaries" and associated maps illustrate the concept). Watershed-based planning recognizes the fundamental links between upland and aquatic resources, and the functional links between land and water management strategies. This approach, as demonstrated since NCIRWMP inception, is a proven alternative to relying on traditional jurisdictional boundaries. Rather than by county, municipality, or special district, boundaries of watershed management areas (WMAs), watersheds, IRWM planning areas, and local project implementation areas, for example, may be applied as the physical units for local land and water management.

9.2 STATUS OF EXISTING PLANNING ACTIVITIES FOR THE NORTH COAST

9.2.1 OVERVIEW OF LOCAL WATER & LAND USE PLANNING

The Region's resource planning framework is based upon and subsumes numerous existing and developing local, regional, state, federal, and Tribal management plans, programs, and policies (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region").

In order to gain insight into current planning efforts, needs, and opportunities, the NCRP in 2013 conducted extensive interviews with dozens of professional planners working in the North Coast on water and/or land resource issues. The results of those interviews are available through the NCIRWMP website[203] and are reproduced in Appendix E "Relationship to Local Land

199 California Assembly Bill No. 32 http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf

200 California Senate Bill No. 375 (2008) at http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0351-0400/sb_375_bill_20080930_chaptered.pdf

201 Californai Senate Bill No. 732 (2007) at http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0701-0750/sb_732_bill_20080930_chaptered.html

202 Refer to Section 2.5.3 for information on NCRP development of the locally-tailored "opt-out" process, which allows participating entities to participate in the NCIRWMP in a manner that aligns with local priorities while addressing state requirements for IRWM planning and implementation funding.

203 NCRP Partner and Stakeholder Interview Synthesis 2013. Counties, municipalities, Resource Conservation Districts, and non-profits were represented in the interviews. (71 professional planners contacted; 41 interviewed by December 2013.) http://www.northcoastirwmp.net/docManager/1000009209/NCRP_Planner_Interviews_Summary_2013.pdf

and Water Use Planning"). Fourteen types of water or land use plans[204] were defined by NCRP staff, based on the interviews and on extensive research into existing document libraries. The number and proportion of plan types produced in each county and for North Coast Tribes are illustrated in Figure 2 ("Local Water/ Land Use Plans by Primary Planning Subject").

A total of 363 relevant plans (as of 2013) were identified as relevant to the North Coast IRWMP: over 44 percent of identified plans were related to "Land Use Planning" and nearly 20 percent to "Water Quality Planning." It is apparent that some counties have developed a greater number and/or a more diverse array of plan types than others. For example, Sonoma (126), Humboldt (102), and Mendocino (67) have more plans than the other counties (e.g. Siskiyou at 32 plans); some counties have relatively few plans prepared or in development (e.g. Del Norte has 17 and Trinity just six). Tribal entities have prepared 13 water resource plans. The number of plans developed locally is not necessarily a reflection of local priorities; in many cases, entities with fewer financial and human resources will produce fewer plans because of resource limitations, not lack of interest/need. The types of plans developed locally may reflect local priorities: for example, Trinity County plans are focused on just groundwater (5 plans) and local planning (1 plan), while Sonoma and Mendocino counties are represented by a diversity of plan types in of 13/14 categories. Tribal plans are moderately diverse, focused on water quality, land use planning, forest management, environmental quality, groundwater, and salmonid recovery.

9.2.2 OVERVIEW OF LOCAL WATER & LAND USE STRATEGIES

The NCRP and North Coast stakeholders (including water resource and land use planners at all scales) continue to consider a diverse range of opportunities afforded the Region by participating in NCIRWM planning and implementation. Per direction of DWR and in support of NCIRWMP goals and objectives, the Plan addresses and integrates all or part of the following strategies, which are equivalent to state-recommended Resource Management Strategies (RMS)[205] in the California Water Plan (DWR 2009): agricultural water management; city and county general planning; disaster planning and emergency response; flood protection and floodplain management; groundwater management, recharge, and conjunctive use; multi-purpose program planning; salt and salinity management; stormwater and runoff management; urban water management and water supply assessment; water conservation planning; and watershed management and restoration.

Per California Water Code §10540(b), Section 9.2.2 provides information to facilitate coordination between the NCIRWMP planning activities and the planned actions of NCRP members. Land and water use planning entities are both components of the NCRP governance and decision-making bodies, and regularly interact via regular NCRP meetings, conferences, and other in-person outreach opportunities (Section 3.3 "Fostering Collaborative Partnerships"). Subsections below outline some of the major plans, programs, and policies identified in the planning synthesis that relate to these actions (i.e. RMS). Opportunities for the NCIRWMP to integrate with these existing efforts, and their updates, are indicated where appropriate.

9.2.2.1 Agricultural Water Management

Policy for Maintaining Instream Flows in California Coastal Streams

The North Coast "Instream Flow Policy" (SWRCB 2014) establishes principles and guidelines for maintaining instream flows for the protection of fishery resources; may potentially introduce widespread impacts for agricultural and rural water users on the North Coast.

NCRWQCB Water Quality Compliance Program for Dairies & Concentrated Animal Feeding Operations

This regional dairy permitting process was developed by the North Coast Regional Water Quality Control Board (NCRWQCB) to regulate concentrated animal feeding operations that discharge into waters of the United States.

NCRWQCB Agricultural Lands Discharge Program

This regional program of the North Coast RWQCB addresses water quality impacts associated with irrigated agricultural lands in the North Coast Region.

California Agricultural Water Stewardship Initiative

This initiative raises awareness about approaches to agricultural water management that support the viability of local agriculture, conserve water, and protect the Region's ecological integrity. Launched in 2008, the initiative became a project of the California Roundtable on Water and Food Supply in fall of 2011. Their website is a resource center for growers, ranchers, and others interested in sound farm water management, providing case studies and practices to promote agricultural efficiencies and sustainability.

204 Plans synthesized for the NCIRWMP are categorized into the following subjects, all of which have water and land elements: climate change, conservation, economics, ecosystem function, energy, environmental quality, groundwater, land use planning, salmonid recovery, social, water supply, water quality, and watershed planning.

205 In this context and for Plan organization purposes, these are equivalent to state RMS introduced in Section 8 "Resource Management Strategies").

Humboldt Agricultural Enhancement Program

This program assists local dairy operators in the Eel River Delta and Humboldt Bay Regions with implementation of operations management practices intended to improve the quality of ground and surface water resources. Includes best management practices (BMPs) for animal waste storage facilities, waste distribution systems for nutrient management, and roof runoff management.

University of California Cooperative Extension (UCCE) Humboldt Del Norte Counties Livestock and Range Management Program

This program informs livestock, range, and pasture producers about a variety of topics related to ranch, livestock, and rangeland management in Humboldt and Del Norte Counties. It focuses on efforts to keep livestock and rangeland healthy and productive, but may have relevance to NCRP effort at agricultural water management.

Trinity County RCD Strategic Action Plan

The "agriculture" Strategic Area of the Trinity County RCD action plan provides a framework to promote voluntary application of site-specific BMPs and offers technical assistance with the goal of improved water quality and soil conservation.

Mendocino County Resource Conservation District (RCD)

Mendocino County RCD provides coordinated permitting services: they are a "one-stop shop" for permitting. Projects qualifying for streamlined permitting are covered by nine standard USDA-Natural Resources Conservation Service restoration practices. The program is based on a successful model developed for the Navarro River watershed (there, a workshop series was conducted with resources to help farmers implement conservation practices).

Sonoma RCD

Sonoma RCD[206] (serving majority of Sonoma County) offers a Conservation and Stewardship Program that works with agricultural producers to develop Farm Conservation Plans and implement BMPs related to water conservation and streamflow restoration; watershed planning; habitat enhancement; and agricultural and natural resources education. Their Russian River Coastal Tributary Improvement Program also has great relevance to the NCIRWMP. Sonoma RCD offers publications to guide water/land management decisions, including for vineyard frost protection, Russian River stewardship, livestock grazing, and management to enhance land/water quality for small properties.

Gold Ridge RCD

The Gold Ridge RCD (serving parts of Sonoma County) has worked closely with the NCRP to produce the Integrated Coastal Watershed Management Plan (ICWMP) for Salmon Creek. They also have produced the "Nutrient Management Planning Guidance for Small Coastal Dairies."

Del Norte RCD

The Del Norte RCD hosts an Agricultural Enhancement Program to improve resource management by assisting local farmers improve nutrient management and waste distribution systems to meet standards for waste discharge requirements and avoid enforcement fines.

Central Modoc RCD

The Central Modoc RCD provides rural agricultural and natural resources outreach, including riparian-friendly grazing projects and Pit River fish surveys.

Shasta Valley RCD

Shasta Valley RCD (serving central Siskiyou County) has conducted and reported on projects related to Shasta River instream flow assessment and spawning gravel evaluation and enhancement plan.

West Lake RCD

West Lake RCD (serving western Lake County) has conducted invasive plant surveys and removals (i.e. *Arundo donax)* and conducts trainings for stream monitors.

North Sonoma County Agricultural Reuse Project

Initiated in 2007, this project utilizes existing network of RCDs, National Resource Conservation Service, Farm Bureau, UCCE offices, and California Agricultural Water Stewardship Initiative (described above) to investigate expansion of or satellites similar to "LandSmart" in Sonoma and Napa Counties: a collaborative program to help land managers meet natural resource management goals. The collaboration between these different entities expands each RCD's capacity and increases RCD capacity to better serve landowners and provide access to various skills and expertise.

Working with these groups, NCRP staff could develop a highly relevant template program that could potentially transfer throughout the Region, and to other regions/states seeking assistance with local agricultural management enhancements, including as they relate to existing TMDL implementation.

206 "Sonoma RCD" as of 2013; formerly the Sotoyome and Southern Sonoma RCDs.

9.2.2.2 City and County General Planning

General Plans

General Plans form the foundation for land and water planning in the North Coast. Every city and county in California must adopt a comprehensive long-term General Plan in accordance with Section 65300 of the California Government Code. There are seven required elements of a General Plan (land use, circulation, housing, conservation, open space, noise, and safety): water-related issues (e.g. water supply and treatment) are included in each General Plan's "Conservation" element. There are over 100 general planning documents in the North Coast (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region" and Table 8 "Select General Plans of North Coast Entities"). These range from detailed, formal General Plans for counties and incorporated municipalities developed in accordance with state requirements, to local coastal plans, to informal "visioning" planning documents for neighborhoods or specific areas. Updates to General Plans are required by the state every 10 years: 2013 is the latest year for decadal updates.

Coordination with local General Plans has been identified by the NCRP as a major opportunity for the NCIRWMP process and framework to provide technical assistance and customizable modules for use by other municipalities/counties. For example, the Humboldt/Trinity Pilot Planning Effort — County Planning Modules. Funded by the Strategic Growth Council in cooperation with the Rural Community Assistance Corporation (RCAC), the effort resulted in identification of 12 Critical Water Planning Areas (CWPAs) in Humboldt, used as a means to conduct outreach during the General Plan update process, a way to organize proposed revisions, and as a planning tool. In Trinity County, 15 CWPAs were identified and are used as a means to conduct local watershed analyses.

9.2.2.3 Disaster Planning and Emergency Response

Multi-Hazard Mitigation Plans (HMP)

Types of natural disasters recognized by local planners that should be of concern to the NCRP (i.e. relate directly to land/water use and management) include dam failure, drought, flood, freeze, landslide, severe weather, tsunami, and wildlfire. Disaster Mitigation Act of 2000 requires local governments to adopt a federally approved HMP to receive pre- and post-disaster mitigation funds. Three North Coast counties have developed Hazard Mitigation Plans to date (Appendix E Table 9 "Stormwater Management and Hazard Mitigation Plans of North Coast Entities"). The level of concern with various potential natural disasters varies for North Coast counties. To date (2014), only Del Norte, Humboldt, and Sonoma Counties have developed plans that include identification of medium and high priority hazards. These are for:

- ***Crescent City/Del Norte County Hazard Mitigation Plan Volume 1*** (Del Norte County) identifies severe weather, tsunami, and wildfire as "high priority" and landslides and flood as "medium priority."
- ***Humboldt Operational Area Hazard Mitigation Plan*** (Humboldt County) identifies drought, flood, landslide, severe weather, and wildfire as "high priority" and tsunami as "medium priority." Humboldt County General Plan Update identifies flood, tsunami, and wildfire as "high priority."
- ***Sonoma County Hazard Mitigation Plan*** (Sonoma County) identifies drought, flood, landslide, severe weather, and wildfire as "high priority" and tsunami as "medium priority."

The NCRP currently works most directly to address disaster related planning through climate change vulnerability assessment and strategy development (Appendix N "Climate Change Vulnerability Assessment for the North Coast Region), particularly for common concerns related to drought, flooding, and (for coastal communities) sea level rise. There also exists the opportunity to integrate county disaster response with NCIRWMP flood, sea level rise, and drought information for the Region. For example, the NCIRWMP framework could assist with HMP development and potentially link the Region's disaster response teams, providing for a larger, regional network to draw upon during times of need.

9.2.2.4 Flood Protection and Floodplain Management

Flood protection and floodplain management planning is incorporated into other local planning documents. Flood-related elements are addressed in all the North Coast General Plans (9.2.2.2 above), which address a

variety of concerns that align with NCIRWMP priorities. Seven plans outside of General Plans address flood protection and floodplain management: six plans are restoration/watershed enhancement plans and address floodplain management in the context of restoring natural hydrologic regimes or restoring native vegetation buffers; one plan (developed by the SCWA) provides flood control goals and strategies from a water management perspective.

There is the opportunity for the NCIRWMP to provide updated, integrated information and strategies related to floodplain management and, particularly, flood protection through development and sharing of the "Flood and Stormwater Management Report for the North Coast Region" (Appendix O "Reports Commissioned for the NCIRWMP").

9.2.2.5 Groundwater Management, Recharge, and Conjunctive Use

Groundwater planning is ongoing in areas throughout the Region. Twelve Groundwater Management Plans (GMPs) are completed or in progress, from the Scott Valley in the Klamath Basin to the Santa Rosa Plain in the Russian River watershed (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region"). Sonoma County Water Agency is leading the compliance effort with the California Statewide Groundwater Elevation Monitoring (CASGEM) program for eight groundwater basins located in Sonoma County, including the Santa Rosa Plain Subbasin ("Sonoma County Groundwater Management Plan Demonstration Project"). The Region would benefit from a comprehensive groundwater monitoring needs assessment, planning, and outreach to address CASGEM and other groundwater requirements.

Other entities in the watershed have developed alternative groundwater plans on their own or in cooperation with others. The NCIRWMP is involved in the following collaborative management planning activities:

- ***The Covelo and Graton Community Services Districts (CSDs)*** in the Eel and Russian River watersheds, respectively, developed groundwater management plans in compliance with requirements for funding through Proposition 50. These plans' development was included in the NCIRWMP Work Plan in the Phase I, Step 2 Implementation Grant.
- ***The Mattole River Headwaters Groundwater Management Plan*** was developed within the Mattole Integrated Coastal Watershed Management Plan (ICWMP), which was developed within the framework of the NCIRWMP.
- ***Groundwater Management and Enhancement Plan for Scott Valley*** was developed by Siskiyou County in collaboration with the NCRP and Siskiyou County RCD. The plan was called for in the Action Plan for the Scott River Temperature TMDL (adopted December 2005 by the NCRWQCB). A Scott Valley Groundwater Advisory Committee member mentioned the dearth of such plans regionally as an obstacle during plan development (Bowman 2012), underscoring an opportunity for the NCRP.

Groundwater management planning presents another opportunity for integration of partners' efforts with those of the NCRP: utilizing the framework and methods by which the NCIRWMP Water & Wastewater Service Provider Outreach & Support Program[207] was developed, a hub could be created for groundwater management throughout the Region. This hub could serve to connect those developing plans with entities that have developed them; provide a platform for sharing data and monitoring approaches; and meet needs related to education and technology transfer.

9.2.2.6 Salt and Salinity Management

The SWRCB and local water and wastewater entities, together with salt/nutrient contributing stakeholders, fund locally driven and stakeholder controlled collaborative processes to prepare salt and/or nutrient management plans for each groundwater basin and sub-basin in the North Coast. Presently, there is one salinity management planning effort in development for the North Coast: The City of Santa Rosa[208] is leading the development of a Salt and Nutrient Management Plan for the Santa Rosa Plain Sub-basin. The plan has identified the need for additional monitoring wells in areas where there are data gaps.

Management of salt and nutrient pollution represents another opportunity for regional collaboration/

207 Learn about this major NCIRWMP program and survey of providers at http://www.northcoastirwmp.net/Content/10412/preview.html

208 City of Santa Rosa. Salt and Nutrient Management Plan for the Santa Rosa Plain Subbasin. In progress, not available online.

cooperation using the NCIRWMP framework (similar to Water & Wastewater Service Provider Outreach & Support Program, as described for groundwater above).

9.2.2.7 Stormwater and Runoff Management

Stormwater and runoff management are closely related to flood protection and floodplain management (Section 9.2.2.4), but are not precisely equivalent. However, there is significant potential for integration of stormwater/runoff with (1) floodwater management, e.g. LID using stormwater runoff (below) and (2) water supply e.g. grey water and other reuse & conservation (Section 9.1.2.10)

Stormwater Management Plans & MS4 Permits

Twenty-nine agencies/municipalities across the North Coast have stormwater management plans and/or programs (Appendix E Table 9 "Stormwater Management and Hazard Mitigation Plans of North Coast Entities"). Municipal Separate Storm Sewer System (MS4) permits require governing agencies to implement a suite of programs to prevent pollution; improve and protect storm water quality; reduce storm water runoff; and enhance the ecologic vitality of local creeks and waterways. SWMP/Programs are required only for large and medium sized municipalities:

- MS4 permits require the discharger to develop and implement a SWMP/Program with the goal of reducing pollutant discharge to the maximum extent practicable.
- In the North Coast, only the City of Santa Rosa, County of Sonoma, and SCWA are regulated under and MS4 permit.

All municipalities serving populations less than 100,000 (small) are regulated by the Phase II Small MS4 permit. Most of the North Coast falls into this category. Small MS4 permits:

- Eliminate need for the municipality to prepare a SWMP/Program
- Specify actions necessary to reduce the discharge of pollutants in storm water to the Maximum Extent Practicable (MEP)
- Require implementation of LID[209] Principles
- Incorporate Special Protections for discharges to ASBS
- Incorporate implementation requirements for adopted TMDLs

In addition to Stormwater Permits/MS4, there are local collaborative efforts underway to manage stormwater/runoff on a watershed basis. Two of these efforts are outlined below:

North Coast Stormwater Coalition

NC Stormwater Coalition is composed of stormwater management staff from the participating cities and counties on the North Coast, as well as local, state, federal and Tribal agency representatives, non-profit organizations, Tribes, SWRCB, and others. Members are City of Arcata, City of Eureka, City of Fortuna, County of Humboldt, County of Mendocino, City of Fort Bragg, and Mendocino County Water Agency/Mendocino County Planning and Building Services. They meet monthly and provide public education, outreach, events and workshops throughout the year.

Russian River Watershed Association

Russian River Watershed Association (RRWA) is a coalition of eleven cities, counties and special districts in the Russian River Watershed that have come together to coordinate regional programs for clean water, fisheries restoration and watershed enhancement. Members are City of Cloverdale, City of Cotati, City of Healdsburg, City of Rohnert Park, City of Santa Rosa, City of Sebastopol, County of Mendocino, City of Ukiah, County of Sonoma, Sonoma County Water Agency, and Town of Windsor. Provides MS4 (Phases I & II) Permit support to member agencies. RRWA also serves as a forum for sharing ideas and coordinating efforts to meet permit requirements.

There is opportunity for NCRP to build upon these local efforts to provide a regional framework for collaboration and cooperation (like Water & Wastewater Service Provider Outreach & Support Program) and to connect stormwater implementation programs with developing TMDLs.

9.2.2.8 Urban Water Management and Water Supply Assessment

Urban Water Management Plans

Fourteen entities in the Region have prepared Urban Water Management Plans (UWMPs) in compliance with California Water Code §10610–10656, Division 6 Part 2.6. UWMPs are prepared every five years by each urban water supplier that provides over 3,000 acre-feet of water annually or serves more than 3,000 connections. UWMPs are required to assess the reliability of its water sources over a 20-year planning horizon during normal, dry, and multiple dry years.

209 Low Impact Design (LID) features aim to mimic the hydrologic function of an undeveloped site by capturing, treating, and infiltrating storm water as close to the source as possible by using small scale landscape-based features located throughout the project site. LID may be required for MS4 permitting. Most cities/counties calling for LID in their General Plans and many cities/counties have green building codes, which incorporate LID features for new and re-building.

DWR provides workshops, webinars, online tools, and a guidebook to assist in UWMP development.

Input from the NCIRWMP is not likely necessary for this water-planning component. However, the NCIRWMP framework may provide a voluntary opportunity to connect growing entities that are nearing this requirement with other, similar sized entities that have successfully completed the process.

9.2.2.9 Water Conservation Planning

Water conservation planning in the North Coast is incorporated into other local planning documents; there are not required "Water Conservation Plans" per se. Water conservation planning may be addressed in General Plans or UWMPs, or may be integrated into plans with broader water/land management goals (e.g. farm Nutrient Management Plans and local watershed plans) as part of a many-pronged approach to improve water quality and supply reliability. There are at least 18 plans in North Coast with water supply/conservation as primary subject: 14 are previously referenced UWMPs, three are previously referenced General Plans (municipal), and one is a watershed plan.

The NCRP recognizes the opportunity to use NCIRWMP framework to link water conservation planning efforts throughout the Region, by sharing resources and technical information with a local focus. There is also the opportunity to tie these efforts back into applicable TMDLs.

9.2.2.10 Watershed Management and Restoration

There are numerous (129+) plans in the North Coast with direct application to the NCIRWMP efforts to manage and restore watersheds and watershed function. These include TMDLs, habitat restoration plans, and watershed assessments. The majority of these have been developed in the North Coast Rivers (34), Russian/Bodega (32), Humboldt (29), and Klamath (15) WMAs; most others span multiple WMAs (Appendix E Table 7 "Local Water and Land Use Plans for the North Coast Region"). The majority of these plans address water quality, watershed planning, ecosystem function, salmonid recovery, and/or land use planning; some have integrated social, economic, and energy elements.

Most watershed management and restoration plans present the opportunity to collaborate with the NCRP to meet multiple objectives of the NCIRWMP (e.g. supporting and/or facilitating salmonid habitat enhancement, water supply reliability with minimal environmental impact, and implementation of statewide water initiatives).

9.2.2.11 Multi-Purpose Program Planning

In order to meet resource use challenges and pursue increasingly integrated grant opportunities, most planning entities in the North Coast utilize at least some multi-purpose program planning. For example:

- Wetlands restoration to restore salmonid habitat and ameliorate flooding
- Riparian restoration to cool stream water temperatures and sequester pollutants, nutrients.
- Uplands restoration to alleviate sedimentation, increase CO2 sequestration, improve habitat, allow for recreation
- Failing infrastructure repair to conserve water, increase water supply reliability, improve environmental justice
- BMPs for Agricultural Operations

With respect to the NCIRWMP and multi-purpose planning, the adoption of the new (2013) name "North Coast Resource Partnership" (NCRP; Section 2.1 "North Coast Resource Partnership") to replace "North Coast Integrated Regional Water Management Plan" recognizes and emphasizes that the NCRP is embarking upon a more well-rounded planning effort in order to meet all of the social, economic, and environmental challenges facing the North Coast, not only those directly related to water.

Each new initiative developed by the state is considered by the PRP for its relevance and applicability to the Region. For example, in response to AB 32 ("California Global Warming Solutions Act" 2006), the NCRP developed a preliminary list of Strategies for Energy Independence and Emissions Reduction and developed a web page to provide relevant information to the public.[210] It was determined by the PRP that energy related planning and fund development (to create energy independence programs, reduce greenhouse gas emissions and create jobs) would best be conducted at the county level, to coordinate with county programs, staff and elected officials.

210 See program information at http://www.northcoastirwmp.net/Content/10349/North_Coast_Strategies_for_Energy_Independence__Emissions_Reduction.html

9.3 COORDINATION OF LOCAL WATER & LAND USE PLANNING

9.3.1 RELATIONSHIP BETWEEN LOCAL, REGIONAL & STATEWIDE PLANS

The NCRP seeks to identify any inconsistencies between the NCIRWMP and the many local water and land plans referenced herein (Appendix E). Although no significant inconsistencies have been identified to date, the NCRP maintains open and transparent processes to document and address such concerns, should they emerge.

NCIRWMP objectives were developed and updated to reflect local, regional, Tribal, and federal priorities and the NCRP has solicited input from these entities throughout the process. NCIRWMP regional planning activities are feeding directly into local planning efforts through (in part):

- The infusion of grant funds for needed projects
- Technical support and professional networking
- Provision of General Plan templates and processes
- Development of Community Watershed & Planning Areas
- Development of the North Coast Energy Independence Program
- Sharing of the latest information to keep local projects and programs aligned with state priorities

NCIRWMP strives to provide and inclusive framework for intra-regional cooperation. NCRP members are enabled to focus on programs and activities they subscribe to, and maintain the autonomy to opt out of participating in others, while remaining signatories and active participants in other programs/applications/ projects (Section 1.4.3 "Local Autonomy").

9.3.2 INTEGRATION OF LOCAL & REGIONAL PLANNING JURISDICTIONS

The jurisdiction for each local plan in the Region coincides with the jurisdiction of the county or municipality that has developed the plan. The jurisdictions of watershed plans, (e.g. TMDLs), however, are basin- or sub-basin-wide. Note that the county and municipal plans carry enforcement authority, while the watershed plans usually call for voluntary participation. Per Section 1.4.4 "Jurisdictional Authority," each North Coast jurisdiction meets its local planning and implementation challenges within the broader NCIRWMP framework. Local plans address local challenges and give an indication of local needs. These needs and challenges are considered by the PRP and documented and incorporated into the NCIRWMP through analysis of local plans, incorporation of proposed projects as an indication of regional need, surveys, interviews, outreach, workshops, and conferences. Often, implementation of projects to satisfy local needs also satisfy broader regional goals, such as ensuring a reliable water supply or restoring salmonid habitat.

9.3.3 INTEGRATION OF EXISTING PLANS & NCIRWMP GOALS/OBJECTIVES

The plans listed in Appendix E all have significant relevance to the Region's resource planning, and all are consistent with the current priorities (Section 1.5 "NCIRWMP Priorities") and latest goals and objectives (Section 4.1.2 "Goals and Objectives for NCIRWMP Phase III) of the NCIRWMP. Specific sections of all the local planning documents referenced herein clearly relate to one or more NCIRWMP goals/objectives. Examples of consistencies between the NCRIMP and existing plans include, but are by no means limited to the following:

- UWMPs and General Plans set water supply reliability as a goal
- Watershed plans often meet several of the primary NCIRWMP objectives related to salmonids, drinking water, and water supply provision with minimal environmental impacts.
- Land and water plans most often apply a diversity of RMS, combining them to achieve multiple goals.
- Because they share fundamental priorities with existing plans (by design), the NCIRWMP projects also frequently implement local and sub-regional watershed plan elements.

As Land Use Plans such as General Plans, Water Resources Elements, Coastal Plans, Forest Plans, and other land management plans are updated, the updates may include strategies provided by the NCIRWMP and template elements developed during the process when municipalities/counties choose

to incorporate them. This will place plans into a regional context while preserving local autonomy: individual planning efforts will be tailored to the specific community while keeping regional needs and interdependencies as important planning components.

9.4 LINKING WATER & LAND USE MANAGEMENT DECISIONS

Historically, the approach to land and water planning has been to manage and make decisions about each resource separately, from the perspective of different agencies. Although water clearly moves across jurisdictional boundaries, water management historically has been based strictly within jurisdictional areas. The IRWM process seeks to resolve this conflict through diverse water management portfolios and early water management input to those responsible for making land use decisions and implementing land use changes (DWR 2012).

In the last decade in California, there has been a movement toward a more inclusive watershed approach to planning (Section 5.1 "Internal Boundaries"). Water and land planners and managers may tackle regional water issues and meet multiple water management objectives by implementing a single multi-benefit project or program, rather than individual projects from one agency with a single purpose. For example, NCRP activities toward floodplain restoration also benefit water supply, water quality, salmonid habitat, recreational access, flood attenuation, and carbon sequestration. The NCIRWMP planning process also provides opportunity to expand and link existing programs with stakeholders who would benefit from them. Examples where NCIRWMP facilitates joining of water and land use decision-making include the "5C's" road maintenance manual distribution and adoption to areas in the Region with similar geology and land uses. Other examples include LandSmart and North Coast Stormwater Coalition, as previously described).

9.4.1 COMMUNICATION NEEDS & STRATEGIES

Often, the relationship among and between land and water resource agencies is characterized as reactive in that one agency is expected to act to accommodate a decision the other agency has already made; early communication is critical to change this relationship dynamic from reactive to proactive (DWR 2012). Open and transparent communication between and among NCRP participants and potential stakeholders is integral to the NCIRWMP approach to planning and implementation (Section 2.4 "Coordination"). Improved interaction between water managers and land use planners can advance the implementation of the NCIRWMP: they can make decisions with better understanding of their impact on each other, and they can identify and act upon opportunities to collaborate and meet multiple goals cooperatively. Communication must flow both ways: to local entities and from local entities into NCIRWMP, state, Tribal, and federal planning processes. The NCRP has established robust mechanisms to ensure public input during formal review periods, group meetings, and via one-on-one communication (Section 3 "Stakeholder Involvement"). The PRP continually evaluates and improves processes to provide for transparency, inclusiveness, and openness in all NCRP activities.

9.4.2 PLANNING & IMPLEMENTATION STRATEGIES

Multi-objective planning frameworks are increasingly the preferred paradigm for local, regional, state, and federal government efforts. Strategies to improve planning and implementation increasingly rely on existing frameworks, plans, programs, and pilot projects. Collaborative strategies, such as those described throughout Section 9, provide:

- A cooperative framework to move past differences and implement positive projects and programs locally that have a regional and statewide benefit
- Efficiencies of scale
- Pooling of technical expertise
- Sharing of financial, human, and technical resources
- Opportunities to develop and disseminate General Plan and other templates that can be customized to suit local entities' priorities
- Leverage of collaborative partnership to benefit each partner locally

9.5 LOCAL AGENCY PARTICIPATION

Currently, relationships between local land use planning entities and water management entities can theoretically be collaborative, cooperative, nonexistent, uncooperative, or confrontational. Agencies are increasingly searching out cooperative, collaborative projects and programs that can accomplish multiple objectives while benefitting the local community. Through the NCIRWMP, local land and water use decision makers are given an opportunity to review and comment on the latest (Phase III) elements that are related to their respective jurisdictions. The NCIRWMP (previous iterations) has been signed and adopted by a variety of local and regional agencies with land management authority (including counties, cities, and water agencies). As the NCIRWMP continues to increase benefits to local entities in the Region (i.e. via the Water & Wastewater Service Provide Outreach & Support Program, North Coast Strategies for Energy Independence & Emissions Reduction, and others; Appendix O "Reports Commissioned for the NCIRWMP"), more entities are likely to participate, increasing the synergy, technical capacity, and diversity of participation in the NCIRWM process. For a complete list of participating agencies, see Appendix M ("MoMU Signatories").

9.6 TRIBAL PARTICIPATION

North Coast Tribes have demonstrated support for the NCIRWMP since its inception in 2005 (e.g. Appendix M "MoMU Signatories" lists these). As described previously (Section 2.1 "North Coast Resource Partnership"), representatives of North Coast Tribes subsequently have been added to the NCRP governance and technical bodies: At its June 24, 2010 meeting, the NCRP considered and unanimously approved a proposal brought forth by a coalition of Tribal governments and voted to include three Tribal representatives to the PRP and the TPRC. This decision has made the North Coast the Region in California with the most formal Tribal involvement in IRWM governance and implementation project technical review. Formal Tribal participation in the NCRP was approved through a revised MoMU that includes the adopted "Tribal Representation Process" (MoMU; Appendix M "Governance & Supporting Documents"). Inclusion of Tribal representation has the effect of ensuring the NCIRWMP addresses Tribal priorities (e.g. Section 1.5 "NCIRWMP Priorities") and that the existing plans and programs of North Coast Tribes are recognized and included in the synthesis of planning documents herein.

9.7 PROCESSES FOR ONGOING COORDINATION & INTEGRATION

Ongoing Processes

The process for coordinating and integrating local water and land use planning with the NCIRWMP is ongoing and is aligned with the processes by which the Plan is amended (Section 2.7.2 "NCIRWMP Updates"). The Plan incorporates the most current land use and water management issues, and identifies planning strategies that may be implemented or explored in the future. Reports commissioned for the NCRP and summary tables related North Coast planning efforts help to support ongoing NCIRWMP updates and process refinements; inform continued outreach efforts; and relate North Coast planning efforts to specific Plan elements.

Information provided in the NCIRWMP, or currently in development, that can help facilitate ongoing efforts at integrated water/land management include:

- Appendix E "Relationship to Local Water & Land Use Planning"
  - » Table 7 "Local Water & Land Use Plans for the North Coast Region"
  - » "NCRP Partner and Stakeholder Interview Synthesis 2013[211]"
- Appendix H
  - » Table 26 "TMDL Status for Impaired Waters of the North Coast Region"
- Appendix O "Reports Commissioned for the NCIRWMP"
  - » "North Coast Land Use and Regional Planning Report"
  - » "Water & Wastewater Service Provider Outreach & Support Program"
  - » "Regional Strategy for Small Disadvantaged Water and Wastewater Providers"
  - » "North Coast Energy Independence, Emissions Reduction, Job Creation, and Climate Adaptation Initiative"
  - » "Flood and Stormwater Management Plan for the North Coast Region"

Future Efforts

The NCRP, under the direction of the PRP, is committed to identifying and implementing future

211 NCRP Partner and Stakeholder Interview Synthesis 2013. http://www.northcoastirwmp.net/docManager/1000009209/NCRP_Planner_Interviews_Summary_2013.pdf

plans to further a collaborative, proactive relationship between land use planners and water managers and between both groups and the NCIRWMP. Upcoming opportunities anticipated by the NCRP include:

- General Plan updates are in progress or planned within five years for most local agencies within Region; their updated information will be incorporated into the NCIRWMP
- The Trinity/Humboldt Pilot Program template (described previously) will become available, along with potentially other templates as appropriate
- Future forums, conferences, and workshops to cultivate the relationship between water and land use decision-makers
- Continue to identify and fund water management projects that meet water supply and water quality objectives while being compatible with existing and planned future land use designations
- Continue and extend outreach to and expand collaborative relationships with local, state, federal resource entities, particularly those representing the land use community
- Continue to identify and promote opportunities for shared water-land management that satisfies priorities of all participants

SECTION 10.0 IMPLEMENTATION IMPACTS & BENEFITS

This section documents the impacts and benefits of the NCIRWMP and its projects; relates past and current projects to local, regional, and state priorities, goals, and objectives; and presents a framework for communicating observed impacts and benefits to NCRP stakeholders and other interested parties. The discussion below and summary tables in the Appendix address the DWR IRWM Plan Standard for "Impacts and Benefits" (DWR 2012). It is recognized that this is a screening-level discussion that is not intended to be highly quantitative or specific at this time. Analyses for Section 10 indicate the specific elements that each project (Proposition 50 and Proposition 84) proposed to address *at the time it was selected*[212] for the NCIRWMP project portfolio.

10.1 ALIGNMENT WITH NCIRWMP GOALS/OBJECTIVES & STATE RMS

The process for soliciting and selecting projects to implement the NCIRWM Plan was designed and is continually refined to enable NCRP's selection of technically sound projects that meet (1) local needs as articulated via the NCIRWMP goals and objectives and (2) statewide priorities related to water planning and resource management. Since 2007, as part of the NCRP's adaptive management process, the NCIRWMP's goals and objectives have been refined, although the original themes related to intra-regional cooperation, salmonid recovery, and beneficial uses of water remain constant (NCRP 2007). The state's Resource Management Strategies (RMS), which identify priorities for the California Water Plan, likewise have been refined over time (i.e. DWR 2009, DWR 2013 draft). Below is a discussion of how recommended state RMS (DWR 2009) have been applied, via project implementation, to address the NCIRWMP goals and objectives (Appendix D Table 6 "Matrix of Local Project Priorities & Resource Management Strategies").

NCIRWMP Goal 1: Intraregional Cooperation & Adaptive Management

Objective 1 — Respect local autonomy and local knowledge in Plan and project development and implementation

Objective 2 — Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation

Associated RMS

North Coast IRWMP Goal 1 and associated objectives are not met by specific RMS (as are others below), but rather via the NCIRWMP approach and NCRP process (Section 2 "Governance and Coordination"). Through a transparent, inclusive process and continual outreach and networking efforts, the NCRP demonstrates respect for local authority while providing an ongoing intra-regional framework for analysis, discussion, and innovation. Through these mechanisms, the NCIRWMP provides the economies of scale and scope described in Section 10.2 "Advantages of a Regional Plan versus Individual Local Efforts."

NCIRWMP Goal 2: Economic Vitality

Objective 3 — Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities.

Objective 4 — Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas

Goal 2 and its associated objectives are met in part by project implementation of specific RMS, but also through NCIRWMP processes. Through prioritizing projects that support DACs during project selection and its stated commitment to the working landscapes heritage of the North Coast, the NCRP contributes to regional economic vitality.

Associated RMS

RMS that prioritized projects have used to contribute toward Objective 4 include:

- Agricultural Water Use Efficiency
- Conjunctive Management & Groundwater
- Recycled Municipal Water
- Surface Storage

212 Section 7 "Project Application, Review, and Selection Process" details the process for including projects in the NCIRWMP.

- Matching Water Quality to Use
- Pollution Prevention
- Agricultural Lands Stewardship
- Ecosystem Restoration
- Forest Management
- Recharge Areas Protection
- Land Use Planning and Management
- Watershed Management

Agricultural water use efficiency, conjunctive management, recycled municipal water, surface storage, and matching water quality to use provides improved water management for working landscapes; these improvements are likely to translate to farm profits, agricultural viability, and help to invigorate the local economy. Pollution prevention projects contribute to maintaining instream water quality, which lessens regulatory burdens (such as TMDL compliance) for agricultural landowners. By voluntarily implementing projects that contribute toward meeting TMDL requirements, farmers and other landowners are also contributing toward agricultural sustainability in the region. Ecosystem restoration, forest management and recharge area protection help to conserve and protect working landscapes and natural areas. Watershed management and land use planning that protect open space and agricultural lands also contribute toward attainment of these objectives.

NCIRWMP Goal 3: Ecosystem Conservation and Enhancement

Objective 5 — Conserve, enhance, and *restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity*

Objective 6 — Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes

Associated RMS

Many prioritized projects directly or indirectly contribute toward achievement of these Objectives. Specific RMS include:

- Agricultural and Urban Water Use Efficiency
- Agricultural Lands Stewardship
- Ecosystem Restoration
- Forest Management
- Surface Storage
- Groundwater and Aquifer Remediation
- Land Use Planning and Management
- Recharge Areas Protection
- Pollution Prevention and Urban Runoff Management
- Watershed Management

RMS such as agricultural lands stewardship, ecosystem restoration, forest management and recharge areas protection include fish passage enhancement, road repair, native tree plantings, riparian restoration and wetlands enhancement/creation. Such projects directly benefit aquatic ecosystems and salmonid habitat through improved habitat, increased stream canopy cover, or provision of ecosystem services such as pollutant filtration, which improves instream water quality.

Agricultural and urban water use efficiency, surface storage, and groundwater and aquifer remediation benefit aquatic ecosystems by decreasing the amount of water withdrawn from surface waters, thereby increasing instream flow, which can contribute toward cooler summertime temperatures and provide greater pollutant dilution. Pollution prevention, urban runoff management and groundwater and aquifer remediation can improve surface water quality, which also improves salmonid habitat. Sediment reduction projects are particularly important for salmonid habitat restoration. Land use planning and watershed planning that factors these strategies into an integrated management framework protects and improves critical habitat.

NCIRWMP Goal 4: Beneficial Uses of Water

Objective 7 — Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources

Objective 8 — Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities

Objective 9 — Protect groundwater resources from over-drafting and contamination

Associated RMS

Many NCIRWMP projects have contributed toward objectives related to water supply and drinking water quality. RMS that have been implemented include:

- Agricultural and Urban Water Use Efficiency
- System Reoperation
- Conjunctive Management & Groundwater
- Recycled Municipal Water
- Surface Storage
- Drinking Water Treatment and Distribution
- Groundwater and Aquifer Remediation
- Matching Water Quality to Use
- Agricultural Lands Stewardship
- Ecosystem Restoration
- Recharge Areas Protection

Agricultural and urban water use efficiency projects, system reoperation, conjunctive management, matching water quality to use, and recycled municipal water projects increase supply reliability directly. Drinking water quality treatment and distribution projects in DACs protect public health by improving failing infrastructure. Groundwater and aquifer remediation help to buffer supplies, improve drinking water quality, and protect groundwater resources. Agricultural land stewardship protects supply reliability, improves surface water quality, which can lead to better drinking water quality, and protects groundwater resources from over-drafting and contamination. Ecosystem restoration and recharge areas protection contribute toward supply reliability and improved water quality.

NCIRWMP Goal 5: Climate Adaptation & Energy Independence

Objective 10 — Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors and systems

Objective 11 — Promote local energy independence, water/energy use efficiency, GHG emission reduction, and jobs creation

Associated RMS

Climate adaptation and energy independence is addressed at the policy level by the NCRP, but several NCIRWMP projects have implemented the following RMS toward the achievement of these objectives:

- Agricultural and Urban Water Use Efficiency
- Economic Incentives
- Forest Management
- Land Use Planning and Management
- Watershed Management
- Ecosystem Restoration
- Recharge Areas Protection

Agricultural and urban water use efficiencies promote water and energy use efficiency and GHG emission reduction. Economic incentives encourage landowners and businesses to install water and energy saving devices, solar energy panels, and other efficiencies. Forest management to produce biochar enhances local energy independence and carbon sequestration. Land use planning and watershed management that consider vehicle miles traveled, enhance walkability, and assess climate change, impacts, vulnerabilities, and strategies also contribute toward this goal. Many of the habitat enhancement and watershed/recharge area protection projects listed above help to make natural and human communities more resilient to the impacts of climate change, such as more volatile weather, shifting climate zones, temperature extremes and flooding.

NCIRWMP Goal 6: Public Safety

Objective 12 — Improve flood protection and reduce flood risk in support of public health

Associated RMS

Several NCIRWMP projects have improved flood protection and reduced flood risk. RMS employed include:

- Flood Risk Management

- Ecosystem Restoration
- Recharge Area Protection
- Land Use Planning and Management
- Watershed Management

Flood risk management directly addresses this goal by reducing flood impacts. Ecosystem restoration and recharge area protection enhance green infrastructure: the natural capacity of floodplain features to collect and hold excess stormwater when intense precipitation events occur. Land use planning and watershed management that use low impact development and consider downstream impacts also contribute to this objective.

10.2 ADVANTAGES OF INTEGRATING REGIONAL PLANNING AND LOCAL EFFORTS

10.2.1 THRESHOLD EFFECTS

While respecting and acknowledging local autonomy, the North Coast Resource Partnership and the NCIRWMP act as a synchronizing feature between state priorities and local individual plans and projects. A regional plan such as the NCIRWMP that includes the local knowledge and experience and preferences of local community members has many advantages- Regional planning that integrates locally unique individual projects may reduce project implementation costs, enhance the types and amounts of benefits achieved from projects, enhance sharing of information among individual entities, and minimize adverse impacts on biophysical and socioeconomic resources in the Region.

Implementing projects through a framework of regional cooperation can be more cost effective than implementing individual projects separately or on an ad-hoc basis. With regional coordination, aspects of project planning and implementation can be consolidated, which prevents the duplication of efforts and reduces costs. The coordination required to implement a regional approach also leads to greater levels of information and data sharing, reducing costs by allowing project sponsors to learn from past efforts and design future projects with increased efficiency. In addition to reducing costs, coordinated efforts reduce adverse impacts of projects, such as ecological disturbances or disruptions to community resources, by better integrating or timing actions to acknowledge and address ecological and community constraints and opportunities.

A regional framework such as the NCRP has the potential to achieve greater benefits than a series of individual efforts. This may occur as coordination among stakeholders to identify opportunities to extend and connect projects, resulting in greater economies of scale unachievable individually. The NCIRWMP also helps target resources to projects with the greatest benefits. The organizational capacity offered by regional coordination provides resources and support to projects that might not materialize on their own, and over time helps identify and support the implementation of projects that yield greater benefits region-wide. For the rural and sparsely populated North Coast, individual diverse communities working together cooperatively at the regional scale has allowed the North Coast region to identify and further its unique goals and priorities for consideration by the State and DWR.

For these reasons, over time, the NCRP regional framework of cooperation among individual autonomous communities has the potential to support projects that generate greater levels of benefits for the region's communities with the same (or fewer) technical, organizational, and financial resources. Working collaboratively also has greater potential to reduce costs and adverse impacts to ecological and community resources in the region than implementing individual projects without coordination. These "threshold effects" contribute to strengthening the economy of the region, which in turn increases regional coordination and broadens stakeholder participation over time.

10.2.2 INTEGRATION OF INDIVIDUAL PROJECT IMPACT/BENEFIT ANALYSIS

The NCRP regional framework also has advantages when it comes to assessing the benefits and impacts of individual projects. By integrating the analyses of benefits and impacts across a suite of regional projects, those projects that can achieve the highest level of benefit for their costs become more evident. An integrated and consistent analysis of project-level benefits and impacts allows data collection and monitoring standards to mature and evolve in ways that better support the assessment of benefits and impacts over time. This process helps regional managers direct funds and other resources to those projects that will have the greatest benefits over the long run. It also helps educate and encourage project applicants to design projects more effectively, leading to more efficient project outcomes.

Results from project monitoring data and impact/benefit analyses will be used on an ongoing basis (at programmatic level) to inform the NCIRWMP goals and objectives and project selection criteria. These data will be memorialized on a regular basis in the NCIRWMP and in project applications. The Implementation Impacts and Benefits Section will be reviewed along with NCIRWMP Goals and Objectives and will be updated as deemed necessary by the TPRC and PRP. Additionally, a Plan Performance webpage documenting impacts and benefits will be developed to include programmatic summary statistics for the Region.

10.3 POTENTIAL IMPACTS & BENEFITS TO THE REGION & BEYOND

Projects implemented through the NCIRWMP produce benefits throughout the Region, and have the potential to generate benefits that spill over into adjacent regions. Adjacent regions may realize the value of benefits produced in the North Coast directly, as some ecological effects (e.g., carbon sequestration, salmon population enhancement) are not strictly confined to the boundaries of the watersheds that make up the North Coast region, and thus have the potential to improve ecological and economic conditions across a wider area. Water supply and water quality improvements in certain parts of the region (e.g., the Trinity WMA) have the potential to provide benefits across a much wider area as other regions become more dependent on the exports and provision of resources produced in the North Coast region. Benefits may accrue to other regions indirectly as lessons learned in the North Coast from project implementation, inter-organization coordination, and data collection and management yield best practices that other regions throughout the state adopt.

While adverse impacts arising from projects implemented under the NCIRWMP are likely to be minimal and short-term in nature (compared to benefits, which are more likely to be long-lasting), they have the potential to materialize both within the region and in adjacent areas. Whenever possible, the project analysis and review process used by the NCRP seeks to minimize the adverse impacts through careful project design and assessment. The benefit-cost analyses of projects submitted for implementation through the plan explicitly account for adverse impacts as part of the analysis of costs. The cost analysis monetizes adverse impacts where possible so they can be directly compared with monetized benefits.

10.3.1 QUALITATIVE & QUANTITATIVE INDICATORS

Projects proposed through the NCIRWMP produce a wide variety of benefits and impacts that can be measured, both in biophysical and economic terms. Some of these measures are qualitative in nature and others can be assessed quantitatively.

From an economic perspective, projects comprise actions that enhance or create the basic resources that underpin the ecological and economic health of the Region. Economists refer to these basic resources as forms of capital, and categorize them into four groups: natural capital, human-built capital, human capital, and social capital. Most projects that are part of the NCIRWMP are designed to improve the natural and human-built capital in the Region, but produce benefits that bolster human and social capital as well. Adverse impacts of projects also act on these forms of capital by reducing the availability of some resources, usually for a short period of time and over a limited geographic area. When adverse impacts occur from projects in the Plan portfolio, the net effect on the different forms of capital is designed to be positive in the long run. Appendix J Table 43 ("Indicators of Benefits and Impacts of Proposition 50 Projects") shows the four different forms of capital, the indicators used to capture effects that most often arise from projects, and units used to measure changes in the indicators. Section 11 "Performance Monitoring and Evaluation" provides a fuller analysis of an indicator suite to assess both the NCIRWMP and the projects that implement it.

10.3.2 NCIRWM IMPLEMENTATION PROJECTS BENEFITS SUMMARY

Following is an overview of potential economic, social, ecological, and cultural benefits provided by NCIRWMP implementation projects funded by Proposition 50 and Proposition 84 Rounds 1 and 2. Content was developed from information provided by project proponents in reports, contracts, grant proposals, with research and analysis by ECONorthwest, an economics consulting firm. Consistent with widely accepted professional standards, ECONorthwest considered a broad suite of goods and services including those values derived from indirect or non-use of resources. Where sufficient detail exists, the project sponsors' estimates of expected or realized benefits were used.

Note: because not all projects could quantify their benefits, and because the economists erred on the side of caution (underestimating rather than overestimating when calculating benefits), the benefits listed are at the low-end of the continuum of estimates of benefits provided by implementation of these 52 projects.

The quantification of benefits represents the NCRP's best effort to present a realistic description of the value accruing from NCIRWMP project implementation. Given that over half of the projects are currently in progress, project scope may change with enhanced or more limited funding, and the predictions of benefits — even those based on the best available science and socio-economic data — are inherently variable.

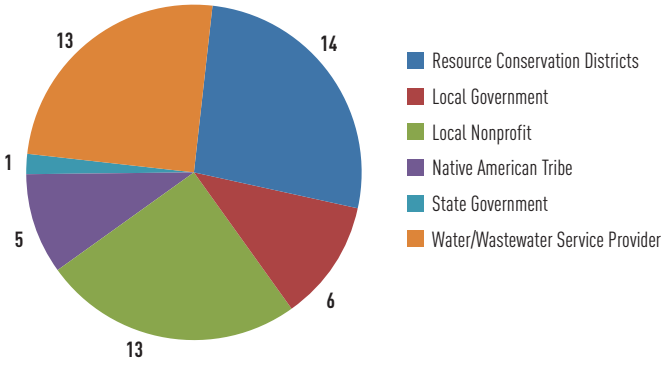


FIGURE 7 PRIORITY PROJECT SPONSORS

Project Composition: 52 NCIRWM Implementation Projects Total

- 17 — IRWM Proposition 50 Round 1 projects
- 4 — IRWM Proposition 50 Round 2 projects
- 18 — IRWM Proposition 84 Round 1 projects
- 13 — IRWM Proposition 84 Round 2 projects
- Total project cost: $80,544,371, spent locally using local supplies and services when possible

Project Type — Integrated Multi-Benefit Projects

- 24 water/wastewater infrastructure projects (24/52 = 46%)
- 43 water quality improvement projects (42/52 = 81%) — these include both instream water quality improvement and drinking water quality improvement projects
- 24 water supply reliability projects (24/52 =46%) (Note, the above numbers do not add up to 100% because several projects provided multiple benefits — both water quality and water supply reliability benefits)

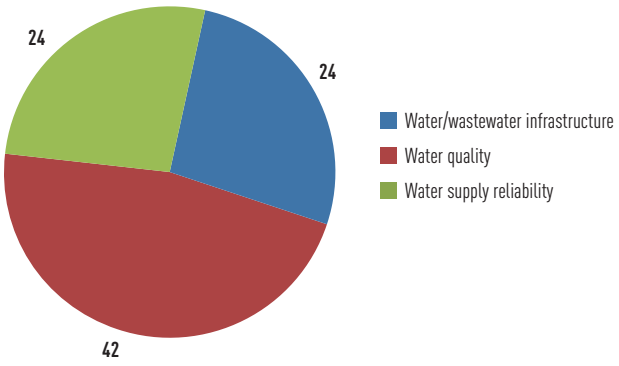


FIGURE 8 PROJECT TYPE

Quantitative Benefits: Water Supply and Water Quality

- Twenty projects protect/ enhance instream flows by a conservative estimate of 1,908,326 gallons of water per day
- 37 (71%) projects assist with TMDL implementation by decreasing sediment, nutrient, or pathogen loads or through increases to instream flows, helping to ameliorate increased water temperatures during summer months
- Twenty-four sediment reduction projects remove and/or stabilize over 910,945 cubic yards of sediment.
- Miles of road decommissioned:78.56; miles of road upgraded: 103.81
- Four projects avoid wastewater violations fines and penalties

FIGURE 9 ROAD-RELATED SEDIMENT REDUCTION PROJECT BENEFITS

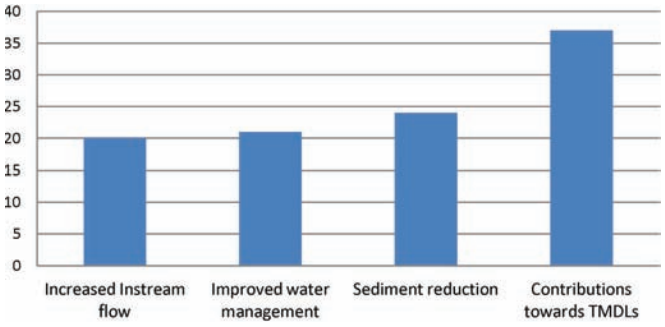


FIGURE 10 NUMBER OF PROJECTS PROVIDING SPECIFIC WATER SUPPLY & QUALITY BENEFITS

Quantitative Benefits: Salmonid Habitat

- 38 projects (38/52 = 73.1%) protect or enhance North Coast coho, Chinook, and/or steelhead fisheries

- Eleven projects improve fish passage by opening at least 156.46 miles of instream habitat for spawning and rearing
- 24 projects include habitat restoration components; these projects collectively:
  - » Install at least 64,947 native trees, shrubs, and grasses
  - » Restore over 838 acres or riparian or wetland habitat
  - » Restore/ enhance at least 91,256 linear feet (17.28 miles) of riparian habitat
- Ten projects include invasive non-native plant removal; these projects collectively remove invasive plants from at least 514.20 acres
- Ten projects have in place ongoing monitoring and data evaluation programs

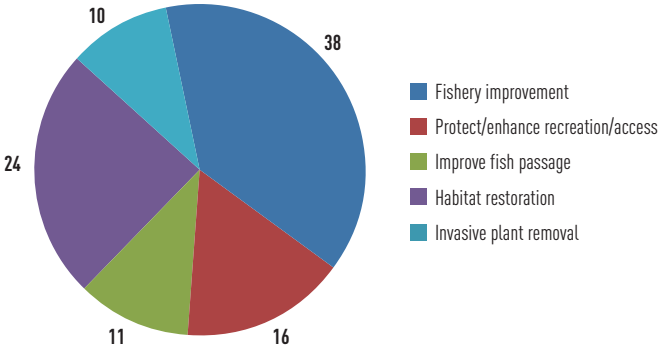


FIGURE 11 NUMBER OF PROJECTS PROVIDING SPECIFIC HABITAT-RELATED BENEFITS

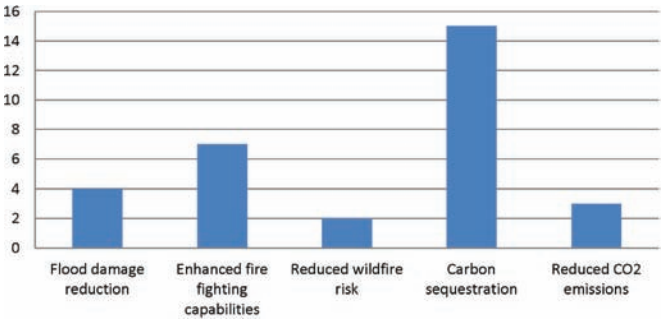


FIGURE 12 NUMBER OF PROJECTS PROVIDING SPECIFIC ECOSYSTEM SERVICES BENEFITS

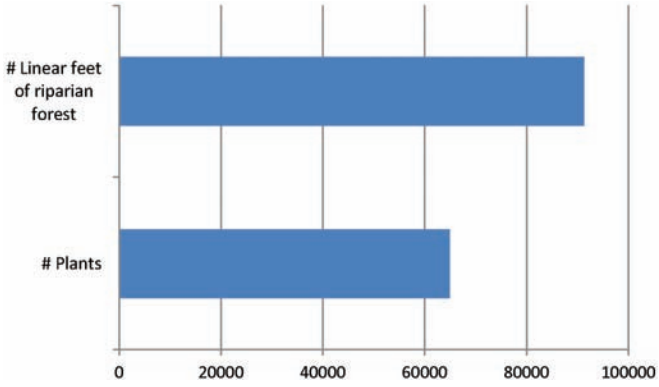


FIGURE 13 BENEFITS OF HABITAT PROJECTS

Socioeconomic

- 24 projects protect the agricultural and resource-dependent heritage of farmers, ranchers, Tribes, and other residents of the North Coast;
- Eleven projects provide for social health and safety by improving access for emergency vehicles, improving impacted drinking water quality in disadvantaged communities, and protecting public health through contaminant reduction;
- 52 (all) projects used local labor and supplies when possible and contribute to state goals for environmental justice and social equity.

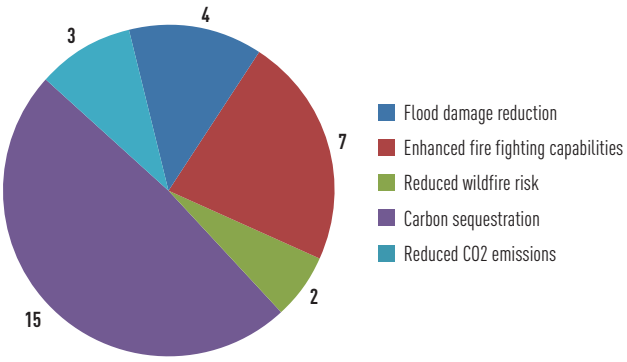


FIGURE 14 NUMBER OF PROJECTS PROVIDING SPECIFIC SOCIO-ECONOMIC BENEFITS

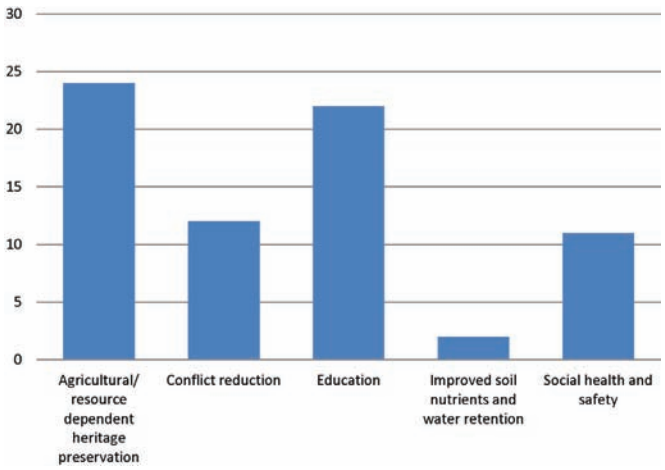


FIGURE 15 NUMBER OF PROJECTS PROVIDING SPECIFIC SOCIO-CULTURAL BENEFITS

10.3.3 MONETIZATION OF IMPACTS & BENEFITS

Monetization of impacts (costs) and benefits is conducted at two levels within the NCIRWMP process: (1) a screening analysis conducted by project sponsors when they propose specific projects to become part of the integrated plan and (2) a detailed analysis is conducted when projects are put forward for funding. In the screening analysis, project proponents are provided with a list of suggested economic unit values to apply to the physical units associated with the indicators of benefits and impacts their projects may generate. Project sponsors may also use custom values if they have information that can support them. Appendix J Table 45 ("Estimated Project Benefits for Water Supply, Quality, and Services") provides the suggested economic unit values project proponents may consider.

To compete for funding, selected projects must undergo a more detailed benefit-cost analysis that rigorously assesses the benefits and costs associated with a project's effects over time. The analysis incorporates information about the potential demand for particular benefits and the regional availability of substitutes to produce a more nuanced assessment of the economic value of the benefit to the Region. The analysis also includes uncertainty about the amount and timing of the benefit.

Not all benefits and impacts can be monetized. Both the screening analysis and the benefit-cost analysis explicitly acknowledge this. Limitations of monetization arise both from project sponsors' ability to adequately measure the biophysical effects of projects, especially over the long run, and in economists' ability to assign economic values to goods and services that materialize outside the market economy. Non-market valuation approaches provide good information to assign values to many of these effects, allowing them to be assessed alongside market effects. Some effects (especially those related to cultural services derived from the environment) are impossible to adequately value in monetary terms for all stakeholders. In the screening analysis and the benefit-cost analysis, these benefits and impacts are described qualitatively, using details to characterize the importance of the effect, such as its timing, magnitude, duration, and the populations that it would affect.

10.3.4 METHOD TO DETERMINE RELATIVE DEGREE OF IMPACT/BENEFIT

The screening-level analysis and the benefit-cost analysis described above both provide information (both monetary and non-monetary) that allows regional managers to assess the relative level of impacts and benefits across all projects.

10.4 CRITICAL IMPACTS OF NOT IMPLEMENTING PROJECTS

Projects implemented through the NCIRWMP address a wide variety of challenges facing the ecological resources and human communities across the North Coast. Without the NCIRWMP supporting the implementation of these projects, the ecological and socioeconomic challenges would continue to mount, further eroding the basic resources that support economic vitality in the Region. Funding these projects now will help avert a range of impacts that would occur if the projects were not implemented. These include:

- Decreases in drinking water supply reliability, especially in disadvantaged communities that have few other options to access capital needed to repair aging water and wastewater systems.
- Degradation of water quality and riparian habitat that adversely affects salmonid populations and the livelihood of communities dependent on healthy commercial, recreational, and Tribal fisheries.
- Reductions in surface and groundwater supply availability and increases in water scarcity that affects the production of agricultural and ecological goods and services, leading to loss of economic resiliency and increased conflict throughout the Region.
- Increases in the spread of invasive species that impair habitat function and reduce the value of goods and services produced by the Region's ecosystems.

Critical impacts, if not addressed in a coordinated and timely way, would have cumulative and long-

term adverse impacts that translate to economic costs within and outside of the Region.

10.5 IMPACTS & BENEFITS OF PROPOSITION 50 IMPLEMENTATION PROJECTS

Proposition 50 was the source of funding (allocated over two rounds) for the first 25 projects in the North Coast portfolio. Appendix J Table 43 ("Indicators of Benefits and Impacts of Proposition 50 Projects") presents the benefits of Proposition 50 implementation projects. Proposition 50 projects are loosely characterized by three primary objectives: 10 targeted improvements in water or wastewater infrastructure; 16 involved actions to improve water quality; and 9 improved water supply reliability. Many of the projects accomplished multiple objectives and collectively, produced a wide range of benefits, enhancing all four forms of capital in the North Coast.

Impacts from these projects were minimal and generally resulted from temporary disruptions to ecosystems and infrastructure during project construction. Any adverse impacts resulting from these actions were remediated as reconstruction efforts were completed and ecosystem restoration matured over time.

10.5.1 IMPACTS & BENEFITS TO DACs

The majority of the projects funded through Proposition 50 produced benefits that directly or indirectly benefited the North Coast Region's DACs (these may include Native American Tribes). Projects in DACs have improved water supply reliability, shored up critical infrastructure, and enhanced the resiliency of the surrounding ecosystems these communities depend on. The projects produced tangible monetary benefits for the communities, such as reduced operations and maintenance costs and avoided replacement costs. They also produced benefits that are not quantifiable in monetary terms, but are economically important because they enhance the quality of life for people in these communities. Examples of the benefits include opportunities for education, training, networking, and cultural preservation.

10.5.2 IMPACTS & BENEFITS TO SENSITIVE HABITATS & SPECIES

Well over half of the Proposition 50 projects directly enhanced salmonid populations and their habitat. The projects accomplished this through water quality improvement efforts (e.g., by reducing sedimentation), water supply and infrastructure projects that increased water available for instream flows at critical times during the year, and riparian and forest restoration activities that improved salmonid habitat.

10.6 IMPACTS & BENEFITS OF PROPOSITION 84 IMPLEMENTATION PROJECTS

Appendix J Table 44 ("Indicators of Benefits and Impacts of Proposition 84 Projects") documents benefits of Proposition 84 implementation projects. Proposition 84 funded 31 projects in the Region through two rounds of funding. The projects are loosely characterized by three primary objectives: 14 targeted improvements in water or wastewater infrastructure; 25 involved actions to improve water quality; and 14 improved water supply reliability. Over half (16) of the projects targeted improvements in more than one of the categories. Collectively, the projects produced a wide range of benefits, enhancing all four forms of capital in the North Coast Region.

Impacts from these projects were minimal and generally resulted from temporary disruptions to ecosystems and infrastructure during project construction. Any adverse impacts resulting from these actions were remediated as reconstruction efforts were completed and ecosystem restoration matured over time.

10.6.1 IMPACTS & BENEFITS TO NATIVE AMERICAN TRIBES & DACs

The majority of the projects funded through Proposition 84 produced benefits that directly or indirectly benefited the North Coast's Native American Tribes and DACs. Five projects were specifically sponsored and implemented by Native American Tribes, and Tribes were partners in other projects. Projects that benefit DACs and Tribes with limited resources provide improved water supply reliability, shored up critical infrastructure, and enhanced the resiliency of the surrounding ecosystems these communities depend on. The projects produced tangible monetary benefits for the communities, such as reduced operations and maintenance costs and avoided replacement costs. They also produced benefits that are not quantifiable in monetary terms, but are economically important because they enhance the well being of communities and their residents. Examples of the benefits arising from the Proposition 84 projects including opportunities for education and training, and cultural preservation.

10.6.2 IMPACTS & BENEFITS TO SENSITIVE HABITATS & SPECIES

The three species of salmonids that inhabit the North Coast hydrologic region (steelhead trout, coho and Chinook salmon) are federally listed under Endangered Species Act (ESA) and are the targets of California Department of Fish and Game species recovery plans, as well as substantial State funding and resources. Because these fish are anadromous — spending

a substantial part of their lives in the ocean — the status of their populations has far reaching impacts throughout the region, the state and the world. Restoration of viable populations of salmonids to the North Coast region — through a collective program of sediment reduction, invasive species removal and

NPS/TMDL implementation — will have significant positive impacts on ecosystem health and biodiversity, local, regional and state economies, cultural uses for tribal groups and conflict reduction related to in-stream flows and watershed land use.

Twenty-one of the 31 projects funded by Proposition 84 directly enhanced salmonid populations and their habitat. The NCIRWMP's Proposition 84 projects accomplished these benefits through water quality improvement efforts (e.g., by reducing sedimentation), water supply and infrastructure projects that increased water available for instream flows at critical times during the year, and riparian and forest restoration activities that improved salmonid habitat. Almost one-third of the projects produced documentable increases in carbon sequestration and three reduced carbon emissions directly by reducing energy use. Just under half of the projects directly involved habitat restoration, which benefited both salmonid populations and other species that depend on riparian and forested landscapes.

SECTION 11.0 PERFORMANCE MONITORING & EVALUATION

DWR's Guidelines for IRWM (DWR 2012, p. 21) state, "The IRWM Plan shall contain performance measures and monitoring methods to ensure the objectives of the Plan are met. Therefore, the IRWM Plan must describe a method for evaluating and monitoring the [*NCRP's*] ability to meet the objectives and implement the projects in the IRWM Plan." The Phase I (2005) and Phase II (2007) iterations of this document presented preliminary ideas for developing these methods, based on an adaptive management approach. The short- and long-term needs within the Region are expected to change as implemented projects yield expected benefits and as political, social, and environmental conditions change. In the spirit of that approach, and to support continued improvements to the NCIRWMP and NCRP processes, Phase III (current document) expands on these initial monitoring efforts, most of which continue to be conducted by project proponents.

Section 11 and related appendices address, per 2012 DWR Guidelines, describe the framework and proposed processes to establish a standardized Plan and project performance monitoring system based on measurable indicator data, and to evaluate performance based on objective benchmarks. DWR has confirmed it is appropriate for the NCRP to evaluate "Plan Performance" by rolling up (summing) the project evaluation determinations for all the individual projects implemented by the Plan (as presented in Section 7). That process is described in detail below, and is closely related to the indicators that are introduced in Section 4 "NCIRWMP Goals & Objectives" and Section 10 "Implementation Impacts & Benefits," and projected for Section 12 "Long-term Financing & Implementation."

11.1 STATUS OF EXISTING MONITORING ACTIVITIES

This section describes existing statewide monitoring efforts, as well as the methods used to evaluate and measure the success of the prioritized water management projects at both the programmatic and project level (Appendix G Table 12 "Monitoring Plans of the North Coast Region"). Watershed and water quality monitoring is currently conducted by a number of state agencies, each with its programmatic mission to fulfill. Watershed and water quality monitoring in the North Coast is vital for evaluation of the effectiveness of sediment reduction programs, instream habitat restoration programs, fish passage projects and other watershed enhancement projects. On-going monitoring is critical to understanding how land use practices such as road building, timber harvest, irrigated agriculture, and land conversion impact the aquatic resources and habitats of the North Coast Region. Equally important is the compliance monitoring of public wastewater treatment facilities to ensure the health and safety of water quality for beneficial uses. In keeping with its commitment to adaptive management, the NCRP intends uses existing and proposed monitoring efforts to inform management decisions and guide changes to management, policy, and decision-making in the North Coast Region.

Data gaps exist throughout the North Coast Region (Section 13.3 "Identifying and Addressing Data Gaps"). Although numerous assessment efforts, such as the North Coast Watershed Assessment Program (NCWAP) and individual watershed assessments have been conducted, and the SWRCB, DWR, and NCRWQCB conduct monitoring on several waterways, most of the watersheds, rivers, and streams in the region have not been adequately assessed or monitored using standardized, scientifically accepted protocol. It is a goal of the NCIRWMP to further identify these watersheds, rivers and streams and to prioritize them for future assessment and monitoring programs.

Established monitoring programs with applications to NCIRWMP project and process evaluation are briefly described below (Appendix E includes these plans in its listing of existing planning efforts in the North Coast).

11.1.1 STATE WATER RESOURCES CONTROL BOARD MONITORING PROGRAMS

Surface Water Ambient Monitoring Program (SWAMP)

Trends in surface water quality and habitat, the effectiveness of control strategies, TMDL implementation, and nonpoint source pollution are monitored as part

of the statewide Surface Water Ambient Monitoring Program (SWAMP), which is administered by the SWRCB. The goals of the program include statewide monitoring that is consistent and systematically applied through the development of data quality assurance protocols and centralized data management. The SWAMP database is currently being developed and will be designed to feed the U.S. EPA STORET water quality data management system. Other surface water monitoring programs that are managed as part of the SWAMP program include State Mussel Watch, Toxic Substance Monitoring Program, Toxicity Testing Program, and Coastal Fish Contamination Program.

The nine Regional Water Quality Control Boards implement monitoring activities through contracts with CDFW, U.S. Geologic Survey (USGS) and USEPA. The SWAMP monitoring approach utilized by the NCRWQCB incorporates both long-term trend monitoring at permanent monitoring stations and rotating site-specific monitoring closely related to the TMDL development and implementation schedule (NCRWQCB 2013).

The permanent monitoring stations established by the NCRWQCB includes sites located along the Smith, Klamath, Scott, Shasta, Trinity, Mad, Eel, Gualala and Russian Rivers and Redwood Creek (NCRWQCB 2013). These sites record core metrics that will be used for long-term water quality trend detection; they are sampled at the same frequency and time each year. Selection of these indicators is based on scientific, practical and programmatic objectives and the amount of available funding. The goal is to provide a broad, accurate view of water quality and watershed health in the region. The permanent stations' data will be applicable for trend analysis as well as testing yearly or seasonal differences at station locations, among different reaches in a given watershed, and between watersheds.

Site-specific monitoring in the North Coast Region rotates among the NCRWQCB designated WMA on a planned schedule to support remedial actions, develop TMDLs and collect information towards the potential listing or delisting of waterbodies under the Clean Water Act Section 303(d). Water quality parameters measured in each basin are based on specific watershed characteristics and water quality objectives identified in the individual WMA sections in the NCRWQCB Watershed Planning Chapter (NCRWQCB 2013).

Clean Water Team Citizen Monitoring Program

Through a partnership with many local Resource Conservation Districts, the SWRCB is actively promoting volunteer monitoring among landowners, farmers, ranchers, and community members. The "Clean Water Team Citizen Monitoring Program" is a statewide program developed by the SWRCB Nonpoint Source Pollution Control Program to offer suggestions, guidelines and protocols for volunteer monitoring efforts. This program is increasingly being incorporated into the SWAMP monitoring program to complete site-specific monitoring in the North Coast Region.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) program is a federal program that is currently administered by the SWRCB to regulate wastewater discharge to surface waters, stormwater drains and groundwater. All wastewater discharges in the North Coast Region are regulated through NPDES permitting which requires self-monitoring of relevant water quality data to be submitted to the NCRWQCB for compliance evaluation in accordance to the "Waste Discharge Requirement, General Monitoring and Reporting Program" (SWRCB 1997).

11.1.2 CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

California Salmonid Habitat Restoration Manual

Project evaluation and monitoring is outlined in the California Department of Fish and Wildlife (CDFW) California Salmonid Habitat Restoration Manual to measure whether specific restoration goals have been achieved through project implementation including upslope and road remediation monitoring. Several project proponents intend to use this manual to implement and monitor NCIRWMP salmonid habitat restoration projects.

Restoration Effectiveness Monitoring

In 2003, the CDFW issued a report entitled the "Interim Restoration Effectiveness and Validation Monitoring Protocols, California Coastal Salmonid Restoration Monitoring and Evaluation Program" to provide protocols for monitoring the effectiveness of funded and other fish habitat restoration projects. The report is currently under scientific review and listed protocols are being field-tested. Other CDFW efforts are underway to develop a statistical sampling design for statewide coastal monitoring and a data management support system.

11.1.3 CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION

In 1990 the Board of Forestry established the Monitoring Study Group (MSG) to evaluate the Forest Practice Rules protection of beneficial uses and water quality. Membership of the MSG is made up of representatives from agencies, CALFIRE, the public, and the timber industry. The long-term monitoring program includes hillslope monitoring of Timber Harvest Plan (THP) lands, Forest Practice Rule implementation and effectiveness

monitoring, and the development of scientifically valid monitoring plans for 303(d) listed waterbodies.

11.1.4 CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

California Department of Public Health is the lead agency responsible for developing and implementing the Drinking Water Source Assessment and Protection Program. The purpose of this program is to monitor and assess drinking water sources, at both surface water and groundwater levels.

11.1.5 INTERAGENCY PROGRAMS

Groundwater Ambient Monitoring and Assessment

The Groundwater Ambient Monitoring and Assessment program (GAMA) was developed through interagency cooperation to evaluate and monitor the quality of groundwater resources in California. Participating agencies include USGS, SWRCB, RWQCB, DWR, Department of Health Services, Lawrence Livermore National Laboratory, counties, and local water agencies. The GAMA program goals include the establishment of baseline groundwater conditions, creation of a secure database to archive assessment data, provision of trend analysis for long-term groundwater management and assistance in the development of groundwater objectives at the regional or basin scale.

Natural Resources Project Inventory

Through a partnership of the California Biodiversity Council and the University of California at Davis, Information Center for the Environment, data is collected about restoration efforts occurring statewide. This information is available in a comprehensive electronic database titled the Natural Resources Project Inventory, accessible on the Internet.

Pacific Northwest Aquatic Monitoring Partnership

The stated purpose of the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) is to provide a forum for coordinating state, federal, and Tribal aquatic habitat and salmonid monitoring programs. The intent of the partnership is to improve communication, share resources and data, and use compatible monitoring protocols to increase scientific credibility and provide greater accountability to local stakeholders. PNAMP has developed five working groups; these groups focus on monitoring watershed condition, effectiveness, fish populations, estuaries, and data management.

The PNAMP provides an opportunity for local and regional planners to utilize monitoring protocols and data collection and storage techniques that are compatible with other agencies and that have undergone extensive scientific review specific to Pacific Northwest environmental conditions. The NCRWMG may consider joining the Partnership in addition to participating in SWRCB and DWR monitoring efforts in order to more fully involve the Region in cooperative interstate monitoring efforts and to enable the group to bring the results of the partnerships' efforts to bear in local and regional monitoring planning activities.

11.1.6 OTHER MONITORING PROGRAMS

The California Water Quality Monitoring Council has produced a Preliminary Inventory of Monitoring Programs[213] that may include additional program resources with application to the NCIRWMP. Other monitoring programs, particularly in addition to water quality monitoring, will be documented in the NCIRWMP as they are identified.

11.2 APPROACH TO NCIRWMP MONITORING & EVALUATION

In alignment with the IRWM Guidelines (DWR 2012), the NCIRWMP approach to monitoring, evaluation, and adaptive management/ continual improvements ensures that:

- The NCRP is making progress toward Plan Objectives using measurable indicator metrics (below)
- The NCRP is implementing projects listed in the NCIRWMP
- Each implementation project complies with applicable rules, laws, and permit requirements
- Implementation projects demonstrate a commitment to long-term monitoring and assessment of climate change adaptability in management options

NCIRWMP Plan performance is directly related to implementation project performance. By selecting projects that propose to meet the objectives of the NCIRWMP, the NCRP is striving to meet the goals identified through the NCIRWMP process. To measure how closely the NCRP is meeting those goals, the success of the individual projects in achieving their specific project goals must be evaluated.

For example, consider NCIRWMP Objective 6: "Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes." The progress that the NCRP and NCIRWMP make toward

213 Listing from 2008 available at http://www.mywaterquality.ca.gov/monitoring_council/docs/invntry120308.pdf

this objective can be evaluated by tallying the number of projects that, when implemented, will contribute towards this goal. How well the objective is being met is measured by summing the separate NCIRWMP performance measures. Appendix J Table 43 "Indicators of Benefits and Impacts of Proposition 84 Implementation Projects" describes that 18 of the 21 Proposition 50 projects enhanced fisheries and fish populations. The NCIRWMP has achieved Objective 6 by improving 153 miles of fish passage for fish populations and reducing the amount of sediment input into salmonid bearing streams by stabilizing 442,000 yd3 of potential upslope sediment.

Thus, overall NCIRWMP performance becomes a measure of the cumulative success of the implementation projects portfolio.

The indicator data collected by project proponents as part of project monitoring, and by the NCRP as part of Plan update/evaluation/adaptive management is used to systematically and objectively evaluate success. The indicator data types are a subset of, and fully compatible with, the measures used to conduct the formal project impact/benefits analysis (Section 10 and Appendix J "Project Impact & Benefit Analysis"). In addition to ecological and social indicators presented in Appendix J, the NCRP has developed a suite of economic indicators (Section 12 "Long-Term Implementation and Financing"), including the valuation in dollars of natural capital and working landscapes. Data are monitored via protocols established by and compatible with existing statewide systems, as presented in Appendix G ("Monitoring Protocols for NCIRWMP Evaluation").

11.3 INDICATOR METRICS FOR PERFORMANCE EVALUATION

Both the NCIRWMP and its projects are evaluated by monitoring a suite of measurable [qualitative or quantitative] indicator data metrics that are directly associated with each objective, and comparing the results to baseline, benchmark, or desired conditions. A listing of indicators recommended for the NCIRWMP and projects is presented below. The preliminary framework for using indicator data to calculate project and Plan performance is presented in Appendix F Table 10 ("Indicators to Evaluate NCIRWM Plan and Project Performance").

11.3.1 PLAN-LEVEL PERFORMANCE EVALUATION

The evaluation of the Plan as a whole is based on measurable achievement of projects toward their goals, which are required to align with the NCIRWMP objectives. The NCRP engages the NCIRWMP in an update and refinement process, including performance evaluation, according to the schedule and steps described in Section 2.7 "Public Input and Plan Updates." The level of project success bears directly on determination of NCIRWMP performance. If all projects meet their stated goals (e.g. as evidenced by results of indicator monitoring) then NCIRWMP Plan performance can be considered "excellent." However, if only a percentage of goals are met, then NCIRWMP Plan performance may be less than excellent and requires intervention. The NCRP proposes the use of the following standard Plan performance benchmarks to define "performance" level:

- If 92–100 percent of project goals are met = **EXCELLENT**
- If 85–92 percent of project goals are met = **GOOD**
- If 75–84 percent of project goals are met is = **FAIR**
- If 74 percent or fewer of project goals are met = **POOR**

Should the NCIRWMP earn a Plan Performance rating of less than 85% project-level goals met, project selection criteria will be re-evaluated to ensure that projects are of sufficient technical capacity to meet their stated goals.[214] Plan Performance is closely related to project-level performance, which is detailed below.

11.3.2 PROJECT-LEVEL PERFORMANCE EVALUATION

The evaluation of the individual prioritized projects that implement the NCIRWMP is based on progress toward stated goals of each project application (e.g. those listed in Project Summaries, Appendix I.3) and each project's monitoring plan (project-specific, including by whom, by what methods, and when). Project proponents have primary responsibility for development of project-specific monitoring plans. Project-specific monitoring plans will conform to SWAMP and other state requirements mentioned below. They will include, but not be limited to, the following elements from the 2012 DWR IRWM Guidelines:

- Clear, concise description of what is being monitored for each project
- Measures to remedy or react to problems encountered during monitoring
- Location of monitoring
- Monitoring frequency
- Monitoring protocols/ methodologies, including who will perform the monitoring

214 Indicators for NCIRWMP objectives 1 and 2 (Goal 1 "Intra-regional Cooperation and Adaptive Management") are related to determining the success of Plan processes, and thus are not measured at the project level as are those in Section 11.3.2.

- DMS or procedures to track monitoring data
- Procedures to ensure the monitoring schedule is maintained and that adequate resources are available to maintain monitoring through scheduled lifetime.

The eight NCIRWMP project-level priorities and examples of specific indicators of success toward these priorities are outlined below. The project priorities have been organized around the following: drinking water improvement, economic benefits, energy independence, groundwater protection, public safety[215], salmonid habitat improvement, watershed/habitat improvement, and water quality improvement. The specific indicator data types and metrics vary for projects, as applicable.

Drinking Water Improvement

1. Stream flow measurements
2. Amount of water supplied by alternatives such as offstream storage or recycled tailwater or wastewater
3. Reduction in system water losses
4. Number of new or improved drinking water connections
5. Percent of time that drinking water meets or exceeds federal and state drinking water quality requirements

Economic Benefits

- Number of jobs created/ maintained through project implementation in working landscapes and natural areas
- Economic analysis of benefits provided by project implementation in working landscapes and natural areas (e.g. $80 per acre-foot per year for increased instream flow for environmental purposes; Brown 2007)

Energy Independence

- Amount of energy generated using green technology
- Amount of energy saved through water/energy use efficiencies
- Percentage reduction in GHG emissions
- Number of jobs created/maintained through project implementation

Groundwater Protection

1. Percent reduction of percolation from oxidation ponds to groundwater
2. Analyze samples drawn from monitoring wells for groundwater contamination

Public Safety

1. Percent reduction in flood events given historic rainfall patterns
2. Percent reduction in severity/duration of flood events given historic rainfall patterns
3. Amount of fire-fighting water supply newly available
4. Number of new fire hydrants

Salmonid Habitat Improvement

1. Number of river miles made accessible for potential rearing habitat
2. Habitat inventory (i.e. instream features such as pools, riffles etc., large woody debris, substrate)
    a. Thalweg surveys to determine pool depth and frequency and channel degradation
    b. Cross-sectional surveys to determine thalweg degradation and bank stability
    c. D50 surveys to determine coarsening of spawning gravels
3. Percent canopy closure
4. Spawning surveys, snorkel surveys

215 Per NCIRWMP goals and objectives, the "public safety" priority of the NCIRWMP projects is focused on (1) reducing risk of flooding and, to the extent applicable, wildfire and (2) improving drinking water access and quality. Other aspects of public safety (e.g. emergency planning and response) are beyond the scope of the NCIRWMP.

5. Percent reduction in fisheries closures

Watershed/Habitat Improvement

1. Percent survival of seedlings planted
2. Number of acres of revegetation
3. Number of acres of invasive species removed
4. Number of acres of permanent seasonal wetland
5. Number of linear feet of streambank stabilized
6. Amount of sediment prevented from entering surface water

Water Quality Improvement

1. Percent reduction in sanitary sewer overflows
2. Percentage of volume of wastewater discharge that meets state water quality standards
3. Water quality monitoring: DO, temperature, contaminants, etc.
4. Post-treatment erosion cavity measurements[216]
5. Percent reduction in beach closures due to pathogen contamination
6. Number of Low Impact Development techniques/ practices implemented

11.4 INSTITUTIONAL-LEVEL PERFORMANCE EVALUATION

Evaluation of institutional-level performance occurs on an ongoing basis and is based on the efficacy of the NCRP members in conducting the processes it utilizes to involve stakeholders and achieve process transparency, inclusion, local autonomy, jurisdictional authority, adaptive management, and integration. Indicators for the two objectives[217] of Goal 1 "Intraregional Cooperation and Adaptive Management" are related to determining success of the NCRP, and include provision of ample outreach and input, and judicious selection of implementation projects that propose to meet NCIRWMP goals[218].

11.5 ADAPTIVE MANAGEMENT PROCESSES

Per IRWM Guidelines "IRWM Plans must contain provisions for reviewing project objectives and considering new, expanded, or even different solutions that meet multiple local needs" (DWR 2012). The NCIRWMP is established upon and refined via adaptive management principles that apply to the Plan, its projects, and its institutional processes (Section 1.4.5 "Adaptive Management"). Lessons learned from project-specific monitoring efforts are used to improve the NCRP's ability to prioritize future implementation projects. In accordance with the NCRP's commitment to continual improvement and refinement, the assessments of indicator data allow determinations of project, Plan, and NCRP performance that improves over time; warrants improvement; and/ or demonstrates ongoing effective performance.

216 Per CDFW 1998 Part X: Upslope Assessment and Restoration Practices

217 NCIRWMP Objective 1: Respect local autonomy and local knowledge in Plan and project development and implementation; Objective 2: Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation. See indicators in Appendix F "Indicators of NCIRM Plan and Project Performance."

218 The process whereby the NCRP solicits, evaluates, and selects projects to implement the NCIRWMP is detailed in Section 7.

SECTION 12.0 LONG-TERM FINANCING & IMPLEMENTATION

As required by California Water Code Section §10541(e) (8), this section describes the NCIRWMP's strategy for implementing and financing the NCRP-recommended suite of projects and programs. The section begins with a discussion of the context and challenges facing plan participants. Section 12 outlines the documented funding needs in the Region; the NCRP financing accomplishments to date (including matching local funds); local funding mechanisms and how these can be used to manage costs; and documents known funding sources; highlights unique funding innovations that have been developed in the North Coast; and articulates the NCRP process for managing alternative project financing options. Appendix K "Financing History and Future Financing") presents associated data tables, constituting the Financing Plan for the latest suite[219] of implementation projects.

12.1 CHALLENGES TO FINANCING IN THE NORTH COAST REGION

Relatively small communities and spectacular natural resources characterize the North Coast Region. However, an uncounted number of potentially beneficial projects have been stalled because of the hurdles created by the need for affirmative votes to implement them. As the Public Policy Institute of California (PPIC) recently described, Article XIII of the State's Constitution (put in place by Proposition 13 in 1979 and Proposition 218 in 1996) can "stymie local agencies' ability to pursue the modern water management techniques needed to maintain reliable... service." Rigid constitutional requirements that rates and fees must be specifically linked to services for each property jeopardize the implementation of innovative programs and the provision of basic services.

Despite these universal challenges, the integrated planning process has been successful in the North Coast Region. Appendix K Table 47 ("Summary of NCIRWMP Use of Funds") illustrates that, to date, the State's investment has been approximately $35.5 million and the North Coast Region has used this as leverage to complete nearly $100 million of watershed improvements. This has more than doubled the State's investment and created a framework and processes for implementing additional successful integrated projects.

An assessment conducted by the U.S. Environmental Protection Agency in 2011 found California could use $44.5 billion to fix aging drinking-water systems over the next two decades (U.S. Environmental Protection Agency 2013). ASCE's 2012 "Infrastructure Report Card for America" gave the state a "C" and assigned the following investment needs for water infrastructure:

- Levees/Flood Control: $2.8 billion per year
- Urban Runoff: $6.7 billion per year
- Wastewater: $4.5 billion per year
- Water: $4.6 billion per year

More recently, the PPIC's 2014 work focuses on the same type of investments that are included in the NCIRWMP and reports funding gaps of $2 to $3 billion dollars annually including:

- $30 million to $160 million to provide safe drinking water in small, disadvantaged, rural communities
- $800 million to $1 billion for floods
- $500 million to $800 million for stormwater management
- $400 million to $700 million for ecosystem support for endangered species
- $200 million to $300 million for integrated water management.

The North Coast Region maintains an active, continuously open funding application process on its website. As a result of this effort, the NCRP is aware of nearly $750 million ($0.75 billion) of funding needs in the Region. This need includes over $515 million for infrastructure projects, many for disadvantaged and Tribal communities, and over $220 million for restoration and ecosystem support efforts for endangered species, especially salmonids.

12.2 PROCESS FOR CONSIDERATION OF FUNDING SOURCES

DWR's IRWM Guidelines (2012) require that each Region have a governance process for funding consideration and adoption. The North Coast Region has a proven, multi-step project application, review and selection process, which was updated and formalized in 2012[220]. The Guidelines are meant to promote the integration of projects region-wide, while allowing the flexibility

219 While the IRWM Guidelines have not historically required a formal discussion of financing and implementation, the North Coast's proven track record with successful project outcomes demonstrates that its structure is robust, accountable, effective, and that it facilitates innovate financing activities focused on disadvantaged communities (DACs) and ecosystem services.

220 NCRP-approved NCIRWMP Project Review and Selection Guidelines at http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf

to address local priorities and specific funding source requirements. The NCRP has used the standardized scoring and selection process to bring funding into the Region; funding which is matched with local resources to accomplish local projects. Appendix K Table 48 ("Summary of Funding and Financing to Date") presents a summary of the NCIRWMP funding activity to date, listing project proponents, state funding source, value of the local match, and sources of Operation and Maintenance (O&M) costs.

12.3 FUNDING & CERTAINTY OF OPERATIONS & MAINTENANCE

Operations and maintenance (O&M) funding for NCIRWMP projects will come from various sources including ratepayers, landowners, operating funds and future grants (Appendix K Table 48 "Summary of Funding and Financing to Date"). Many of the municipalities and agencies that provide water or wastewater services will fund implementation projects through utility rates and/or operating funds. Nonprofit agencies implementing NCIRWMP projects will fund O&M through landowner agreements for project maintenance, operating funds, and by obtaining future grants (in which O&M costs may be funded) and private donations (e.g., California Land Stewardship Institute, Mattole Restoration Council, Gualala River Watershed Council). Landowner agreements are obtained prior to implementing projects on private lands; landowners commit to maintaining projects for a specified time period — usually 10–20 years — in exchange for having the project implemented on their land. Resource Conservation Districts and other natural resource agencies are expected to fund O&M from operating funds and, where appropriate, through landowner agreements. Tribes will fund O&M through Tribal operating funds.

O&M funding source certainty is considered high for most projects included in the NCIRWMP. Nonprofit organizations, RCDs, Tribes, and natural resource entities that participate in the NCIRWMP have a proven track record of obtaining funding, implementing projects, and maintaining completed projects, which increases confidence that O&M funding for NCIRWMP projects will be ongoing. Likewise, the large municipalities and water supply and wastewater treatment agencies have the customer base and rate structure to be confident of long-term O&M funding for implementation projects. The least certain sources of O&M funding for the NCIRWMP are the smaller water supply and waste water treatment providers located in economically disadvantaged communities (DACs). Because O&M costs are shared across a smaller number of customers, rate increases are often not feasible in DACs leaving small utilities financially burdened and unable to commit scarce operating funds to O&M for a completed project. In recognition of this and other issues faced by these entities, the NCRP has initiated the NCIRWMP Water & Wastewater Service Provider Outreach & Support Program, which will enhance opportunities for funding O&M on NCIRWMP implementation projects. Appendix K Table 48 ("Summary of Funding and Financing to Date") provides expected sources of O&M funding and assesses certainty on a case-by-case basis.

12.4 FINANCIAL INNOVATIONS IN THE NORTH COAST REGION

The North Coast Region has pioneered several innovative programs, beyond what is required by the DWR IRWM Guidelines. These further demonstrate the commitment the Region has to using the principles of integrated management to provide a broad range of benefits to its communities. The programs described below have resulted in measurable benefits for the Region and, more importantly, have helped inform the manner in which the Region identifies funding opportunities, prioritizes is projects and works to deliver long-lasting outcomes that can be translated outside of its borders.

12.4.1 CAPACITY BUILDING FOR DACs

The NCRP received a DWR grant to improve the capacity and quality of service of small water supply and wastewater service providers through coordination, technical assistance, trainings, integrated planning, funding opportunity identification, and education. In 2013, Humboldt County staff, acting on behalf of the NCRP, circulated a survey to over 300 entities representing all public water and wastewater systems serving communities in the North Coast Region. The entities surveyed included Tribal systems, cities, special districts, and mutual water companies, many of which provide critical services in small rural communities. The survey was intended to determine technical, managerial, and financial needs and project priorities and it highlighted the following expressed needs:

- Assistance with securing funding and navigating the process of replacing or upgrading aging infrastructure;
- Assistance with general water and wastewater system infrastructure operations, maintenance and repair;
- Support to comply with state standards (especially drinking water standards);
- Assistance with identifying funding opportunities and preparing grant applications; and

- Support to develop and maintain maps of water and wastewater systems.

In response to these needs, the NCRP is working with the Rural Community Assistance Corporation (RCAC), Cal Rural Water, and a team of engineering consultants to develop a suite of trainings and tools that build capacity for providers in disadvantaged communities and that can be replicated statewide. The work follows a "utility management cycle" that has been developed by the North Coast Region and includes information that supports the development of capital projects, the management of systems, training for providers and sound financial management.

On the capital project side, the effort includes the development of a "Small Community Toolkit" to assist water and wastewater purveyors in the initial scoping and development of solutions to their infrastructure needs. The elements of the Toolkit are presented in Appendix K Table 49 ("Small Community Toolkit Elements").

For operations support, the targeted grant effort is working to leverage the established "Technical Managerial and Financial" (TMF) template developed by RCAC. This on-line template allows purveyors to prepare the 13 elements required for funding from the California Department of Public Health and is an important resource for "self-help" in disadvantaged communities. Training is being provided through a series of workshops that introduce participants to the Small Community Toolkit, the TMF Template, and funding and financing opportunities. Many of the workshop locations also afford participants with the opportunity upload their Preliminary Project Information onto the North Coast's website, which helps them take advantage of future funding opportunities and ensures that the NCRP's understanding of regional funding needs remains current and valid.

Because the survey results revealed significant needs around funding, the NCRP convened a "Small Community Assistance Workshop" in Sacramento in February 28, 2014. The workshop included representatives from DWR, the California Department of Public Health, the State Water Resources Control Board, the U.S. Department of Agriculture's Rural Utility Service, California's Infrastructure Bank, the Indian Health Service and the Rural Community Assistance Corporation. These state, federal and non-profit organizations work together to organize the California Funding Fair and provided valuable insight on the needs survey results, the tools being developed by the NCRP and the funding and financing vehicles available for small communities. Their input has informed the funding opportunities considered in this Plan. Workshop participants also identified barriers to assisting disadvantaged communities and Tribes with limited resources, including:

- Disadvantaged and Tribal systems don't have drought plans
- Disadvantaged and Tribal systems don't have emergency plans
- Disadvantaged communities need a way to fund storage Indian Health Service emergency funding can only be accessed when supply is reduced to 15-25 gpd
- Disadvantaged communities need technical assistance with financials and rate studies because rates must be at 1.5% to 2% of MHI before grants
- Disadvantaged communities need technical assistance with hiring consultants
- USDA requires a Vulnerability Assessment and Emergency Response Plan to fund a project
- CDPH planning funding requires four Technical, Managerial, and Financial (TMF) elements
- CDPH construction funding requires full TMF
- Decentralized systems are difficult to manage without a governance overlay for O&M
- Board members for small districts need training
- Solar projects can reduce long-term costs but payback benefits aren't universally understood It is very difficult to assist non-federally recognized tribes
- Mobile home park systems are often private, for-profits making them very difficult to assist
- Forming legal entities that can receive assistance is difficult, time consuming and expensive It is hard to access pre-planning funding for early application work

While the Small Community Toolkit, TMF template and workshops help address some of these barriers, the list is an important reminder of how financing plans need to be structured to support disadvantaged communities. As a result of this workshop, the NCRP is exploring the opportunity of developing a revolving loan fund through the NCIRWMP to fund early planning/organizational efforts that will allow future grant proposals from disadvantaged communities to be more competitive.

In order to test the usefulness of its tools, the NCRP's targeted grant also includes 10 demonstration projects where the tools will be applied to help agencies move forward in the application process. These projects, which will each receive approximately $15,000 of assistance each, are outlined in Appendix K Table 50 ("Economically Disadvantaged Community Demonstration Projects"). This assistance is additive to the IRWM funding outlined in Appendix Table 47 ("Summary of NCIRWMP Use of Funds") and Table 48 ("Summary of Funding and Financing to Date").

12.4.2 ENERGY/WATER USE EFFICIENCY

The NCRP has successfully expanded the types of assistance it provides to include energy efficiency and greenhouse gas reduction efforts, which is consistent with the goals for the Region. In 2009/10, the NCRP managed an energy efficiency block grant program that provided nearly $1 million in funding and assisted 11 agencies in accomplishing a variety of upgrades and conversions. Appendix K Table 51 ("Energy Efficiency Block Grant Program") presents the impact of this effort, which is additive to other funding documented above.

The results of the Energy Efficiency Block Grant Program highlight a concept that became evident in the DAC Targeted Grant Program; saving energy pays for itself and that helps the Region. Several of the DAC Demonstration Projects will facilitate the conversion of local utilities to renewable solar power, which USDA and the Indian Health Service have both concluded reduces the operations and maintenance costs for utility systems. Because of these experiences, the funding opportunities considered in this plan include programs that fund energy conservation and conversion to renewable power. While this is not required by DWR's IRWM Guidelines, the NCRP has learned that funding these improvements reduces uncertainty around future costs and upward pressure on utility rates, while reducing greenhouse gas emissions.

12.5 FUNDING OPPORTUNITIES CONSIDERED FOR THE NCIRWMP

Because of the North Coast Region's strong history in matching IRWM funds, the NCRP brings an understanding of available funding mechanisms, including several local funding structures that have supported project implementation, operations and maintenance. In accordance with the IRWM Guidelines, this section documents various funding opportunities outside the IRWM process. The NCRP understands that projects can be more easily matched to funding sources when applicants understand the mandate of the funding agency. Through its work on the DAC Targeted Grant Program, the NCRP has coordinated with a number of funding agents representing state, federal, Tribal and private organizations. Appendix K Table 53 ("Summary of Funding Agencies, Mandates, and Eligibility") summarizes the mandate of each of these agencies and eligible applicants, illustrating how funding agency resources can be matched to project needs.

12.5.1 FEDERAL FUNDING OPPORTUNITIES

The NCRP has identified federal agencies that provide funding assistance for the types of projects included in the NCIRWMP. These are outlined below.

- ***The Army Corps of Engineers*** can provide flood control assistance and will soon be able to provide water supply assistance under the auspices of the developing Water Resources Development Act (WRDA). The flood control programs are well established but require congressional budget authorizations in order to fund projects. Because of this, Corps programs can be less than certain and are most applicable to larger agencies and projects, where there are resources available to manage the federal process. The WRDA program is new but provides a promising venue for large water supply and water recycling programs. Like the flood control programs, WRDA is subject to congressional budget approval, reducing certainty and making it more appropriate for large agencies and projects.
- ***The Bureau of Reclamation*** provides a number of grant opportunities including the WaterSMART Water and Energy Efficiency Grants, the WaterSMART Pilot and Demonstration Project Grants, WaterSMART Grants for Climate Analysis Tools, WaterSMART System Optimization Grants, the WaterSMART Cooperative Water Management Program and Water Recycling Grants. Like the Corps programs, the Bureau's programs have a stable history, generally through the authorization provided by Tile XVI, but certainty varies with congressional budgeting cycles.

- ***The Department of Agriculture (USDA)*** has several funding programs for rural and agricultural areas. The Rural Utility Service provides water and wastewater grants and loans that fund the planning, design and construction of water and waste disposal systems in rural areas and towns with a population not in excess of 10,000. The funds are available to public bodies, non-profit corporations and Tribes. The program funds renewable energy installations for water and wastewater utilities. The program is well developed and receives regular budget allocations, making funding available on an annual basis. Funding is indexed to median household income, with grants of up to 45% of project costs reserved for the communities most in need. Loans are typically secured by rates or assessments. RUS also has a national "Search Grant" Program that can provide up to $25,000 in grant assistance for the development of application materials. This program is highly competitive. USDA Natural Resource Conservation Service (NRCS) also offers individual landowners assistance with its Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP), which are funded annually through the Farm Bill and implemented locally by Resource Conservation Districts. Other programs include easement programs to conserve working agricultural lands, wetlands, grasslands and forestlands and Conservation Innovation Grants, which are meant to stimulate the development and adoption of innovative conservation approaches and technologies.
- ***The Environmental Protection Agency (EPA)*** has multiple grant programs to improve environmental quality, remove contaminants, empower communities, disseminate information, and provide funding for state administered drinking water, wastewater, pollution prevention, and wetlands protection grants. Many of these grant programs are well established and funded on an annual cycle.
- ***The Federal Emergency Management Agency (FEMA)*** provides state and local governments with preparedness program funding in the form of Non-Disaster Grants to enhance capacity to respond to emergencies. It also provides hazard mitigation assistance to implement long-term hazard mitigation measures following a major disaster, and flood mitigation assistance to reduce or eliminate flood damage. These FEMA programs are well developed with regular budget allocations, with funding available on an annual basis.
- ***The US Fish and Wildlife Service (FWS)*** provides funding for habitat conservation and restoration through the North American Wetlands Conservation Act. It supports projects throughout North America that involve long-term protection, restoration and/or enhancement of wetlands and their associated uplands habitats. The Act was passed to support activities under the North American Waterfowl Management Plan and included funding mechanisms. The most recent reauthorization expired in 2012 and grant program appropriation has decreased, but additional program funding from fines, penalties, and other fees provided over $31 million in grant funds.
- ***Indian Health Service (IHS)*** can provide grants for water resources and watershed improvements to Tribal communities. IHS can also assist when Tribal households have on-site costs, such as assessments or the cost of water and sewer laterals, as part of a larger community project. IHS funding is stable and proven and can provide a source of matching funds for projects that benefit Tribal communities. This funding source can fund renewable energy projects.
- ***National Oceanic and Atmospheric Administration (NOAA)*** provides grants for coastal communities to become more resilient to threats posed by coastal hazards such as storms, sea level rise, and climate change. It also provides funding for coastal and marine habitat restoration projects in support of listed species recovery. Funding has been steady for the past decade as NOAA has made an effort to use a habitat-based approach to promote species recovery and increase sustainable fisheries.

12.5.2 STATE FUNDING OPPORTUNITIES

The NCRP has identified a number of state funding agents that can assist with a wide variety of natural resources and economic development projects. State funding is generally stable and secure, but it is dependent on the political process and is subject to national and international economic fluctuations. State funding opportunities are outlined below.

- ***The Air Resources Board (ARB)*** has hundreds of millions of dollars in grants available over the next several years to reduce emissions from on- and off-road vehicles and equipment. Typically, vehicle and equipment owners apply for funds. Other programs provide incentives for emissions reduction, demonstration projects, and clean air initiatives. The ARB also provides emission credit programs. Future programs relevant to the NCRP may derive from the sale of AB 32 cap and trade auction revenues.
- ***California Pollution Control Financing Authority*** provides low-cost innovative financing to

California businesses for qualified waste and recycling projects. Some pollution control projects qualify for tax-exempt financing. CPCFA assists small businesses with loans up to $2.5 million. Recent assistance has included the purchase of clean air vehicles and conversion of animal waste to clean burning fuel.

- ***California Coastal Commission*** provides grant funds for public access and coastal maintenance and restoration projects with a public education component. It also supports local government planning for sea-level rise, climate change and development of current Local Coast Programs consistent with the California Coastal Act.
- ***California Energy Commission*** is administering four energy conservation, clean energy, and planning programs funded through American Recovery and Reinvestment Act stimulus funding. It also provides efficiency services and an energy efficiency financing program. Low interest loans for energy in agriculture and energy efficiency are offered on a "no time-limit" basis. The CEC also offers rebates for solar installation and energy upgrades.
- ***California Coastal Conservancy*** awards grants to public agencies and nonprofit organizations for projects that enhance public access, habitat protection and restoration in the coastal zone or affecting coastal areas, restoration of coastal urban waterfronts, protection of coastal agricultural land, and resolution of land use conflicts. Project stages generally funded by the Conservancy include pre-project feasibility studies, acquisition, planning, design, environmental review, construction and monitoring. Most projects are developed over time in coordination with Conservancy staff. A current opportunity is climate ready grants, which help to advance planning and implementation of climate change amelioration efforts for local governments.
- ***The Department of Food and Agriculture*** disperses federal USDA funds for the Specialty Crop Block Grant. Specialty crops are fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops. A program objective is the expansion of stewardship practices, natural resource conservation, and the development of ecosystem services to improve environmental and financial performance of specialty crop growers. Funding is contingent upon passage of a Farm Bill yearly and available funding from the USDA Agricultural Marketing Service and ranges from $50,000 to $400,000 per project.
- ***The Department of Parks and Recreation*** offers grants for habitat conservation and land and water conservation. The Habitat Conservation Fund Program provides funding for acquisition, habitat enhancement, and increasing urban visitor use. The Land and Water Conservation Fund is administered by DPR for the National Park Service. The NPS has been required to manage the fund by law since 1964 when it was signed by President Johnson. Land acquired in this way must be placed under federal protection to preserve outdoor recreational use of the site in perpetuity.
- ***The Department of Public Health*** Safe Drinking Fund provides funding and financing for water system improvements necessary to comply with the Safe Drinking Water Act. The funding source is stable and proven and accepts continuous applications for funding. The program can provide funding up to $30 million per applicant with provisions for grants for disadvantaged communities. Loans are typically secured by rates. The Safe Drinking Water Fund prioritizes projects by public health need and is most successfully used by communities with difficulties complying with primary and secondary drinking water standards.
- ***The California Department of Fish and Wildlife*** awards grant funds for projects that sustain, restore, and enhance California's fish, wildlife, plants, and habitats. The Fisheries Restoration Grant Program has been ongoing since 1981 and has invested millions of dollars to support projects from sediment reduction to watershed education. Natural Community Conservation Planning (NCCP) includes grants for developing NCCPs and Habitat Conservation Plans (HCPs) and provides funds for tasks associated with implementation of approved NCCPs. DFW is also the state sponsor of federal ESA grants that support conservation planning and habitat purchases.
- ***The Department of Water Resources*** provides a range of matching grant programs, generally capitalized by bond sales. While DWR's history as a funding agent is well proven, the availability of any particular source of funding is dependent on bond sales. The IRWM funding administered through the NCRP comes through DWR as a result of bond laws passed with Propositions 50, 84 and 1E. Because of this dependence on bond sales, DWR's programs are less certain than the firmly capitalized revolving funds administered by CDPH and SWRCB. In its work with the DAC Targeted Grant Program, the NCRP has identified the following current DWR programs that could be utilized to provide financial assistance for projects throughout the Region:
  - » Safe Drinking Water Contaminant Removal Proposition 50: provides grants of up to $5

million for pilot and demonstration projects and disinfection improvements for drinking water;

  - » Local Groundwater Assistance: currently expended but the program can provide grants of up to $250,000 for local groundwater development;
  - » California Safe Drinking Water Bond Law Proposition 81: Provides very limited grants and loans to disadvantaged communities in partnership with CDPH and been effectively used for leak detection, metering and to "make up the difference" around a Drinking Water SRF project.

- ***Housing and Community Development*** block grants from the federal government, through the state to the counties, vary widely in their use for water and wastewater infrastructure. While the funding source is stable and has a long history, its primary focus is the development of affordable housing and counties will often limit the amount of block grant funds that are expended on infrastructure. Community Development Block Grants can be a good source of grant funding for on-site costs (assessments, construction of laterals) for low-income households as part of a larger community project.
- ***I-Bank*** provides loans of up to $20 million for local public projects that meet tax-exempt financing criteria, promote economic development and attract long-term employment opportunities. Loans are typically secured by rates or assessments. I-Bank's funding approval process is relatively rapid and it can be an effective source of funding for communities with strict, short compliance deadlines.
- ***State Water Resources Control Board*** provides loan and grant funding for construction of sewage and water recycling facilities, underground storage tank remediation, watershed protection, and NPS pollution control projects.
- ***The State Revolving Fund (SRF) Program*** provides loans of up to $50 million for water quality improvement projects, including wastewater, stormwater and recycled water. The Water Recycling Program provides $75,000 grants for recycled water feasibility studies. The SRF's "Expanded Use Program" can provide for more flexible "principal forgiveness" options for disadvantaged communities. This program is proven and certain with a 20-year history of assisting communities. SRF loans are typically secured by rates or assessments. The Agricultural Drainage Loan Program addresses treatment, storage, conveyance or disposal of agricultural drainage that threatens water quality. SWRCB also offers several ongoing grant programs, including the Clean Beaches Initiative, Clean Water Act NPS projects, Small Community Wastewater, and the Stormwater Program; these programs are proven and stable.
- ***The Wildlife Conservation Board*** administers a capital outlay program for wildlife conservation and outdoor recreation. The WCB selects, authorizes, and allocates funds for acquisition of land suitable for recreation and the preservation, protection, and restoration of wildlife habitat. Programs are grouped by type: riparian, forest, inland wetlands, agricultural lands, rangeland, oaks, habitat enhancement, acquisition, tax credit, public access, and monitoring.

2014 Interim Drought Funding

The NCRP acknowledges that through Senate Bill 104 and other vehicles, a significant amount of drought funding has been made available by the State. In general, this designated funding is moving through established programs, including the IRWM Program, on an expedited schedule. The NCRP will work with DWR to assemble a suite of recommendations for IRWM Drought Funding. However, because this source of revenue is highly targeted and prioritized for drought emergencies, the NCRP does not view it as a long-lived, certain, and reliable source of funding for infrastructure or ecosystem restoration activities. As a result, this section is devoted to more established programs that can support implementation of the Region's priorities well into the future.

12.5.3 PRIVATE FUNDING OPPORTUNTIES

The NCRP has identified private funding agents that can assist with projects. These include:

- ***The California Special District Association*** provides a "pool" program that allows smaller agencies, which are members of CSDA, to access capital markets more effectively through a joint bond sale. Bond proceeds can fund the construction of projects and bonds payments are typically made from rates or assessments. This program is stable and can provide a relatively certain source of loan funding.
- ***The National Fish & Wildlife Foundation*** supports more than 70 grant programs to protect and restore wildlife and habitat, including Acres for America, a well-known partnership with Walmart Corporation. Priorities for this program include providing access, conserving critical plant and wildlife habitat, connecting existing protected lands, and ensuring the future of rural economies. The Bring Back the Natives/More Fish program funds

activities that protect and enhance sensitive and listed fish species. In 2012, NFWF partnered with Wells Fargo to launch the Environmental Solutions for Communities initiative, which is designed to support projects that link economic development, community well being, stewardship, and health of the environment. This five-year initiative is expected to provide a total impact of over $37.5 million. NFWF funding is stable and secure with a proven track record; several NCIRWMP project proponents have successfully obtained NFWF grants.

- ***Pacific Gas & Electric*** provides rebates for projects that generate renewable energy. While rebate funds typically cannot be used as security for loans or other types of debt, the rebates can reduce the overall cash demand for a renewable energy project and reduce payback time. Rebate programs are variable and rebate amounts have generally been reducing over time, however rebates can enhance the economics of an otherwise cost-effective renewable energy program.
- ***Rural Community Assistance Corporation (RCAC)*** provides loans much like the CSDA program, which can be used for infrastructure improvements and paid back with rates or assessments. This program is proven and certain. In addition, RCAC writes annual grants to community foundations, which may support specific activities, particularly those targeted at disadvantaged communities. Examples include the Humboldt Area Foundation, which focuses on Humboldt County and the California Endowment, which supports drinking water for public schools. RCAC also writes grants to large banks, which must invest in infrastructure to support low-income housing through the various community reinvestment acts. While this targeted grant-writing activity is not as certain as the capitalized revolving funds, it can provide valuable assistance in certain situations.
- ***Various Community and private family foundations*** may have an interest in funding research, planning or particular project implementation in the North Coast.

12.5.4 LOCAL FUNDING MECHANISMS

Because grants will rarely cover 100% of any projects cost and because many of the identified funding agencies provide loans, the NCRP has identified common local funding mechanisms that can secure loans and support operations and maintenance. Appendix K Table 52 ("Common Local Agency Funding Mechanisms") illustrates the how local rates, assessments, and taxes can be utilized to secure debt to implement projects.

As also highlighted by PPIC's findings, four of the commonly employed local funding mechanisms require affirmative votes to implement, which can be a barrier to project implementation and long term operational funding. When local rates, assessments or taxes have been put in place, they provide a certain and long-lived mechanism for funding capital, operational and maintenance costs. However strong community outreach and understanding are often required to establish or increase these various local funding mechanisms.

The Region's water and wastewater utilities generally employ rate revenue to fund operations and maintenance, capital improvements and to match grants. Within the Region, several other local funding mechanisms support water supply, water quality and restoration activities. For example:

- The Sonoma County Agricultural Preservation and Open Space District is funded by a ¼ cent sales tax
- The Sonoma County Water Agency's Flood Control Zones receive revenue from benefit assessments
- The City of Santa Rosa's Stormwater Utility is funded by a local property-based fee

12.6 NCIRWMP FINANCING PLAN (5-10 YEAR)

Per the IRWM Guidelines, this subsection is intended to demonstrate that the North Coast's Policy Review Panel (PRP) has considered long-term, sustainable financing of the Plan and its most recent recommended suite of projects and documented that understanding for all stakeholders. As shown above (Appendix K Table 47 "Summary of NCIRWMP Use of Funds), most of the cost of developing, maintaining, and implementing the NCIRWMP is borne by local North Coast entities with State grant funding providing a necessary, but only partial, supplement in funds.

12.7 ALTERNATIVE PROJECT FINANCING

The NCRP has experienced situations where an approved project was not able to fully expend its grant allotment. In an effort to keep unexpended dollars in the Region, the PRP in 2012 formalized the process for reallocation the funding of alternative projects.

The 2012 alternative process is described below.

- The project funding reallocation first prioritized the County in which the original project was located and was made available to other project(s) that were within the defined suite of projects in the grant agreement

- PRP members from the County and Tribal Region where the original project was located determined which projects would receive reallocation and the amount of funding
- If the County of origin option was not available (i.e., no projects from the County of origin within the project suite need additional funding):
  - » Staff announced the availability of funds to project proponents within the grant agreement suite of projects
  - » Staff solicited project requests and descriptions of need from eligible project proponents
  - » Staff determined potentially eligible projects and referred these to a Technical Peer Review Committee (TPRC) ad-hoc committee
  - » The ad-hoc committee developed criteria for project reallocation and project reallocation option recommendations
  - » The TPRC reviewed ad-hoc committee option recommendations
  - » The PRP reviewed and approved recommendations.

For future grant application cycles, the TPRC and PRP review process will identify projects and alternative projects to receive priority should additional funding become available. When the reallocation process occurs, priority will be given to projects within the County where the originally funded project(s) are located.

SECTION 13.0 DATA MANAGEMENT & INFORMATION SHARING

The Data Management Plan for the North Coast Region is being developed as part of a process intended to result in more efficient, effective, standardized data acquisition, input, analysis, and dissemination throughout the Region.[221] The over-arching goal for the North Coast IRWM Data Management Plan is a streamlined and easy to use framework that is fully compatible with ongoing and newly-emerging state systems that will objectively assess and improve, through an adaptive management process, the performance of the North Coast IRWM Plan, its implementation projects, and other regional water management activities.

13.1 OVERVIEW OF THE NORTH COAST DATA MANAGEMENT SYSTEM (DMS)

Limited economic resources in the North Coast Region encourage efficiencies in accomplishing common goals and objectives. Sharing data and successful technology, and developing replicable materials and programs for region-wide dissemination are proven models for effective implementation of the NCIRWMP. Using the NCIRWMP's cooperative, regional association and infrastructure, the NCRP identifies best practices underway throughout the Region, analyzes results achieved based on their success, and develops demonstration models and corresponding metrics and materials to replicate and distribute proven and tested programs (e.g. Humboldt and Trinity County General Plan Water Elements; voluntary AB 32 and SB 375 compliance). This approach provides rural North Coast communities with an established framework and the organizational capacity to ensure that those entities that desire these tools, methods, policies, and planning models have access to them through the NCRP and NCIRWMP. It also generates large amounts of data.

The current North Coast DMP[222] represents an ideal situation for monitoring capacity that could support Plan evaluation and guide refinement. A more pragmatic approach to monitoring projects and incorporating lessons learned is warranted. Section 11 "Performance Monitoring & Evaluation" presents a framework description of the NCRP's proposed scaled-down version, which is more appropriate for this relatively massive and economically challenged IRWM Region.

13.2 MONITORING & ASSESSMENT DATA PROTOCOLS

Numerous monitoring programs currently operate in the North Coast Region (Appendix G Table 12 "Monitoring Plans of the North Coast Region"). Typical data collection techniques are referenced in Appendix G Table 12 ("Monitoring Protocols for NCIRWMP Evaluation"), which lists recommended protocols for NCIRWMP projects.

13.3 IDENTIFYING & ADDRESSING DATA GAPS

Data Gaps Identified by the North Coast Data Management Plan

Indicator Categories in the DMP are:

- Landscape Condition: composition, connectivity, land use

221 The DWR IRWM Plan Standard "Technical Analysis" [distinct from Standard "Data Management"] is introduced here in Section 13, but is fully addressed per DWR requirements in Appendix Q ("Technical Sources, Resources, & References"). This is a change from the Annotated Outline circulated to the Public through July 2013, which proposed this information as "Section 14 Technical Sources and Analyses." However, substitution with Appendix Q does not constitute an actual addition or subtraction of information in the Plan: rather, it is simply an editorial decision meant to improve document structure (not content).

222 Draft North Coast Data Management Plan (2010) available at http://www.northcoastirwmp.net/Content/10377/North_Coast_Assessment_Monitoring_and_Data_Management.html

- Biotic Condition: ecosystem/community measures, species and population measures,
- Organism Condition: Individual organism measures
- Chemical and Physical Characteristics: water and soil concentrations of nutrients, inorganic/organic chemicals
- Hydrology and Geomorphology: surface/groundwater flow, dynamic structural characteristics, material transport/distribution

The degree of data paucity varies for these data categories: for example, data for chemical and physical characteristics of water are relatively abundant, current, and available (more so for surface than groundwaters). So too are data on biotic condition: data for condition of populations and communities are more readily available than for individuals. Biotic data primarily relate to salmonids, but increasingly relate to bio-indicators like benthic macroinvertebrates (prey for fishes) and algae blooms. Data gaps become apparent, however, in the realms of surface/groundwater interactions, water use and supply, and climate uncertainty.

Notably, the original DMP includes no data categories for assessment of unconventional "resources" (e.g. social, economic, health, others). These are addressed in the main document body, Section 10 "Implementation Impacts and Benefits" and Section 11 "Performance Monitoring and Evaluation").

Data Gaps Identified by North Coast Planner Interviews

In 2013 NCRP staff conducted interviews with dozens of professional planners from counties (Del Norte, Humboldt, Mendocino, Siskiyou, Sonoma, and Trinity), municipalities, RCDs, and non-profit organizations throughout the North Coast Region223. Interviewee expertise by department included building/planning (22% of participants), management (20% of participants), community development, environmental/public health, flood control, land improvement, natural resources, public works, transportation, and water agency/districts. Interviews solicited information about data gaps, specifically (Figure 3 "Data Gaps: Local Planning").

Data Gaps Identified by Synthesis of North Coast Water/Land Use Planning Synthesis

While there is a substantial amount of planning and watershed information available for the North Coast, the region lacks complete coverage. Many very thorough watershed-specific assessments have been conducted, however the entire region can benefit from additional and enhanced existing conditions reports and analyses. In general, coastal and populated areas contain more plans and programs than sparsely populated and inland areas. Locations or subjects around which there is controversy, for example the Klamath basin or the Potter Valley diversion of water from the Eel to the Russian River, typically generate a greater number of studies and planning documents than less contentious areas.

On the coast, detailed watershed assessments by the CDFG Coastal Watershed Planning and Assessment Program are lacking for Alder Creek, Bear River, Brush Creek, Elk Creek, Freshwater Creek, Garcia River, Greenwood Creek, Gualala River, Mattole River, Salt River, Scott River, Shasta River, and South Fork Eel River. In the Klamath WMA, data coverage is weak or lacking for the Middle Klamath, Lower Klamath and Upper Butte and Lost River Hydrologic Units (HUs). In the Humboldt Bay WMA, data coverage is weak or lacking for the Mad River, Redwood Creek, and Trinidad HUs. Data coverage is also weak for parts of the Eel River WMA.

The planning efforts matrix also lacks current information about recent and current conditions such as the 2007–2009 drought or the current 2014 drought, precipitous salmonid population decline, and economic conditions. Drought conditions have been ongoing for the past three years with current conditions described as historic. The planning matrix and water and watershed management plans list lack detailed planning information and specific management strategies for coping with extended drought. There is also limited information about climate change. Although general predictions about future climate and weather conditions for the state have been developed, detailed predictions specific to the entire region are lacking. Documents within the list also lack recent data regarding and proposed strategies for contending with the salmon fisheries collapse. In order to implement adaptive management strategies in response to changing conditions, the most recent salmonid population and habitat monitoring data should be readily available in order for planners and decision makers to act promptly.

Appendix E Table 7 ("Local Water and Land Use Plans for the North Coast Region") contains many plans and programs that have not been analyzed with respect to relevance for the NCIRWMP or conformance with State Program Preferences and Resources Management Strategies. This list can serve as a starting point for addressing many of the data gaps identified above. Data gaps that require additional research, such as detailed watershed assessments, should be prioritized and addressed as funding becomes available.

223 Synthesis of 2013 NCRP interviews with local planners available at http://www.northcoastirwmp.net/docManager/1000009209/NCRP_Planner_Interviews_Summary_2013.pdf and is reproduced here in Appendix E ("Relationship of NCIRWMP to Local Water and Land Use Planning").

13.4 DATA MANAGEMENT & INFORMATION SHARING: DEVELOPMENT & MAINTENANCE OF THE DMP

The County of Humboldt will perform overall management of the DMP for the North Coast Region. Roles of NCRP project proponents and NCRP staff, as they relate to project monitoring and data reporting, are outlined in Appendix G "Monitoring Protocols for NCIRWMP Evaluation."

The DMS will document project benefits through the NCIRWMP website. The NCRP will be launching a new website by mid-September 2014; this will include a Plan Performance page that provides programmatic summary statistics for the region as well as data for individual projects. The Plan Performance page will be updated at least annually and more frequently as needed. This webpage will be distributed to all relevant state agencies. Additionally, on an ongoing basis the North Coast will track statewide databases, evaluate mechanisms for ensuring compatibility with statewide databases, contact relevant state agencies and send information regarding the NCRP and NCIRWMP to relevant state agencies for inclusion in their databases. At all times, the NCRP will maintain open communication channels with state agencies and serve as a conduit where appropriate to disseminate information between local and state/federal levels.

Project Performance — QA/QC and Benefits

Each project proponent will develop a Project Performance Monitoring Plan (PPMP) to track project performance. These plans will describe tools used to monitor project performance (see Appendix G for NCIRWMP-approved monitoring protocols chosen for consistency with State Data Clearinghouses such as GAMA, CASGEM, CEDEN, and SWAMP) so that data collected will conform to statewide requirements for data collection and reporting including units, standardization, and metadata format. The PPMPs will include QA/QC measures; many of the NCIRWMP-approved monitoring protocols provided in Appendix G include QA/QC measures. The plans will also set interim targets to track the project's progress toward meeting the benefits claimed and indicate where and which data will be collected and the types of analyses to be used (based on guidance provided in Appendix G). The PPMPs will also describe and justify monitoring tools and targets and provide a discussion of how monitoring data will be used to measure project performance.

In an effort to avoid duplication of effort and in recognition that most project proponents are DACs with limited resources, statewide data will not be collected at the regional level, but instead, as described above, project proponents will be required in their PPMP to upload relevant information to statewide databases. In addition, the NCIRWMP will require submission of project-specific metrics (see Appendix J, Tables 42 and 45 for the types of metrics most commonly used) as determined from the project application and scope of work. These metrics will be synchronized with other reporting requirements and reported on a regular basis and will document physical benefits for each project as they accrue. Data will be quantitative and will include physical units of measure as provided in detail in Appendix J, Table 45. Examples include: acres of habitat restored, tons of sediment prevented from entering stream system, acre-feet of water per year left instream, number of participants in workshops or programs, number of households with access to improved water supply reliability, etc.

Stakeholder-Identified Topics

The NCIRWMP process involves extensive outreach and identification of local/regional needs, providing the opportunity for stakeholders to identify issues of local and regional concern. The NCIRWMP website provides background on how such topics have been identified and researched, and how the NCRP has developed strategies to address those needs. For example, the Water & Wastewater Service Provider Outreach and Support Program and Energy Independence and Emissions Reduction Program were identified as growth areas for the NCIRWMP process after widespread outreach throughout the region. These topics are described in detail on the NCIRWMP website, with web pages and associated documentation for each special topic. Future topics will be identified and vetted through the same inclusive, transparent process and will also be researched, documented, and disseminated through the NCIRWMP website.

Data Collection Techniques

Data collection techniques are varied to capture the widest range of applicable information. The NCIRWMP website allows for ongoing North Coast Project data upload, which allows for continual identification of need in the Region. Project data upload requests such metadata as organization, project type, goals and objectives, statewide priorities addressed, funding status, location, and benefits (see http://www.northcoastirwmp.net/proj2012/rpf.php, which allows for project upload after registration to ensure data integrity). Project reporting contributes to statewide databases as described above and also provides quantitative information relevant to plan performance, which will be collected on a regular basis as described above. Project reporting will include quantitative benefits information relevant to Plan performance evaluation.

Meeting, conference, workshop, and other materials are posted in the Event section of the NCIRWMP website by staff and associated meeting materials are linked with the event in the NCIRWMP resources library. Stakeholders are invited to provide information to staff regarding their organization/event and that information is uploaded. Special topics are identified by stakeholders in the Region as described above. Once identified and determined to constitute a need by a significant number of stakeholders, a topic is researched by NCIRWMP staff with findings presented to the PRP, which decides upon further action, if any. This process and the data it generates is documented during meetings and on special topic web pages as relevant and appropriate.

Data Management and Dissemination

The data collected through the methods described above will be compiled and disseminated at several levels (see Data Management and Dissemination Task Table, page 1, Appendix G) and all of the data will be made available on the NCIRWMP website through specific pages, such as the Project Benefits page, interactive mapping application or through the North Coast IRWMP Library. This furthers the RWMG's efforts to share collected data by providing the information in an easily accessible website and in multiple ways to ensure the information is available for a wide range of uses and to a variety of interested parties (http://www.northcoastirwmp.net/docs.php).

Project Level

The new website, due for launch in mid-September 2014, will contain a page dedicated to providing benefits information and plan performance measures that highlight achievements in tabular format. Additionally, specific North Coast project data is made available on the website through implementation project posters and information pages and are available at: http://www.northcoastirwmp.net/Content/10446/North_Coast_Resource_Partnership_Project_Posters.html. Implementation project videos are available through YouTube links:

- Shasta Water Association & Araujo Dam Restoration projects: http://www.youtube.com/watch?v=6A2I5kF4sjk
- Salt River Ecosystem Restoration Project: http://www.youtube.com/watch?v=D6BoI4peVL4
- Newell Water System Renovation: http://www.youtube.com/watch?v=nKnbtYgvLkk
- Yurok Lower Klamath Restoration: https://www.youtube.com/watch?v=b3T6G_PG-gQ
- Lower Mid-Klamath Habitat Protection Road Decommissioning Implementation Project: https://www.youtube.com/watch?v=XOhLp5cw7Po
- Gualala River Watershed Council: https://www.youtube.com/watch?v=wLndRkL5PhI
- Raw and Recovered Water for Irrigating Public Agencies — Trinity County Waterworks District #1: https://www.youtube.com/watch?v=05v-hfx-gb4
- Forsythe Creek Sediment Reduction Program: https://www.youtube.com/watch?v=NNCzTS8nyDI
- Mid Van Duzen River Ranch Road Sediment Reduction Program: https://www.youtube.com/watch?v=8xV2Bho-8j0
- Sonoma County Water Recycling and Habitat Preservation Project Phase 2A: https://www.youtube.com/watch?v=eYUVw6d5tys

The new NCIRWMP website will also include a web portal that houses and makes public plan performance data and analyses, educational materials; and monitoring and assessment protocols and data sources relevant to the North Coast Region (see Appendix G). Additionally, spatial data will be available through an improved interactive map application that includes project specific data (see existing mapping application at: http://www.northcoastirwmp.net/Content/10376/map.html).

Watershed Level

At the watershed level, data is disseminated through the NCIRWMP website. Each Watershed Management Area has a separate web page containing specific geo-physical information, links to relevant plans and programs, and local watershed groups (e.g., http://www.northcoastirwmp.net/Content/10301/preview.html). Additionally, the interactive mapping application provides geographic locations of important features and other pertinent spatial data at the WMA and smaller spatial scales (see: http://www.northcoastirwmp.net/Content/10376/map.html).

Regional IRWMP Level

The website, special handouts, and meetings, workshops, and conferences are used to disseminate data and information on a regional level. The website and the NCIRWM Plan (available through the website) provides descriptions of the NCIRWMP process, participants, identified needs, and planning and implementation projects, etc. Related materials are provided through the North Coast Library. Additionally, outside documents and plans that pertain to water and land management in the North Coast (at both regional and watershed scales) are available on website in the Documents

and Plans webpage (http://www.northcoastirwmp.net/Content/10331/North_Coast_Documents_and_Plans.html). Special topics information is also available through the website, which provides the NCIRWMP process of identification of and strategies for addressing special needs, staff research about the identified topic, and other relevant information. Additionally, analyses of cumulative project benefits at the regional scale will be provided for each grant cycle using quantitative data reported by project proponents during project implementation.

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDICES

Submitted to:
California Department of Water Resources

Submitted by:
North Coast Resource Partnership

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III, August 2014
Submitted to: California Department of Water Resources
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APPENDICES

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX A

NCIRWMP OBJECTIVES X STATEWIDE PRIORITIES & LOCAL PROJECT PRIORITIES

APPENDIX A: NCIRWMP OBJECTIVES X STATEWIDE PRIORITIES & LOCAL PROJECT PRIORITIES

Per state IRWM Guidelines (DWR 2012), Table 1 and Table 2 demonstrate that the NCRP integrate into the Plan and processes the latest NCIRWMP goals and objectives and (1) statewide IRWM priorities and (2) local project priorities1, respectively. The Phase I/II NCIRWMP includes equivalent tables for the original Plan objectives and projects (NCRWMG 2007).

TABLE 1 MATRIX OF NCIRWMP OBJECTIVES & STATEWIDE IRWM PRIORITIES

	STATEWIDE IRWM PRIORITY							
NCIRWMP GOALS & OBJECTIVES	Drought Preparedness	Efficient Water Use & Reuse	Climate Change Response	Environmental Stewardship	Integrated Flood Management	Protect Surface and Ground Water Quality	Improve Tribal Water/ Natural Resources	Equitable Benefit Distribution
Goal 1: Intraregional Cooperation & Adaptive Management								
Obj. 1: Respect local autonomy and local knowledge in Plan and project development and implementation				•				•
Obj. 2: Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation			•		•			•
Goal 2: Economic Vitality								
Obj. 3: Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities.					•			•
Obj. 4: Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas				•			•	•
Goal 3: Ecosystem Conservation and Enhancement								
Obj. 5: Conserve, enhance, and restore watershes and aquatic ecosystems, including functions, habitats, and elements that support biological diversity	•		•	•	•	•	•	
Obj. 6: Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes			•	•	•	•	•	
Goal 4: Beneficial Uses of Water								
Obj. 7: Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources	•	•	•	•			•	
Obj. 8: Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities	•					•	•	•
Obj. 9: Protect groundwater resources from over-drafting and contamination	•					•	•	
Goal 5: Climate Adaptation and Energy Independence								
Obj. 10: Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors	•		•		•			•
Obj. 11: Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation	•	•	•					•
Goal 6: Public Safety								
Objective 12: Improve flood protection and Obj. 12: Reduce flood risk in support of public health.			•		•			•

1 Note that "project/local priorities" as used in this document are the *project-specific priorities*, as compiled by NCRP staff and project proponents, *of locally-implemented projects, not necessarily of local entities per se*).

TABLE 2 MATRIX OF NCIRWMP OBJECTIVES & LOCAL PROJECT PRIORITIES

Categories for Local Project Priorities[2] in Table 2 are the same as those in Table 6 ("Matrix of NCIRWMP Objectives & RMS). By design, the "local project priorities" are equivalent to "project performance measures" categories used in developing the Plan and project evaluation framework (Section 11 "NCIRWMP Evaluation and Monitoring").

	LOCAL PROJECT PRIORITIES							
NCIRWMP GOALS & OBJECTIVES	Salmonid Habitat Improvement	Watershed and Habitat Improvement	Water Quality Improvement	Water Supply Reliability	Groundwater Protection	Energy Independence	Public Safety	Economic Benefits
Goal 1: Intraregional Cooperation & Adaptive Management								
Obj. 1: Respect local autonomy and local knowledge in Plan and project development and implementation						•	•	•
Obj. 2: Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation						•	•	•
Goal 2: Economic Vitality								
Obj. 3: Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities.								•
Obj. 4: Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas			•	•	•			•
Goal 3: Ecosystem Conservation and Enhancement								
Obj. 5: Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity	•	•	•				•	•
Obj. 6: Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes	•	•	•				•	•
Goal 4: Beneficial Uses of Water								
Obj. 7: Ensure water supply reliability and quality for municipal, domestic, agricultural, and recreational uses while minimizing impacts to sensitive resources		•		•				•
Obj. 8: Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities			•					•
Obj. 9: Protect groundwater resources from over-drafting and contamination			•	•	•			
Goal 5: Climate Adaptation and Energy Independence								
Obj. 10: Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors						•	•	
Obj. 11: Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation						•	•	•
Goal 6: Public Safety								
Objective 12: Improve flood protection and reduce flood risk in support of public health.			•				•	•

2 Note that "project/local priorities" as used in this document are the *project-specific priorities*, as compiled by NCRP staff and project proponents, *of locally-implemented projects, not necessarily of local entities per se*).

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APPENDIX B
NCIRWMP OBJECTIVES X STATEWIDE LOCAL PROJECT GOALS

APPENDIX B
NCIRWMP OBJECTIVES X LOCAL PROJECT GOALS

Following are cross-walked tables that demonstrate the integration of NCIRWM Plan Goals and Objectives with (1) the stated goals of NCIRWMP implementation projects (project specific goals).

TABLE 3 MATRIX OF NCIRWMP OBJECTIVES AND LOCAL PROJECT GOALS (PROPOSITION 50)

	NCIRWMP GOALS & OBJECTIVES											
	Goal 1: Intraregional Cooperation		Goal 2: Economic Vitality		Goal 3: Ecosystem Conservation & Enhancement		Goal 4: Beneficial Uses of Water			Goal 5: Climate Adaptation & Energy Independence		Goal 6: Public Safety
NCIRWMP PROJECTS: PROPOSITION 50	Respect local autonomy & local knowledge	Provide an ongoing framework for NCIRWMP project implementation	Ensure that economically disadvantaged communities are supported	Improve the economic benefits of working landscapes & natural areas	Conserve and enhance watersheds & aquatic ecosystems	Enhance salmonid populations	Ensure water supply reliability and quality	Improve drinking water quality to protect public health	Protect groundwater from over-drafting & contamination	Address climate change effects, impacts, vulnerabilities, and strategies	Promote energy independence, water/energy efficiency, GHG reduction	Improve flood protection and reduce flood risk
Proposition 50 — Round 1												
California Land Stewardship Institute, Fish Friendly Farming Environmental Certification Program	•	•		•	•	•	•			•		
California State Parks — North Coast Redwoods District, Head Hunter/Smoke House Non-point Sediment Reduction Project		•		•	•	•	•					
City of Crescent City, Wastewater Treatment Plant Renovation	•	•	•	•	•	•	•	•	•	•	•	•
City of Etna , Water Supply Project	•	•	•	•	•	•	•	•			•	
City of Eureka, Martin Slough Interceptor Project	•	•	•	•	•	•	•			•		•
City of Santa Rosa, Sonoma County Water Recycling and Habitat Preservation Project	•	•		•	•	•	•			•	•	•
Covelo Community Services District, Covelo Wastewater Facilities Improvement Project		•	•	•	•	•		•				•
Graton Community Service District, Graton Wastewater Treatment Upgrade and Reclamation Project	•	•	•		•	•	•				•	•
Gualala River Watershed Council, Sediment Solutions for the Gualala: Phase III	•	•		•	•	•	•					•
Humboldt County Resource Conservation District, Salt River Restoration Project	•	•	•	•	•	•	•			•		•
Humboldt County Resource Conservation District, Mid Van Duzen River Ranch Road Sediment Reduction Program	•	•	•	•	•	•	•					•
Mattole Restoration Council, Mattole Integrated Water Management Program	•	•	•	•	•	•	•	•		•	•	•
Mendocino County Resource Conservation District, Navarro Watershed Road Sediment Reduction Project	•	•	•	•	•	•						
Modoc County, Newell Water System Renovation	•	•	•				•	•	•			
Pacific Coast Fish, Wildlife & Wetlands Restoration Association, Redwood Creek Erosion Control		•	•	•	•	•						•
Shasta Valley Resource Conservation District, Shasta Water Association Dam Restoration	•	•	•	•	•	•	•	•	•		•	

NCIRWMP PROJECTS: PROPOSITION 50	NCIRWMP GOALS & OBJECTIVES											
	Goal 1: Intraregional Cooperation		**Goal 2: Economic Vitality**		**Goal 3: Ecosystem Conservation & Enhancement**		**Goal 4: Beneficial Uses of Water**			**Goal 5: Climate Adaptation & Energy Independence**		**Goal 6: Public Safety**
	Respect local autonomy & local knowledge	Provide an ongoing framework for NCIRWMP project implementation	Ensure that economically disadvantaged communities are supported	Improve the economic benefits of working landscapes & natural areas	Conserve and enhance watersheds & aquatic ecosystems	Enhance salmonid populations	Ensure water supply reliability and quality	Improve drinking water quality to protect public health	Protect groundwater from over-drafting & contamination	Address climate change effects, impacts, vulnerabilities, and strategies	Promote energy independence, water/ energy efficiency, GHG reduction	Improve flood protection and reduce flood risk
Shasta Valley Resource Conservation District, Araujo Dam Restoration	•	•	•	•	•	•	•		•		•	
Trinity County Waterworks District #1 , Raw & Recovered Water for Irrigating Public Agencies	•	•	•	•	•	•	•	•				
Weaverville Sanitary District, Water Reclamation Project	•	•	•	•	•	•	•			•	•	
Westport County Water District, Water Supply Reliability Project		•	•	•	•	•	•					
Proposition 50 — Round 2 and Supplemental												
Gold Ridge Resource Conservation District, Salmon Creek Sediment Reduction and Water Conservation Program	•	•		•	•	•	•			•	•	
Mattole Restoration Council, Mattole Integrated Coastal Watershed Management Program	•	•	•	•	•	•	•			•		
Mendocino Land Trust, Big River Lower Mainstem Restoration Project	•	•		•	•	•	•			•		•
Mendocino Resource Conservation District, Forsythe Creek Upslope Road Sediment Reduction Project	•	•	•	•	•	•	•					•

TABLE 4 MATRIX OF NCIRWMP OBJECTIVES AND LOCAL PROJECT GOALS (PROPOSITION 84)

NCIRWMP PROJECTS: PROPOSITION 84	NCIRWMP GOALS & OBJECTIVES											
	Goal 1: Intraregional Cooperation		**Goal 2: Economic Vitality**		**Goal 3: Ecosystem Conservation & Enhancement**		**Goal 4: Beneficial Uses of Water**			**Goal 5: Climate Adaptation & Energy Independence**		**Goal 6: Public Safety**
	Respect local autonomy & local knowledge	Provide an ongoing framework for NCIRWMP project implementation	Ensure that economically disadvantaged communities are supported	Improve the economic benefits of working landscapes & natural areas	Conserve and enhance watersheds and aquatic ecosystems	Enhance salmonid populations	Ensure water supply reliability and quality	Improve drinking water quality to protect public health	Protect groundwater from over-drafting & contamination	Address climate change effects, impacts, vulnerabilities, and strategies	Promote energy independence, water/ energy efficiency, GHG reduction	Improve flood protection and reduce flood risk
Proposition 84 — Round 1												
City of Fort Bragg , Waterfall Gulch Transmission Main	•	•	•	•	•	•	•	•				
Del Norte Resource Conservation District , Del Norte Agricultural Enhancement Program	•	•	•	•	•	•	•					

	NCIRWMP GOALS & OBJECTIVES											
	Goal 1: Intraregional Cooperation		**Goal 2: Economic Vitality**		**Goal 3: Ecosystem Conservation & Enhancement**		**Goal 4: Beneficial Uses of Water**			**Goal 5: Climate Adaptation & Energy Independence**		**Goal 6: Public Safety**
NCIRWMP PROJECTS: PROPOSITION 84	Respect local autonomy & local knowledge	Provide an ongoing framework for NCIRWMP project implementation	Ensure that economically disadvantaged communities are supported	Improve the economic benefits of working landscapes & natural areas	Conserve and enhance watersheds and aquatic ecosystems	Enhance salmonid populations	Ensure water supply reliability and quality	Improve drinking water quality to protect public health	Protect groundwater from over-drafting & contamination	Address climate change effects, impacts, vulnerabilities, and strategies	Promote energy independence, water/ energy efficiency, GHG reduction	Improve flood protection and reduce flood risk
Gold Ridge Resource Conservation District, Bodega Bay HU Water Resources Management Project	•	•	•	•	•	•	•	•		•	•	
Gualala River Watershed Council, Gualala River Sediment Reduction Program	•	•		•	•	•				•		
Happy Camp Community Services District, Happy Camp Water Treatment System Upgrade		•	•	•	•		•	•			•	•
Happy Camp Sanitary District, Indian Creek Sewer Pipeline Crossing	•	•	•	•	•	•	•					
Hopland Band of Pomo Indians, Nissa-kah Creek Fish Passage at Hwy 175	•	•	•	•	•	•						
Humboldt Bay Municipal Water District , HBMWD-Blue Lake Fieldbrook Pipeline Support Retrofit	•	•	•				•	•		•		•
Karuk Tribe, Camp Creek Habitat Protection-Road Decommissioning Implementation Project	•	•	•	•	•	•						
Mattole Restoration Council , Mattole Integrated Watershed Management Initiative	•	•	•	•	•	•	•			•		
Mendocino County Resource Conservation District, Mendocino Headwaters Integrated Water Quality Enhancement Project	•	•	•	•	•	•	•			•		
Mendocino County Resource Conservation District, Mendocino Jumpstart Integrated Water Plan	•	•	•	•	•	•			•	•	•	
Pinoleville Pomo Nation, Ackerman Creek Habitat Restoration	•	•	•	•	•	•	•			•		
Redwood Forest Foundation Inc. , Sustainable Forests, Clean Water & Carbon Sequestration Demonstration Project	•	•	•	•	•	•				•		
Sonoma County Water Agency, The Copeland Creek Watershed Detention/Recharge, Habitat Restoration, and Steelhead Refugia Project	•	•		•	•	•	•		•	•		•
Sonoma Resource Conservation District, Russian River Arundo donax Removal and Riparian Enhancement Program	•	•		•	•	•				•		•
Sonoma Resource Conservation District , Lower Russian River Water Quality Improvement Project	•	•		•	•	•	•					•
Willow Creek Community Services District, Hwy 96 Stormceptor	•	•	•	•	•	•	•	•				•
Proposition 84 — Round 2												
Big Rock Community Services District, Stabilize Water Storage Tank Project	•	•	•				•	•				

	NCIRWMP GOALS & OBJECTIVES											
	Goal 1: Intraregional Cooperation		**Goal 2: Economic Vitality**		**Goal 3: Ecosystem Conservation & Enhancement**		**Goal 4: Beneficial Uses of Water**			**Goal 5: Climate Adaptation & Energy Independence**		**Goal 6: Public Safety**
NCIRWMP PROJECTS: PROPOSITION 84	Respect local autonomy & local knowledge	Provide an ongoing framework for NCIRWMP project implementation	Ensure that economically disadvantaged communities are supported	Improve the economic benefits of working landscapes & natural areas	Conserve and enhance watersheds and aquatic ecosystems	Enhance salmonid populations	Ensure water supply reliability and quality	Improve drinking water quality to protect public health	Protect groundwater from over-drafting & contamination	Address climate change effects, impacts, vulnerabilities, and strategies	Promote energy independence, water/ energy efficiency, GHG reduction	Improve flood protection and reduce flood risk
California Land Stewardship Institute, Fish Friendly Farming and Fish Friendly Ranching Environmental Certification in the Russian, Navarro, and Gualala River Watersheds	•	•	•	•	•	•	•			•		
California Land Stewardship Institute, Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program	•	•	•	•	•	•	•			•		
Gold Ridge Resource Conservation District, Gold Ridge Coastal Watersheds Enhancement Project	•	•		•	•	•	•	•		•		
Gualala River Watershed Council, Gualala River Sediment Reduction Program	•	•		•	•	•	•	•		•		
Humboldt Bay Municipal Water District, Ranney Collectors 1 & 1A Lateral Replacement	•	•	•	•	•	•	•	•	•	•		
Karuk Tribe, Lower Mid-Klamath Habitat Protection-Road Decommissioning Implementation Project	•	•	•	•	•	•	•					•
Mendocino County Resource Conservation District, Mendocino County Working Landscapes Riparian Demonstration Project	•	•	•	•	•	•	•			•		
Salyer Mutual Water Company, Larger Capacity Storage Tanks, Dedicated Main Line, Meters/Master Meter Project	•	•	•	•	•	•	•	•				
Siskiyou County, Siskiyou County Septage Pond Closure	•	•	•	•	•	•	•		•	•		
Trinity County Resource Conservation District, West Weaver Creek — Channel and Floodplain Rehabilitation	•	•	•	•	•	•	•	•			•	
Westhaven Community Services District, Westhaven CSD Water Tank	•	•	•				•	•				
Yurok Tribe — Yurok Tribal Fisheries Program , Restoration of Lower Klamath River Habitats	•	•	•	•	•	•		•		•		

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APPENDIX C
NCIRWMP OBJECTIVES X KEY ISSUES

APPENDIX C
NCIRWMP OBJECTIVES X KEY ISSUES

Following is a cross-walked table that demonstrates the integration of current NCIRWMP objectives with the current issues identified by stakeholders via the process described in Section 6 ("Local & Regional Water-Related Issues").

TABLE 5 MATRIX OF NCIRWMP OBJECTIVES & KEY ISSUES

		WATER RELATED ISSUES						
NCIRWMP GOALS & OBJECTIVES		Salmonid population decline	Impaired water quality	Reduced water availability	Drinking water supply, infrastructure & safety	Flood management & flood control	Aquatic invasive & naturalized species	Climate change effects
Goal 1: Intraregional Cooperation & Adaptive Management	Obj. 1: Respect local autonomy and local knowledge in Plan and project development and implementation	•	•	•	•	•	•	•
	Obj. 2: Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation	•	•	•	•	•	•	•
Goal 2: Economic Vitality	Obj. 3: Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities	•	•	•	•	•	•	•
	Obj. 4: Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas	•	•	•	•	•	•	•
Goal 3: Ecosystem Conservation & Enhancement	Obj.5: Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity	•	•	•		•	•	•
	Obj. 6: Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes	•	•	•		•	•	•
Goal 4: Beneficial Uses of Water	Obj. 7: Ensure water supply reliability and quality for municipal, domestic, cultural, agricultural, and recreational uses while minimizing impacts to sensitive resources	•	•	•	•			•
	Obj. 8: Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities		•	•	•			•
	Obj. 9: Protect groundwater resources from over-drafting and contamination		•	•	•			•
Goal 5: Climate Adaptation & Energy Independence	Obj. 10: Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors systems			•		•	•	•
	Obj. 11: Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation			•				•
Goal 6: Public Safety	Obj. 12: Improve flood protection and reduce flood risk in support of public safety					•		•

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APPENDIX D
NCIRWMP PROJECT PRIORITIES X RESOURCE MANAGEMENT STRATEGIES

APPENDIX D: NCIRWMP PROJECT PRIORITIES X RESOURCE MANAGEMENT STRATEGIES

Categories for Local Project Priorities[1] in Table 6 are the same as those in Table 2 ("Matrix of NCIRWMP Objectives x Local Project Priorities"). By design, the "local project priorities" are equivalent to "project performance measures" categories used in developing the Plan and project evaluation framework (Section 11 "NCIRWMP Evaluation and Monitoring"). Diverse priorities may be achieved through use of multiple Resource Management Strategies (RMS: from DWR 2009 and 2013). Refer to Section 8 ("Resource Management Strategies").

TABLE 6 MATRIX OF LOCAL PROJECT PRIORITIES & RESOURCE MANAGEMENT STRATEGIES

	RMS identified by DWR as having "potential for great benefits in the North Coast"														
LOCAL PROJECT PRIORITY	Agricultural Lands Stewardship	Agricultural Water Use Efficiency	Conjunctive Management and Groundwater Storage	Ecosystem Restoration	Flood Risk Management	Forest Management	Groundwater and Aquifer Remediation	Land Use Planning and Management	Pollution Prevention	Recharge Areas Protection	Surface Storage – Regional/Local	Urban Stormwater Runoff Management	Urban Water Use Efficiency	Water-dependent Recreation	Watershed Management
Salmonid Habitat Improvement	•	•	•	•		•	•	•	•	•	•	•	•		•
Watershed & Habitat Improvement	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Water Quality Improvement	•	•	•	•	•	•	•	•	•	•		•		•	•
Water Supply Reliability		•	•		•		•	•		•	•		•		•
Groundwater Protection	•	•	•	•		•	•	•	•	•	•	•	•		•
Energy Independence		•						•					•		
Public Safety				•	•		•	•	•			•		•	•
Economic Benefits	•	•	•	•	•	•	•		•	•	•	•	•	•	

1 Note that "project/local priorities" as used in this document are the *project-specific priorities*, as compiled by NCRP staff and project proponents, *of locally-implemented projects, not necessarily of local entities per se*).

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APPENDIX E
RELATIONSHIP TO LOCAL WATER & LAND USE PLANNING

APPENDIX E: RELATIONSHIP TO LOCAL WATER & LAND USE PLANNING

This appendix summarizes some of the findings of interviews[1] with local planning professionals (Section E.1) and lists relevant regional planning documents as they relate to the goals and objectives of the NCRP and NCIRWMP (Section E.2). Refer to Section 9 ("Relation to Local Water & Land Use Planning") for discussion of these results.

E.1 LOCAL RESOURCE USE DOCUMENTS, DATA GAPS, & OPPORTUNITIES

Introduction

In an effort to better understand planning efforts underway in communities throughout the North Coast, NCIRWMP staff conducted interviews of planning professionals in counties, cities, and other resource management agencies in the region. The participation of 71 professional planners was solicited via email; forty-one participated in interviews during thirty-four telephone calls conducted during April and May 2013. Interviewees were chosen by contacting city and county planning offices and through referrals by other interviewees. Twenty-three interviewees represented county departments including building, planning, and environmental health, flood control, natural resources, public works, and transportation. Twelve interviewees represented municipality departments including community development, public works, water, community services, and planning. Four interviewees represented Resource Conservation Districts throughout the region and two interviewees represented nonprofit organizations (Figure E1 "Interviewees by Workplace"). Twelve of the interviewees were located in Humboldt County, eight in Sonoma, and seven each in Siskiyou and Mendocino counties. Four interviewees were located in Del Norte and three in Trinity counties (Figure E2 "Interviewees by County"). Interviewee expertise was extensive, spanning a wide range land and water resource — related professions. Planning/ building and managerial positions comprised about 42% (17) of the interviewees, while 10% of interviewees (4) worked in community development, public works, and at water service agencies respectively. Three individuals worked in environmental/ public health departments and two worked in flood control, land improvement, natural resources, and transportation departments respectively (Figure E3 "Interviewees by Expertise").

Interviews ranged from 15 to 45 minutes in length with the interviewees provided a copy of the questions and general information about the NCIRWMP via email several days prior to the call. Each interview was transcribed on the spot with interviewees told that comments will not be attributed to specific individuals, but rather compiled as a broad summary of responses from planning professionals throughout the region. Any question an interviewee indicated fell outside of their jurisdiction was skipped.

Interview questions were grouped into five topics: Land Use and Water Planning, Climate Change Vulnerability and Response, Energy Efficiency and Security, Water

Figure E1. Interviewees by Workplace

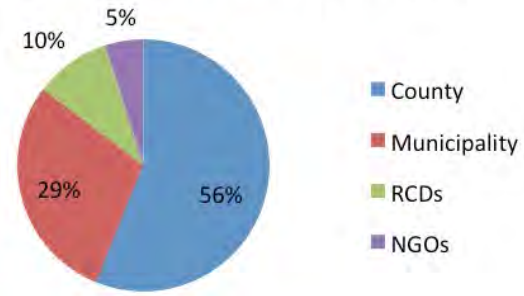


Figure E2. Interviewees by County

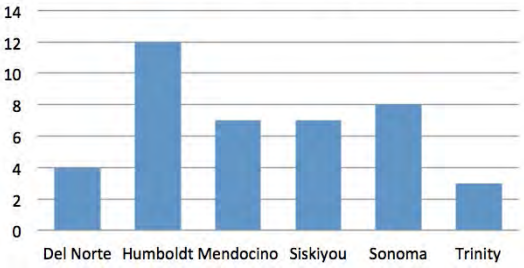
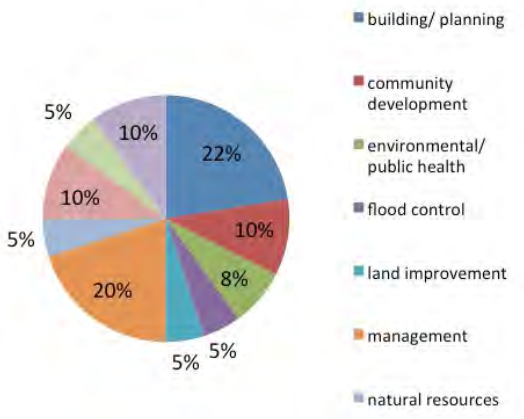


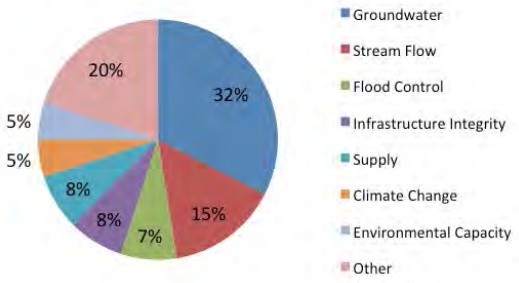
Figure E3. Interviewees by Expertise



1 NCRP Partner and Stakeholder Interview Synthesis 2013. Counties, municipalities, Resource Conservation Districts, and non-profits were represented in the interviews. (71 professional planners contacted; 41 interviewed by December 2013.) http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207 . See Appendix L (Table 55 "Public Outreach & Plan Input Opportunities") for a listing of interview participants.

Management, and Miscellaneous. The Miscellaneous topic was used to cover final questions regarding subjects for future conference workshops and NCIRWMP-related expenses.

Figure E4. Interviewee Identified Data Gaps



Land Use and Water Planning

Interviewees were asked about local land use or water planning projects. Responses varied from policy development to planning concerns to on-the-ground projects. One entity is considering the merits of a water efficient landscape ordinance while another is challenged by a lack of greenway ordinances to regulate land use in and around gulches. Flood control is of concern for other municipalities, with inadequate resources limiting training and response capabilities. Another city is completing a capital improvement program that includes prioritizing projects related to water. Low Impact Development (LID) planning and projects are underway in many areas to improve stormwater management. Several entities are working on water supply issues, from water rights to recycled water to groundwater.

In many areas, groundwater is of concern because of the difficulty of determining the extent and quality of water within aquifers. CASGEM — the state's groundwater elevation monitoring system — requires local parties to assume responsibility for monitoring and reporting groundwater elevations to remain eligible for water grants or loans from the state, so several entities have collaborated on groundwater monitoring programs. Municipalities are also looking towards development or implementation of climate action plans and GHG inventories. Several entities are working on stormwater management, especially floodway protection and habitat improvement. One city has removed non-native invasive grasses, increasing floodplain capacity and improving salmonid habitat. Others are utilizing watershed management plans to facilitate streamflow improvement, maintain water supply reliability, implement wetland restoration, and maintain and improve agricultural operations.

Many identified further information or studies — data gaps — that would improve their organization's ability to achieve synchronization of land and water use planning (Figure E4 "Interviewee Indentified Data Gaps"). About a third of respondents indicated that additional groundwater information would be helpful, especially in Mendocino County, the Shasta watershed, the Smith River Plain and the Ukiah basin. Respondents stated that a better understanding of underlying geology, residential and agricultural use, and underground storage tanks and contamination would be helpful. Several also mentioned streamflow and hydrogeology at the subwatershed scale — at levels where project planning is occurring. These comments were made regarding areas with limited flow in the summer — both with respect to understanding the underlying hydrogeology and in more accurately determining withdrawals. Flood control, particularly methods and private levee location and methods — were brought up by three interviewees. Three respondents also stated that information regarding longevity and condition of local water supply and quality infrastructure, especially small water suppliers, would greatly enhance planning decisions. Additional information about water supply was mentioned generally, with storage option feasibility — collecting rainfall during winter, when water is plentiful for use in summer, when water is scarce — mentioned specifically. Subjects that were mentioned by only one respondent include the need for a data sharing hub, identification of watersheds that support critical populations of endangered species, saltwater intrusion and precipitation monitoring

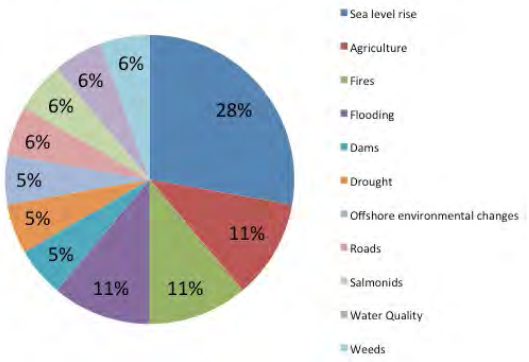
Climate Change Vulnerability and Response

When asked about local resources that will be vulnerable to climate change impacts in the next 50 to 100 years, coastal interviewees responded that sea level rise — on vulnerable infrastructure in low-lying areas or along shorelines. The maritime industry was mentioned as particularly vulnerable. Impacts to agriculture, especially related to crop phenology changes, two people mentioned increased risk of forest fires and their environmental consequences, and flooding events due to greater storm intensity. Subjects mentioned by one respondent include ocean ecosystem changes, drought, salmonid populations, and water quality (Figure E5 "Climate Change Vulnerability").

Interviewees were asked about local scale studies in their area; projects mentioned include development of Climate Action Plans, local scale vulnerability projects (North Bay Climate Adaptation Initiative, Regional Climate Protection Authority, and Pepperwood Preserve were mentioned specifically), GHG inventories, and flood management projects. Other local climate change projects include agricultural sustainability, carbon sequestration, wildfire planning, and hazard mitigation.

When respondents were asked to identify additional climate changed-related planning or assessment information for their area, several stated local-scale climate modeling. Planning was also identified by several individuals — with respect to rural community preparedness and resilience, sea level rise, transportation, and reliable future conditions predictions. The effects of sea level rise as it is expected to impact infrastructure and as it will effect king tides and tsunami inundation were also of concern. Geologic conditions and how they will change with time, hydrology, predicted storm surges, and increased fire risk and associated environmental consequences were also mentioned as data gaps in climate change-related planning (Figure E6 "Climate Change Data Gaps").

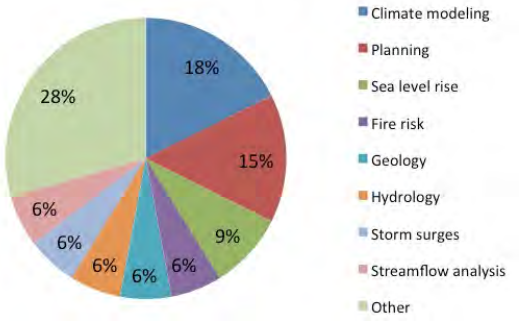
Figure E5. Climate Change Vulnerability



Energy Efficiency and Security

Interviewees provided many examples of current and potential local and regional energy efficiency/ security projects and programs in the North Coast.

Figure E6. Climate Change Data Gaps



Examples of Current, Planned, and Potential Energy & Security Projects

- Big Flat and Rock Creek Communities (near Weaverville) — are off the grid.
- Biochar Initiative — using a specialized form of charcoal as a soil amendment using woody waste
- Biofuel facility — multiple cities
- Biomass facility — manure digesters may have potential in unincorporated areas
- Energy efficiency: i.e., residential home retrofit programs, streetlights (LED) replacement projects, energy efficient upgrades to facilities and buildings, provision of city property for electric car charging station.
- Energy infrastructure: i.e., evaluating smart-grid transmission, replacement of substation, maintenance and repair projects
- Geothermal power plants — i.e., geothermal project to take treated wastewater and transfer it to the local recreational pool as a heat transfer pump — Crescent City
- Nutrient credit exchange program — Sotoyome RCD, City of Santa Rosa, and NC RWQCB
- Solar Power —ie, Trinity PUD runs local programs for solar installations
- Wind development

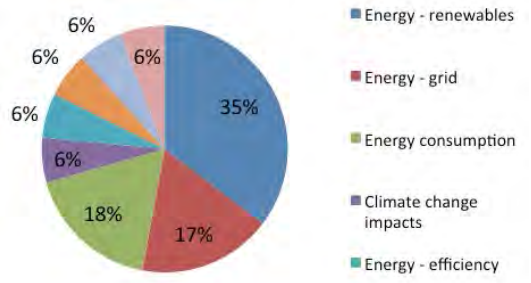
They contributed to an extensive list including diverse projects such as biochar, energy efficiency, nutrient credit trading, and power generation. Respondents were also generated a substantial list of potential local and regional funding sources.

Potential Energy Funding Sources

- Bay Area Regional Energy Network — financing and technical assistance
- CA Energy Commission
- CPUC
- Federal tax rebates
- Local foundations: Headwaters, McLean, Humboldt Area Foundation
- NRCS

- PACE financing,
- Pacific Power and Light
- PG&E
- Redwood Community Action Agency Weatherization Assistance Program
- Redwood Coast Energy Authority
- Rebate, Rate, and Buyback Programs — some municipalities have these programs with local utilities
- Redwood Coast Energy Watch
- Rural Development provides financing for energy conservation
- Sonoma County Energy Independence Program (SCEIP)
- SCWA –Energy Financing — bond issuance for energy projects
- USDA
- WELL in Willits Economic Localization — local energy production and sustainable conservation

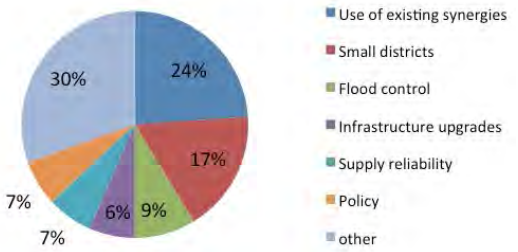
Figure E7. Energy Efficiency Data Gaps



Data gaps identified by respondents primarily concerned information about renewable energy — wind, solar, wave, geothermal, and hydroelectric, the energy grid — transmission capacity and disaster readiness, and energy consumption — both historic and present. Other subjects about which interviewees indicated data was lacking include climate change impacts, energy efficiency measures, and renewable energy pricing strategies (Figure E7 "Energy Efficiency Data Gaps").

Water Management

Figure E8. Opportunities to Improve Integration



When asked about opportunities in their area to improve integration across multiple water management strategies, interviewees had numerous suggestions (44) (Figure E8 "Opportunities to Improve Integration"). About one quarter of the respondents suggested using existing synergies — from capacity building on local watershed projects to using existing regional and state networks to strengthen integrated planning efforts. Multiple planning processes and organizations were suggested as vehicles for collaboration, including the groundwater management planning process, Humboldt Bay Municipal Water District municipal meetings, RCDs, County Engineers Association of California, and DWR. Small water supply/ wastewater entities were identified as an opportunity for integration. There are many small districts that may experience economies of scale — decreasing costs per unit ouput — if they merge into a single larger entity. The Ukiah Valley in Mendocino County was mentioned as an area that may benefit from mergers. Other small districts are in need of the benefits of integration for assistance with failing infrastructure — from septic tanks in the Lower Russian River, to lack of capacity in aging wastewater treatment plants. Flood control opportunities focused on levees, and the opportunity for multiple benefits when implementing flood control projects in a landscape context. Infrastructure repairs were mentioned in the context of improving efficiency and reducing energy consumption while supply reliability focused on sustainability and self-sufficiency. Opportunities to improve water management integration associated with policy included county zoning for biotic resources to implement creek setbacks, the NCRWQCB requesting agricultural assistance with monitoring, and possible summer uses for tertiary treated water (including discharge into the Eel River). Many other opportunities for water management integration were identified including increased communications via radio operability, economic development, groundwater banking, LID, surplus water, and water security.

Interviewees stated that additional information about climate change, dams — removal and increased capacity, groundwater — both use and recharge, and the impacts from illegal marijuana cultivation would be useful to their endeavors. Streamflow improvement plans and determining base flows in key rivers were also mentioned. Additional

data gaps identified by interviewees include salmonid habitat assessment, water quality, communication with regulatory agencies, and blue-green algae sources, impacts, and management strategies.

Figure E9 ("Opportunities for Integrated Planning") indicates some opportunities identified by local planning entities as supportive of water and/or land management integration, including via the NCRP. Section 1 presents a detailed briefing on the NCRP approach to integration for the NCIRWMP.

Figure E10 ("Data Gaps: Local Planning") illustrates some concerns of local planners with specific regard to data gaps that inhibit local planning efforts. Research focused in these areas is encouraged for and by the NCRP. Particularly lacking are data related to groundwater (32% identified) and stream-flow (15%). Data gaps are discussed in Section 13 of the main document.

Figure E9. Opportunities for Integrated Planning

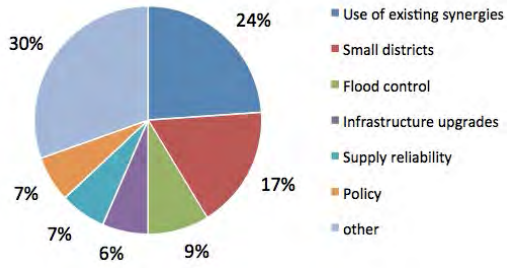
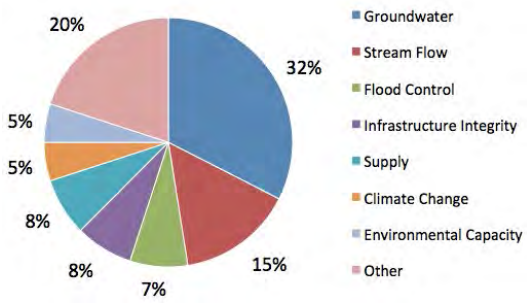


Figure E10. Data Gaps: Local Planning



E.2 LOCAL WATER & LAND USE PLANS & PROGRAMS

IRWM Plan Standards (DWR 2012) require the NCIRWMP identify and align to the extent feasible with existing local "land" and "water" planning (note this document combines these into a single water-land unit, per the integration concept fundamental to the NCRP). Table 7 "Local Water & Land Use Planning Documents for the North Coast Region" compiles existing and developing plans and/or programs of local North Coast entities (e.g. Tribes, counties, RCDs, municipalities, agencies) that are related to North Coast water and/or land management.

The plans are summarized in Figure E11 below ("Local Water and Land Use Plans by Primary Planning Subject.") for each North Coast county, and the North Coast Tribes.

Figure E11 Local Water/Land Use Plans for Counties and Tribes, by Plan Subject

(a) All Entities combined (b) Del Norte (c) Humboldt and (d) Mendocino Counties (e) Siskiyou (f) Sonoma (g) Trinity Counties and (h) North Coast Tribes

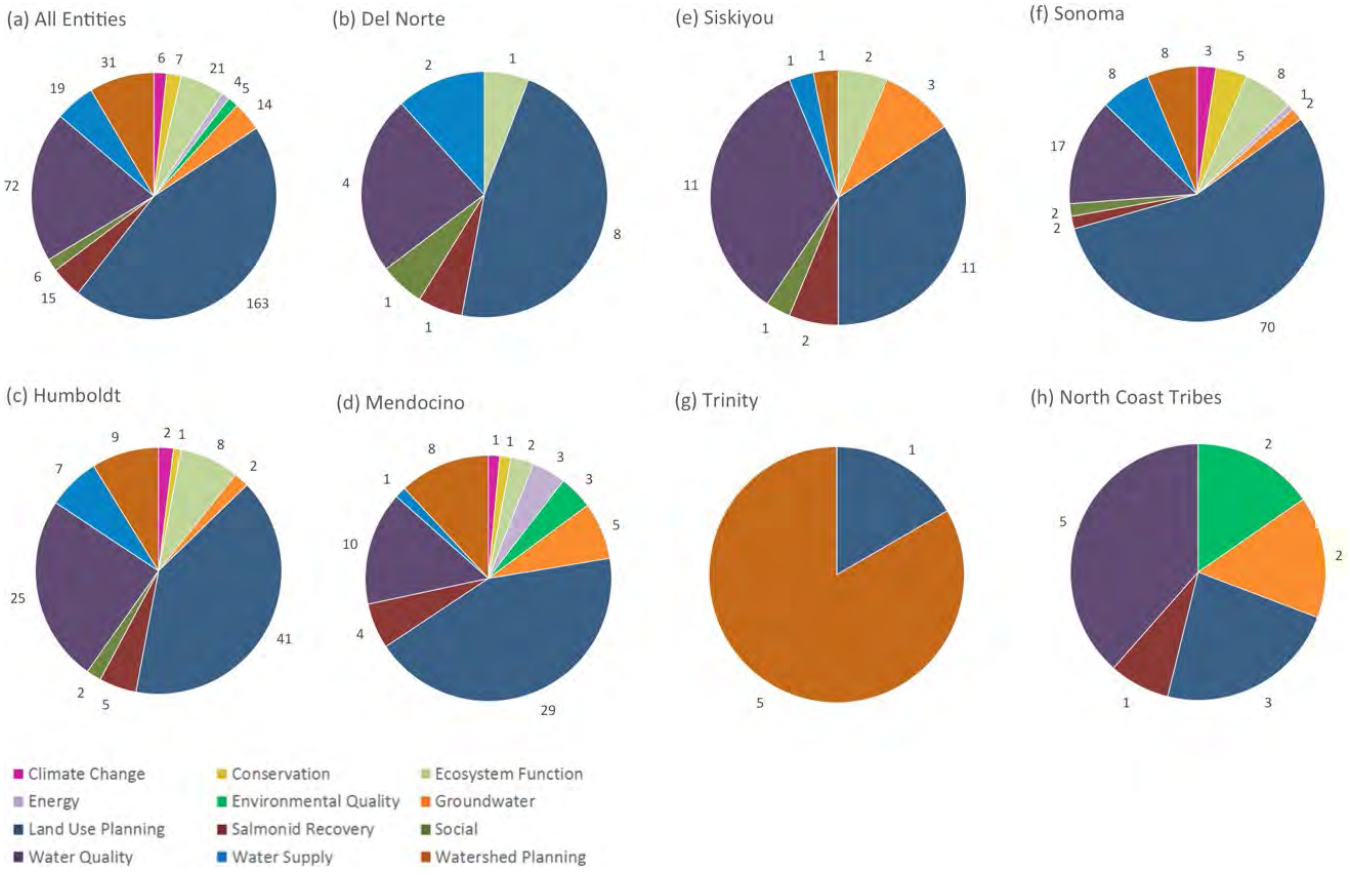


TABLE 7 LOCAL WATER & LAND USE PLANS FOR THE NORTH COAST REGION

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Groundwater	Groundwater Management Plans	Covelo Area Groundwater Management Plan. In progress.	"In September 2004, Covelo CSD published a technical document entitled Groundwater Monitoring Report of Findings, Covelo Community Services District that outlines the results from detailed groundwater assessment and monitoring, as well as the development of recommendations related to groundwater in the service area."	Covelo Community Services District	Tribe: Round Valley Tribes WMA: Eel River County: Mendocino
Groundwater	Groundwater Management Plans	Covelo Area Groundwater Management Plan. In progress.	"In September 2004, Covelo CSD published a technical document entitled Groundwater Monitoring Report of Findings, Covelo Community Services District that outlines the results from detailed groundwater assessment and monitoring, as well as the development of recommendations related to groundwater in the service area."	Covelo Community Services District	Tribe: Round Valley Tribes WMA: Eel River County: Mendocino
Groundwater	Groundwater Management Plans	Humboldt Bay Municipal Water District Groundwater Management Plan. 2005.	"The scope of this GWMP addresses groundwater management issues impacting groundwater extraction in the Lower Mad River Area, in particular, the groundwater basin used by HBMWD."	Humboldt Bay Municipal Water District	WMA: Humboldt Bay County: Humboldt
Groundwater	Groundwater Management Plans	Orick Area Groundwater Management Plan. In progress.	"Orick CSD will be developing a GWMP for the service area...to be completed by June 2007."	Orick Community Services District	WMA: Humboldt Bay County: Humboldt Municipality: Orick
Groundwater	Groundwater Management Plans	Scott Valley Community Groundwater Study Plan. 2008.	"The GW Study Plan is intended to be a living blueprint of the hydrologic, ecologic, water resource management, and agricultural management research needs and of the investigative approaches that can be taken to develop management practices that meet the mandate for protection of water, agricultural, and ecological resources in the Scott Valley. The GW Study Plan summarizes the current status of knowledge about the hydro-agro-eco-geography of the Scott Valley and outlines potential approaches to addressing critical current research needs. Individual study projects and tasks are described and scheduled in a way that is most efficient and timely to make the best use of funds to collect the information and data needed."	North Coast Regional Water Quality Control Board, Siskiyou County RCD, and Siskiyou County	WMA: Klamath River County: Siskiyou
Groundwater	Groundwater Management Plans	Shasta Valley Groundwater Management Plan.	Not yet published.	Siskiyou County	WMA: Klamath River County: Siskiyou
Groundwater	Groundwater Management Plans	Tulelake Irrigation District Groundwater Management Plan. 2012.	"The purpose of this groundwater monitoring plan is to provide a reference and procedural basis for groundwater monitoring in the Tule Lake Subbasin (1-2.01). Using the policies and procedures set forth in this plan the ulelake Irrigation District, hereafter referred to as TID, will regularly and systematically monitor groundwater elevations at designated monitoring sites."	Tulelake Irrigation District	WMA: Klamath River County: Siskiyou
Groundwater	Groundwater Management Plans	Mendocino County Coastal Groundwater Development Guidelines. 1989.	"The County of Mendocino has adopted the following policies which apply to the development of new or expanded groundwater supplies in the coastal areas of the County. These policies and the attendant requirements for proof of water and hydrological studies are intended to assure that development is consistent with the limitations of the local water supply."	Mendocino County	WMA: North Coast Rivers County: Mendocino
Groundwater	Groundwater Management Plans	Draft Santa Rosa Plain Groundwater Plan Goals and Objectives. 2012.	"The goal of the Plan is to locally manage and protect groundwater resources by a balanced group of stakeholders through non-regulatory measures to support all beneficial uses, for present and future generations."	Sonoma County Water Agency and Basin Advisory Panel	WMA: Russian Bodega County: Sonoma

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Groundwater	Groundwater Management Plans	Mendocino County Coastal Ground Water Study. 1982.	"This report culminates two years of data collection and research. It presents reconnaissance-level information on the geologic and hydrologic conditions that influence the occurrence, storage, and recharge of ground water in the coastal Mendocino County area."	Department of Water Resources and Mendocino County Water Agency	County: Mendocino
Groundwater	Groundwater Management Plans	Mendocino Groundwater Management Plan. 2004.	"The GMP allows local government to mandate the amount of naturally occurring groundwater that can be withdrawn from the Town's aquifers on a sustained basis. The purpose of the program is to prevent depletion of the Town's groundwater by not exceeding the aquifers safe yield, which is the amount of water that can be pumped regularly and permanently without dangerous depletion of the groundwater storage reserve. "	Mendocino City Community Services District	County: Mendocino
Groundwater	Groundwater Management Plans	Graton Area Groundwater Management Plan. In progress.	"Graton CSD will be developing a GWMP for their service area. The process for GWMP development is outlined in the NCIRWMP Work Plan, Graton CSD Table A.3. and work item 7. The Graton CSD GWMP will be complete by June 2007."	Graton Community Services District	County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Final Environmental Impact Report: Salt River Ecosystem Restoration Project. 2011.	"This Final Environmental Impact Report addresses the potential environmental impacts of the Salt River Ecosystem Restoration Project (hereinafter called Salt River Project) near Ferndale in Humboldt County. The proposed project entails creation of a new or expanded Salt River channel, restoration of wetland habitat at Riverside Ranch, and upland restoration and erosion control work in the Wildcat Hills. Currently most of the lands on or near the proposed channel and Riverside Ranch are in agricultural (mostly dairy) uses."	Humboldt County Resource Conservation District	WMA: Eel River County: Humboldt
Environmental Quality	Local Watershed Plans and Related Documents	Programmatic Environmental Assessment Comprehensive Integrated Resource Management Plan. 2012.	"The Comprehensive IRMP provides goals and preferred management objectives for the natural, cultural and human resources of the Round Valley Indian Reservation. The plan was developed based on an inventory of resource conditions and issues compiled from existing studies, assessments, and agency data, management workshops, focus groups and a community survey."	Round Valley Indian Tribe	Tribe: Round Valley Tribes WMA: Eel River County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	City of Willits Bicycle and Pedestrian Specific Plan.		City of Willits	WMA: Eel River County: Mendocino Municipality: Willits
Water Quality	Local Watershed Plans and Related Documents	Lower Eel River TMDL for Temperature and Sediment. 2007.	"The purpose of the Lower Eel River TMDLs is to identify the total amount (or load) of sediment and heat that can be delivered to the Lower Eel River and tributaries without exceeding water quality standards, and to subsequently allocate the total amount among the sources of sediment or heat in the watershed. EPA expects the Regional Board to develop an implementation strategy that meets the requirements of 40 CFR 130.6. The allocations, when implemented, are expected to achieve the applicable water quality standards for sediment and temperature for the Lower Eel River and its tributaries."	US EPA	WMA: Eel River County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Van Duzen River and Yager Creek TMDL for Sediment. 1999.	"A primary mission of the TMDL program is to protect the health of impaired aquatic ecosystems by ensuring attainment of water quality standards, including beneficial uses. The development of this TMDL provides a unique and valuable opportunity to look at the entire VDR basin, not just discrete projects or ownership specific projects, to determine the major sediment delivery mechanisms which influence the attainment of applicable state water quality standards (WQS). The results of this TMDL provide a basin-wide framework from which to establish sediment reduction measures to attain WQS."	U.S. Environmental Protection Agency	WMA: Eel River County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Water Quality	Local Watershed Plans and Related Documents	Wiyot Tribe Water Pollution Control Program. 2002.	"In October 2002 the Wiyot Tribe established a waterpolution control grogram under authority of sections 106 and 319 of the federal Clean Water Act. The goals of the program are to: assess and better understand the Tribe's water resources to identify threats and negative stressors to water quality, and monitor and protect the quality of the Tribe's water resources and their uses."	Wiyot Tribe	Tribe: Wiyot Tribe WMA: Eel River County: Humboldt
Watershed Planning	Local Watershed Plans and Related Documents	Salt River Assessment. 2009.	Assessment Components include a description of the watershed location and geography, geology, and climate.	CDFW Coastal Watershed Program	WMA: Eel River County: Humboldt
Watershed Planning	Local Watershed Plans and Related Documents	Salt River Ecosystem Restoration Project Adaptive Management Plan. 2011.	"The purpose of the Salt River Ecosystem Restoration Project (SRERP) is to restore historic processes and functions to the Salt River watershed. These processes and functions are necessary for re-establishing a functioning riverine, riparian, wetland and estuarine ecosystem as part of a land use, flood alleviation, and watershed management program."	Humboldt County RCD	WMA: Eel River County: Humboldt
Ecosystem Function	Local Watershed Plans and Related Documents	Arcata Creeks Management Plan. 1991.	"The purpose of the Arcata Creeks Management Plan is to provide guidance for management of creeks that flow through Arcata in order to provide the fullest realization of the creeks' beneficial uses."	Arcata Environmental Services Department	WMA: Humboldt Bay County: Humboldt Municipality: Arcata
Ecosystem Function	Local Watershed Plans and Related Documents	Humboldt Bay and Eel River Delta Inventory of Monitoring and Restoration Efforts. 2009.	This webpage contains information about data, projects, and resources related to this project. The project was initiated with the stated purpose to: "improve the regional management of wetland resources within the Humboldt Bay and Eel River Delta area by developing a cooperative framework to formulate a regional wetlands strategy."	CDFW Coastal Watershed Program	WMA: Humboldt Bay County: Humboldt
Ecosystem Function	Local Watershed Plans and Related Documents	Humboldt Bay Initiative. 2009.	"The Humboldt Bay Initiative (HBI) — previously the Humboldt Bay Ecosystem Program — seeks to create a coordinated resource management framework that links the needs of people, habitats and species by increasing scientific understanding of the ecosystem."	University of California Agriculture and Natural Resources	WMA: Humboldt Bay County: Humboldt
Ecosystem Function	Local Watershed Plans and Related Documents	Humboldt Bay Regional Invasive Spartina Control and Native Marsh Restoration Planning. 2010.	"The State Coastal Conservancy is working with its partners in the Humboldt Bay region to plan for the control of invasive dense-flowered cordgrass (Spartina densiflora) and the restoration of native tidal marsh vegetation. The Conservancy is beginning the environmental compliance process for this project and is soliciting public input."	California Coastal Conservancy	WMA: Humboldt Bay County: Humboldt
Ecosystem Function	Local Watershed Plans and Related Documents	Humboldt Coastal Dunes Cooperative Memorandum of Understanding for Coordinated Ecosystem Management	"The purpose of the MOU is to promote communication and cooperation between participants on issues and activities related to the beach and dunes areas of Humboldt County. This may include coordinated restoration, regional permitting, providing a forum for public input and discussion on dune issues, the development of scenarios for the protection and acquisition of unprotected, high priority lands, education (including signage) and public outreach, recreation including trail coordination and development, and enforcement. The MOU builds upon the efforts that began in 1996 with the formation of the Dunes Forum, which works to preserve the native biodiversity of the North Coast dune ecosystem, and the goals of the Humboldt County Beach and Dunes Management Plan."	Participants: Wiyot Tribe, BLM Arcata Field Office, Humboldt Bay NWR, Redwood National Park, CSP, North Coast Redwoods District, CDFW, California Coastal Commission, California Coastal Conservancy, County of Humboldt, Manila Community Services District, City of Eureka, Center for Natural Land Management, Friends of the Dunes, McKinleyville Land Trust	WMA: Humboldt Bay County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Ecosystem Function	Local Watershed Plans and Related Documents	McDaniel Slough Enhancement Plan	"This authorization has enabled the City of Arcata to prepare a resource enhancement plan to restore up to 274 acres of former salt marsh, known as McDaniel Slough, while adding additional freshwater wetlands (including treament ponds) to the Arcata Marsh and Wildlife Sanctuary. The McDaniel Slough Enhancement Plan will address three primary project goals—restoration of rare salt marsh habitat, alleviation of flooding and the restoration of natural hydrologic functions, and creation of passive recreational opportunities. By re-establishing tidal action, former coastal wetlands can be reclaimed and restored to fresh, brackish, and salt water wetlands. Enhancement measures identified in the proposed plan will improve habitat and water quality values to benefit wetland dependent species, and endangered salmon and steelhead populations. "	City of Arcata Environmental Services Department	WMA: Humboldt Bay County: Humboldt Municipality: Arcata
Land Use Planning	Local Watershed Plans and Related Documents	Eureka Littoral Cell Coastal Regional Sediment Master Plan. Scheduled for release 12.2012.	"The Eureka Littoral Cell Coastal RSM Plan is currently being developed to assist government entities, municipalities, stakeholders, and the general public in developing strategies for beneficial use of sediments within the coastal region from Trinidad to Cape False Cape, including Humboldt Bay, in order to address coastal erosion. The Plan's purpose is to provide sufficient information for local and regional coastal decision makers to develop policies and execute management sub-plans for the future vitality of beaches and shoreline areas within the Eureka Littoral Cell."	State of California Coastal Sediment Management Workgroup	WMA: Humboldt Bay County: Humboldt
Land Use Planning	Local Watershed Plans and Related Documents	Humboldt Bay Management Plan. 2007.	"This planning document, and the effort is embodied in its creation, is the Humboldt Bay Management Plan and represents the region's first ecosystem-based management approach intended to improve the management of Humboldt Bay."	Humboldt Bay Harbor, Recreation and Conservation District	WMA: Humboldt Bay County: Humboldt
Land Use Planning	Local Watershed Plans and Related Documents	Humboldt Beach and Dunes Management Plan. 1995.	This plan guides the management of beaches and dunes on the spits of Humboldt Bay from Table Bluff to the Mad River.	County of Humboldt	WMA: Humboldt Bay County: Humboldt
Land Use Planning	Local Watershed Plans and Related Documents	Port of Humboldt Bay Harbor Revitalization Plan. 2003.	"The Humboldt Bay Harbor, Recreation and Conservation District—along with the City of Eureka and Humboldt County—has undertaken the Port of Humboldt Bay Harbor Revitalization Plan aimed at establishing a new and sustainable maritime focus for the community."	Humboldt Bay Harbor, Recreation and Conservation District	WMA: Humboldt Bay County: Humboldt
Salmonid Recovery	Local Watershed Plans and Related Documents	Humboldt Bay Watershed Action Plan and Enhancement Plan.	The focus of this citizen-led plan is on salmonid and other fisheries. DFG provides technical assistance and the project has received two consecutive 319 (h) grants.	California Department of Fish and Game	WMA: Humboldt Bay County: Humboldt
Salmonid Recovery	Local Watershed Plans and Related Documents	Humboldt Bay Watershed Enhancement Program	"The overall goal of this project is to improve the effectiveness of salmonid restoration and protection efforts in the Humboldt Bay watershed through implementation of the goals and objectives specified in the Humboldt Bay Salmon and Steelhead Conservation Plan that is being developed as part of this effort."	Natural Resources Service: A Division of Redwood Community Action Agency	WMA: Humboldt Bay County: Humboldt
Salmonid Recovery	Local Watershed Plans and Related Documents	Humboldt Bay Watershed Salmon and Steelhead Conservation Plan. 2005.	"The Plan is an assimilation of watershed information, followed by goals and objectives aimed at protecting and/or restoring watershed processes in order to preserve and enhance salmon and steelhead habitat in the sub-watersheds of Humboldt Bay. The SSCP offers the foundation for a framework to systematically and cooperatively engage in salmonid habitat enhancement efforts in Humboldt Bay watershed. The long-term purpose of the SSCP is to encourage cooperative planning and implementation for salmonid conservation."	Humboldt Bay Watershed Advisory Committee and Redwood Community Action Agency Division of Natural Resources	WMA: Humboldt Bay County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Salmonid Recovery	Local Watershed Plans and Related Documents	Martin Slough Enhancement Plan	"Martin Slough is a degraded, partially urbanized stream flowing through the City of Eureka, through the Eureka Municipal Golf Course, and into Swain Slough, tributary to the lower Elk River, south of Eureka. The grantee is developing an enhancement plan to restore natural hydraulic functions, salmonid habitat, and properly functioning tidal wetlands to lower Martin Slough, as well as providing improved public access to the Elk River Wildlife Area. Recovery of natural hydraulic function will improve management opportunities at the Eureka Municipal Golf Course by diminishing flooding in the area. Recovery of tidal salmonid habitat in the lower reaches of Martin Slough will increase available rearing habitat for juvenile salmonids. The recovery of tidal wetlands will increase an important type of habitat that has been significantly degraded or lost in and around Humboldt Bay."	Natural Resources Services Division of the Redwood Community Action Agency	WMA: Humboldt Bay County: Humboldt
Salmonid Recovery	Local Watershed Plans and Related Documents	Redwood Creek Basin Assessment. 2006.	Report provides a basin level geologic evaluation, description of vegetation change, land use, geology, hydrology, water quality, instream habitat conditions, and distribution and status of anadromous salmonids. It provides an evaluation of watershed conditions and land use and recommendations for management, restoration activities and monitoring.	CDFW Coastal Watershed Planning and Assessment Program and North Coast Watershed Assessment Program	WMA: Humboldt Bay County: Humboldt
Social	Local Watershed Plans and Related Documents	Strategy for the Lindsay Creek Watershed & Community. 2005.	"The Strategy incorporates characteristics of a community plan, a watershed plan, and a community 'visioning' document. It begins with information related to the overall project, defines watershed and community based assessment, and concludes with recommendations for community-initiated action, local government policy, and state and federal consideration."	Natural Resources Services Division of Redwood Community Action Agency	WMA: Humboldt Bay County: Humboldt
Social	Local Watershed Plans and Related Documents	Tsurai Management Plan Final. 2007.	"The goal of this project has been to identify areas and causes of past conflict between interested parties over management and implementation decisions concerning the Tsurai Study Area (TSA), to make recommendations to resolve and prevent such conflict to identify areas of common ground for potential collaboration, and to provide specific recommendations and future projects intended to help protect, preserve, and where possible restore, the cultural, natural and recreational resources within the TSA for the benefit of future generations."	Tsurai Management Team: California Coastal Conservancy, City of Trinidad, Tsurai Ancestral Society, Yurok Tribe	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Elk River Sediment TMDL	"At this time, the Regional Water Board staff is in the process of developing a TMDL for sediment in the Elk River watershed. The purpose of the TMDL is to establish loading capacities for sediment while meeting water quality standards and restoring beneficial uses of water of Elk River and its tributaries. Regional Water Board staff are developing the technical aspects of the TMDL including source assessment and load allocations as well as the implementation strategy/program to describe the nature of actions necessary to achieve water quality objectives, a time schedule for the actions to be taken, and monitoring to determine compliance with objectives, for the Boards consideration. "	North Coast Regional Water Quality Control Board	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Freshwater Creek Sediment TMDL	"At this time, the Regional Water Board staff is in the process of establishing a TMDL for sediment in the Freshwater Creek watershed. The goal of the TMDL program is to restore and maintain the sediment impaired beneficial uses of water of Freshwater Creek and its tributaries. Staff will develop the technical TMDL, the implementation, and monitoring plans together."	North Coast Regional Water Quality Control Board	WMA: Humboldt Bay County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Water Quality	Local Watershed Plans and Related Documents	Humboldt Bay First Flush Quality Assurance Project Plan. 2004.	"This Quality Assurance Project Plan covers a volunteer citizen monitoring project called Humboldt Bay First Flush (HBFF). The project is a part of the SWRCB funded program Humboldt Bay Water Quality Improvement Program (HBWQIP). The goal of the HBWQIP is to protect and improve the water quality and environment of the Humboldt Bay and its tributaries through (1) coordinated monitoring of non-point source pollution and (2) conducting public education, outreach, and participation program to reduce pollution from urban runoff and septic systems. The HBFF Project is a hands-on activity to engage and educate local citizens regarding the effects of non-point source pollution in our watersheds. "	Redwood Community Action Agency	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Humboldt Bay PCBs TMDL	Scheduled for completion January 2019.	North Coast Regional Water Quality Control Board	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Humboldt Bay Water Quality Improvement Program.	"The goal of the Humboldt Bay Water Quality Improvement Program (HBWQIP) is to protect and improve the water quality and environment of the Humboldt Bay and its tributaries through: (1) coordinated monitoring of non-point source pollution; and (2) conducting public education, outreach, and participation program to reduce pollution from urban runoff and septic systems."	Natural Resources Service: A Division of Redwood Community Action Agency	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Jacoby Creek Sediment TMDL	Scheduled for completion January 2019.	North Coast Regional Water Quality Control Board	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Mad River Sediment and Turbidity TMDL. 2007.	"The primary purpose of the sediment and turbidity Total Maximum Daily Loads (TMDL) for California's Mad River is to assure that beneficial uses of water (such as salmonid habitat) are protected from detrimental increases in sediment and turbidity. The TMDLs set the maximum levels of pollutants that the waterbody can receive without exceeding water quality standards, an important step in achieving water quality standards for the Mad River basin."	North Coast Regional Water Quality Control Board	WMA: Humboldt Bay County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Redwood Creek Sediment TMDL. 1998.	"Redwood Creek watershed is a forested watershed located north of Eureka in northwestern California. The purpose of the Redwood Creek TMDL is to identify total allowable loads and loading allocations that, when implemented, are expected to result in attainment of applicable water quality standards for sediment."	U.S. EPA	WMA: Humboldt Bay County: Humboldt
Watershed Planning	Local Watershed Plans and Related Documents	Humboldt Bay Initiative: Adaptive Management in a Changing World. 2009.	"This strategic plan is divided into two sections: Section 1and Section 2. In the remainder of the introduction we trace the evolution of HBI, describe program participation, and describe the strategic planning process. Section 1 describes the project in terms of its scope and conservation targets, the current state of the system and critical threats. Section 2 describes our strategies and work plans for addressing the critical threats."	Humboldt Bay Initiative Project Team	WMA: Humboldt Bay County: Humboldt
Watershed Planning	Local Watershed Plans and Related Documents	Humboldt Beach and Dunes Coordinated Resource Management Plan (CRMP). 2002.	This plan provides a coordinated resource planning framework for the coastal dunes and beaches with respect to acquisition, restoration, access, improvements, enforcement, and other issues and projects.	County of Humboldt and California State Coastal Conservancy	WMA: Humboldt Bay County: Humboldt

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Watershed Planning	Local Watershed Plans and Related Documents	Trinidad-Westhaven Integrated Coastal Watershed Management Plan. 2008.	"The Trinidad-Westhaven Integrated Coastal Watershed Management Plan (ICWMP) has been developed in order to improve surface water quality in Trinidad Bay and the watersheds that drain into it. The driving forces behind this effort include regulatory requirements, the need to protect local drinking water supplies, and a general concern for the ecological health of the region."	Trinidad Regional Water Management Working Group	WMA: Humboldt Bay County: Humboldt
Watershed Planning	Local Watershed Plans and Related Documents	Van Duzen River Subbasins Recommendations. 2009.	This website contains a watershed overview, maps, descriptive statistics, a description of the salmonid fishery resources, and recommendations for the Yager, Lower, Middle, and Upper subbasins.	CDFW Coastal Watershed Program	WMA: Humboldt Bay County: Humboldt
Economics	Local Watershed Plans and Related Documents	Community Restoration Plan. 2000.	"Our mission is to assess, protect, restore and maintain the Salmon River aquatic, terrestrial, and human ecosystem, highlighting the recovery of the anadromous fisheries resources through the active participation of the local community and other stakeholders. We will diversify the local economic base, focusing on restoration and will improve communication and cooperation between the stakeholders, including the local community, the managing agencies, Native American tribes, resource users, public interest organizations and the general public."	Salmon River Restoration Council	WMA: Klamath River County: Siskiyou
Ecosystem Function	Local Watershed Plans and Related Documents	Salmon River Noxious Weed Control Program and Management Plan for Restoring Native Plant Communities: Draft Action Plan for the Salmon River Restoration Council. 2002.	"In this plan we hope to set forth a model for managing various types of noxious weeds in other wildlands. This plan empowers communities, organizations, tribes, landowners, agencies, individuals, and others to meet the challenge."	Salmon River Restoration Council	WMA: Klamath River County: Siskiyou
Ecosystem Function	Local Watershed Plans and Related Documents	Salmon River Subbasin Restoration Strategy: Steps to recovery and conservation of aquatic resources. 2002.	"This strategy aims to accelerate rehabilitation of watershed conditions within the Salmon River subbasin by targeting collaborative restoration and protection efforts at high priority drainages. Using an ecosystem-based foundation, the proposed approach focuses on restoring the biological, geologic and hydrologic processes which ultimately shape the quality of aquatic habitat within the subbasin. Building upon information gathered through watershed analyses, transportation planning documents (road access and travel management plans or roads analysis process), and other administrative investigations, this strategy articulates an action plan focused upon reduction of upslope hazards in drainages regaining high quality aquatic habitat and intact native fish communities."	Klamath National Forest and Salmon River Restoration Council for Klamath River Basin Fisheries Restoration Task Force	WMA: Klamath River County: Siskiyou
Salmonid Recovery	Local Watershed Plans and Related Documents	Lower Klamath River Sub-basin Watershed Restoration Plan 2003	Outlines the "training and implementation efforts, prioritized future restoration activities for the sub-basin, and identified tributaries where the activities would be implemented."	Yurok Tribal Fisheries Program	Tribe: Yurok Tribe WMA: Klamath River County: Multiple

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Salmonid Recovery	Local Watershed Plans and Related Documents	Scott River Spawning Gravel Evaluation and Enhancement Plan. 2010.	"The document provides a description of the scientific approach used to identify salmonid spawning habitat conditions and prioritize potential enhancement locations and the results of the application of this approach on the Scott River Watershed. The broad-level study approach has been designed to use best available data and field sampling to assess watershed processes and determine potential impacts to salmonid spawning and incubation habitat. The Plan provides watershed stakeholders with a framework for identifying, quantifying and qualifying spawning habitat for anadromous salmonids within the Scott River Basin and for prioritizing and strategizing the protection and maintenance of quality habitat as well as enhancement of sub-optimal habitat."	Pacific States Marine Fisheries Commission and CDFW	WMA: Klamath River County: Siskiyou
Social	Local Watershed Plans and Related Documents	Community Wildfire Protection Plan. 2012.	The Lower Scott River Fire Safe Council Community Wildfire Protection Plan documents current fire concerns, infrastructure, risks, and actions possible to avert great loss of property and threat to human life and safety in the 24,648 acres of private and public lands designated as the Fire Safe Council Area.	Lower Scott River Fire Safe Council	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Lower Lost River TMDL for Nutrients and Temperature. 2004.	"The Upper Lost River/Clear Lake Reservoir area is listed as impaired for nutrients and temperature in accordance with Section 303(d) of the federal Clean Water Act (CWA). The listings apparently were conferred from the Klamath River listings and not based on data or information specific to the Upper Lost River and Clear Lake Reservoir watershed. The appropriateness of the nutrients and temperature listings in the Upper Lost River is explored in this analysis. If the listings had been confirmed a TMDL would have been developed, however, the listings were not confirmed and de-listing for the watershed (including Clear Lake Reservoir, the streams draining to Clear Lake Reservoir and the Upper Lost River between the Clear Lake Reservoir dam and the Oregon border) is recommended."	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Del Norte
Water Quality	Local Watershed Plans and Related Documents	Action Plan for the Scott River Sediment and Temperature Total Maximum Daily Loads. 2005.	"The Scott River TMDL Action Plan includes the sediment and temperature TMDLs, the strategy to achieve the TMDLs and water quality standards, and draws upon the information presented in the Staff Report. The Scott River TMDL Action plan is proposed as an amendment to the Water Quality Control Plan for the North Coast Region (the Basin Plan) for adoption by the North Coast Regional Water Quality Control Board (Regional Water Board) and the State Water Resources Control Board (State Water Board) "	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Action Plan for the Shasta River Watershed Temperature and Dissolved Oxygen TMDLs. 2006.	"This Action Plan for the Shasta River Temperature and Dissolved Oxygen Total Maximum Daily Loads, hereinafter known as the Shasta River TMDL Action Plan, includes temperature and dissolved oxygen total maximum daily loads (TMDLs) and describes the implementation actions necessary to achieve the TMDLs and attain water quality standards in the Shasta River watershed. "	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Initial Phase of the Scott River Watershed Council Strategic Action Plan — October 2005 Update	"The Scott River Watershed Council (SRWC) has developed this plan for the Scott River watershed for the purpose of cooperatively establishing a common strategy for restoration and management actions. Thus, the Scott River Watershed Strategic Action Plan (SAP) will form the basis for setting priorities for future projects and practices to be supported by the SRWC, the communities within the watershed, and the many funding sources."	Scott River Watershed Council	WMA: Klamath River County: Siskiyou

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Water Quality	Local Watershed Plans and Related Documents	Salmon River Temperature TMDL. 2005.	"The objective of the Salmon River temperature TMDL is to provide estimates of the assimilative capacity of the river by identifying the total load of thermal inputs that can be delivered to the Salmon River and its tributaries without causing exceedence of water quality standards. The total load must then be allocated among the sources of thermal loading in the watershed. The load allocation, when achieved, is expected to result in the attainment of the applicable water quality standard for temperature for the Salmon River and its tributaries. "	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Scott River Watershed Fish Population and Habitat Plan. 1995.	Includes fish habitat objective, riparian habitat objective, fish population objective, and other objectives to improve salmonid habitat. Lists tasks to be implemented by willing landowners to achieve stated objectives.	Scott River Watershed CRMP	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Staff Report for the Action Plan for the Scott River Sediment & Temperature Total Maximum Daily Loads. 2005.	"The support, justification, and technical analysis upon which the Scott River TMDL Action Plan is based can be found in this Staff Report. "	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Siskiyou
Water Quality	Local Watershed Plans and Related Documents	Staff Report for the Action Plan for the Shasta River Temperature and Dissolved Oxygen TMDLs. 2006.	"The Shasta River TMDL is comprised of two distinct parts: the Staff Report and the Action Plan. This document is the Staff Report that supports and justifies the Action Plan."	North Coast Regional Water Quality Control Board	WMA: Klamath River County: Siskiyou
Watershed Planning	Local Watershed Plans and Related Documents	Shasta Watershed Restoration Plan. 1997.	"This document is divided into sections. On the following pages is the C R P Action Plan, presented with as little explanatory text as possible. Following that is the Calif. Department of Fish and Game's Biological Needs Assessment that is attached as a separate document. The Biological Needs Assessment consists of a description of the conditions desirable for salmon and steelhead, along with a summary of current conditions in the Shasta River. The Biological Needs Assessment should provide enough information to understand the need for the actions called for in the CRMP Action Plan." The Watershed Plan is currently being revised; the updated Plan is expected to be completed and approved by 2008.	Shasta River Coordinated Resource Management Planning Committee and Shasta Valley RCD	WMA: Klamath River County: Siskiyou
Ecosystem Function	Local Watershed Plans and Related Documents	Smith River Estuary Enhancement Program	"The Smith River Project launched the Estuary Enhancement Program in the fall of 2000 to protect this vital coastal wetland and nearby human populations. Our project is the first organized effort of its kind to protect the Smith River Estuary from the intensive chemical spraying and habitat destruction that has threatened its health over the past half-century."	The Smith River Project	WMA: North Coast Rivers County: Del Norte
Ecosystem Function	Local Watershed Plans and Related Documents	The Petrolia-Area Broom Plan: An Action Plan for Containing, Reducing, and Eradicating Invasive Broom. Undated.	"The Broom Brush Action Plan: Petrolia Area is the first in a series of neighborhood action plans for containing and eradicating Scotch Broom, one of the more pernicious invasives that has established in the Mattole's grasslands. Eradication matters because it threatens native and working grasslands, lowers land values, and creates higher fuel-load conditions for wildfire."	Mattole Restoration Council	WMA: North Coast Rivers County: Humboldt

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Ecosystem Function	Local Watershed Plans and Related Documents	Garcia River Gravel Management Plan. 1996.	"The goal of the plan is to address impacts of gravel extraction and to provide management recommendations to minimize impacts to fisheries and riparian habitat, channel morphology, and fluvial processes. The objective of the plan is to characterize sediment transport processes, and fisheries and riparian resources in the Garcia River Watershed and to identify non-stream sources of gravel. The gravel management plan integrates the biologic, hydrologic, and geomorphic issues to develop a rationale for the kind of sites and methods appropriate for in-channel and off-channel gravel excavation."	Mendocino County Water Agency	WMA: North Coast Rivers County: Mendocino
Ecosystem Function	Local Watershed Plans and Related Documents	Nearshore Currents and Littoral Drift Study Plan. 2007.	"A study plan is outlined here to characterize coastal currents by establishing mid-range HF radar coverage for the central Mendocino coast. It will provide the foundation for a variety of targeted studies that may be required in the future to protect and manage the coastline as part of the Noyo/Big River Integrated Coastal Watershed Management plan. The approach is compatible with ocean observation networks already in place throughout the state. Cooperation between Mendocino and the established ocean observing associations will benefit the entire region."	Mendocino Water Agency	WMA: North Coast Rivers County: Mendocino
Energy	Local Watershed Plans and Related Documents	Pre-feasibility Study Biomass Power Plan Fort Bragg, Mendocino County, California. 2007.	"This review surveys and compiles current studies regarding biomass-based electric production and specifi cally applies existing knowledge to a potential facility in Fort Bragg, California, where the City Council has expressed interest in the economic development potential of a possible biomass power installation."	North Coast Resource Conservation and Development Council	WMA: North Coast Rivers County: Mendocino
Energy	Local Watershed Plans and Related Documents	Preliminary Feasibility Study for a Biomass Power and Thermal Heat Facility located at the Parlin Fork Conservation Camp. 2009.	"The primary objective of this study is to assess the feasibility of developing a sustainable electrical energy and heat producing facility that would use as fuel that has been traditionally underutilized: woody biomass that is generated as a result of regional fuels treatment activities and woody biomass from traditional logging and forest restoration activities. This study provides a project assessment with the goal of being environmentally sound, socially compatible, and economically viable, employing appropriate combined heat and electrical power generating technology and utilizing locally available fuels that are underutilized."	North Coast Resource Conservation and Development Council	WMA: North Coast Rivers County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	"Land Laying Outward Place" Point Saint George Management Plan. 2004.	Management Plan includes: "Protection and interpretation of natural resources; wildlife habitat preservation, restoration, and management; wildlife-oriented education and research; preservation, management, and interpretation of cultural resources; and compatible public access and uses and open space protection as may be consistent with the other purposes.	County of Del Norte and State Coastal Conservancy	WMA: North Coast Rivers County: Del Norte
Land Use Planning	Local Watershed Plans and Related Documents	Lake Earl Wildlife Area Management Plan Draft. 2003.		California Department of Fish and Game	WMA: North Coast Rivers County: Del Norte
Land Use Planning	Local Watershed Plans and Related Documents	Mill Creek Interim Management Recommendations. 2002.	"The Mill Creek property was acquired by the State of California to (1) protect and restore the property's ecological values, (2) enhance regional ecological values by improving habitat connectivity between state and federal conservation areas, and (3) provide opportunities for compatible public use. Interim Management Recommendations (IMR) were developed to guide protection, restoration, and public use of the Mill Creek property until DPR adopts a General Plan for the property. The IMR planning process involved initial scoping meetings with resource agencies, focused working groups, and the public to define important interim management issues related to the Mill Creek property."	Save-the-Redwoods League	WMA: North Coast Rivers County: Humboldt

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Land Use Planning	Local Watershed Plans and Related Documents	The Community Plan for the Mill Creek Watershed. 2005.	"The Community Plan for Mill Creek was developed to manage 675 acres of land in the Mill Creek watershed. The Community Plan considers three management alternatives. The MCWC has selected Alternative C, Re-Wilding, as their preferred alternative. The Re-Wilding Alternative provides management direction and specific actions intended to restore the natural values of Mill Creek watershed's ecosystem to healthy abundance by careful actions that will enable the forests of the watershed to return to the pre-1940's condition, in terms of vegetative mosaic and structural complexity. Primary goals and measures of accomplishment are that fire hazard is reduced, wildlife habitat restored, and aquatic habitat and fisheries are protected."	Mill Creek Watershed Conservancy, Mattole Restoration Council, & Kate Crockett	WMA: North Coast Rivers County: Humboldt
Land Use Planning	Local Watershed Plans and Related Documents	Jackson Demonstration State Forest Management Plan. 2008.	"This Management Plan accomplishes the goals of synthesizing the knowledge of current resource conditions on JDSF, articulating the desired future structure of the Forest, defining a path to that future condition, and establishing abundant opportunities for future research and demonstration activities. It will guide forest management in a number of key areas, including research and demonstration, sustainable forestry operations, monitoring and research, road management, recreational opportunities, and protection and restoration of wildlife habitat. Chapter 3 provides the details on desired future conditions and planned management for JDSF. Chapter 4 focuses specifically on the research and demonstration program. Chapter 5 addresses monitoring and adaptive management."	California Department of Forestry and Fire Protection	WMA: North Coast Rivers County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	Mitigated Negative Declaration for the InterTribal Sinkyone Wilderness Public Trails Project. 2012.	"The State Coastal Conservancy is making available for public comment its Mitigated Negative Declaration (MND) for the InterTribal Sinkyone Wilderness Public Trails Project. The project is located on the InterTribal Sinkyone Wilderness (ITSW) property located in the Lost Coast Region of Mendocino County. The MND addresses potential impacts from the implementation of the InterTribal Sinkyone Wilderness Plan for Limited Public Access, prepared in 2004,for the development of up to three trails totaling approximately 2.32 miles, and associated facilities, to provide the public with access across the ITSW to connect with the system of public trails on the Sinkyone Wilderness State Park."	California State Coastal Conservancy	WMA: North Coast Rivers County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	Navarro-by-the-Sea Specific Plan Navarro River Redwoods State Park. 2008.	"This Specific Plan envisions the rehabilitation and management of both the Navarro-by-the-Sea Historic District and the estuary ecosystems. The historic buildings and cultural features will be rehabilitated to support a variety of individual and community day use activities. Major estuary activities will include riparian and estuarine research, vegetation and watershed management, and wetland enhancement, all of which support a healthy and diverse natural landscape."	California State Parks Mendocino District and Navarro-by-the-Sea Center	WMA: North Coast Rivers County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	Sinkyone Wilderess State Park Preliminary General Plan and Draft Environmental Impact Report. 2006.	"The General Plan contains comprehensive and integrated sets of park-wide and management area-specific goals and guidelines for the long-term management of the Park. The goals and guidelines focus on the protection of sensitive resources, improvements to administration and operation of the Park, and balancing of visitor needs with the unique wilderness character of the Park."	California Department of Parks and Recreation	WMA: North Coast Rivers County: Mendocino
Salmonid Recovery	Local Watershed Plans and Related Documents	Smith River Anadromous Fish Action Plan. 2002.	"A basin-wide plan that guides management activities on public and private land based upon established ecological principles in order to maintain and enhance the anadromous salmonid populations in the Smith River."	County of Del Norte	WMA: North Coast Rivers County: Del Norte

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Salmonid Recovery	Local Watershed Plans and Related Documents	Assessment of Stream Habitat Conditions, and Recommendations for Improvement, in the Noyo River Hydrologic Sub-Area	"This restoration planning assessment provides guidance to habitat restoration efforts in the Noyo River Hydrologic Sub-Area (HSA) in Mendocino County. It appraises habitat conditions, recommends measures to improve habitat, and identifies streams having particularly good habitat conditions."	California Department of Fish and Game	WMA: North Coast Rivers County: Mendocino
Salmonid Recovery	Local Watershed Plans and Related Documents	Garcia River Watershed Enhancement Plan. 1992.	"The Plan reviews historical changes in the watershed and provides extensive field investigation in portions of the watershed to analyze present conditions. The Plan objective is to develop feasible, cost-effective techniques to reduce erosion and sedimentation, and to restore the fishery, riparian and estuarine resources of the Garcia."	Mendocino County Resource Conservation District	WMA: North Coast Rivers County: Mendocino
Salmonid Recovery	Local Watershed Plans and Related Documents	Navarro Watershed Restoration Plan. 1988.	"Background studies for the Plan include hydrology, geomorphology, sediment production, salmonid habitat condition and distribution, stream flow, stream temperature, water quality, land use patterns, and impacts of the major historical and current land uses. Based on these studies, the Plan makes recommendations for voluntary restoration and conservation actions to benefit water quality in general and the salmon fishery in particular."	Mendocino County Water Agency, The Coastal Conservancy & Anderson Valley Land Trust	WMA: North Coast Rivers County: Mendocino
Salmonid Recovery	Local Watershed Plans and Related Documents	Noyo River Watershed Analysis Report, 1998	Mendocino Redwood Co., LLC (MRC) began conducting fisheries studies in conjunction with its watershed analysis program to identify fish distribution and abundance, fish habitat quality and quantity, as well as potential restoration or enhancement projects. Noyo River Watershed Analysis Report include watershed analysis comprised of mass wasting, surface erosion, hydrology, riparian function, stream channel condition, fish habitat assessment, sediment budget, and prescriptions.	Mendocino Redwood Co., LLC	WMA: North Coast Rivers County: Mendocino
Water Quality	Local Watershed Plans and Related Documents	Dynamics of Recovery: A plan to enhance the Mattole Estuary. 1995.	"This report includes recommendations to identify for treatment the most important sources of upslope erosion, with a focus on the biggest contributors: roads. Because prevention is easier than cure, it would be best to keep these sites from eroding instead of trying to ameliorate the erosion once it has begun, or attempting to repair the damage once the sediment reaches the watercourse. Riparian reforestation is another crucial element in this plan."	Mattole Restoration Council	WMA: North Coast Rivers County: Humboldt
Water Quality	Local Watershed Plans and Related Documents	Action Plan for the Garcia River Watershed Sediment Total Maximum Daily Load. 2002.	"The following Action Plan describes the approach of the Regional Water Board to achieve sedimentation reduction and attain beneficial uses in the Garcia River watershed and serves as a phased TMDL, implementation plan, and monitoring plan for the Garcia River watershed. As a phased TMDL, it will be updated and revised, through Basin Plan amendments, based on new information gathered by Regional Water Board staff and/or submitted by landowners, other agencies, academic institutions and the public that provides an improved assessment of conditions in the Garcia River watershed."	North Coast Regional Water Quality Control Board	WMA: North Coast Rivers County: Mendocino
Water Quality	Local Watershed Plans and Related Documents	Albion River Sediment TMDL. 2001.	"The purpose of the Albion River TMDL is to identify the total load of sediment that can be delivered to the Albion River and its tributaries without causing exceedence of water quality standards, and to allocate the total load among the sources of sediment in the watershed."	U.S. Environmental Protection Agency.	WMA: North Coast Rivers County: Mendocino
Water Quality	Local Watershed Plans and Related Documents	Big River Total Maximum Daily Load for Sediment. 2001.	"The purpose of the Big River TMDL is to identify the total load of sediment that can be delivered to the Big River and its tributaries without causing exceedence of water quality standards, and to allocate the total load among the sources of sediment in the watershed."	North Coast Regional Water Quality Control Board, U.S. EPA	WMA: North Coast Rivers County: Mendocino

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Water Quality	Local Watershed Plans and Related Documents	Navarro River Sediment & Temperature TMDL. 2000.	"The primary purpose of the Navarro River TMDLs is to identify temperature and sediment loading allocations at levels which are necessary to implement water quality standards for temperature and sediment for the Navarro River and its tributaries."	U.S. Environmental Protection Agency.	WMA: North Coast Rivers County: Mendocino
Water Quality	Local Watershed Plans and Related Documents	Noyo River Total Maximum Daily Load. 1999.	"The primary purpose of the Noyo River TMDL for sediment is to identify sediment loading allocations that, when implemented, are expected to result in the attainment of the applicable water quality criteria for sediment. These criteria are established in order to protect beneficial uses. The primary beneficial use of concern is the salmonid fishery, particularly the coho salmon (Oncorhynchus kisutch) fishery."	North Coast Regional Water Quality Control Board	WMA: North Coast Rivers County: Mendocino
Water Quality	Local Watershed Plans and Related Documents	Ten Mile River Sediment & Temperature TMDL. 2005	"The U.S. Environmental Protection Agency (EPA) is establishing the Ten Mile River Total Maximum Daily Load (TMDL) for sediment to identify sediment loading allocations that are necessary to implement water quality standards for sediment, established to protect the beneficial uses of the Ten Mile River."	North Cost Regional Water Quality Control Board	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Albion Basin Assessment. 2004.	Report contains descriptions of vegetation and land use change, geology, hydrology, water quality, and instream habitat conditions. It provides an evaluation of salmonid habitat availability, and recommendations for management and restoration activities.	CDFW North Coast Watershed Assessment Program	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Big River Basin Assessment. 2006.	This assessment contains information about salmonid populations, habitat conditions, impacts of geologic, vegetative, fluvial and other natural processes on watershed conditions, and land use factors. It presents limiting factors for salmonid production and recommended watershed management and habitat improvement implementation efforts.	Coastal Watershed Planning Assessment Program	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Big River Preliminary Plan: Resource Assessment and Recommendations. 2005.	Mendocino Land Trust developed a preliminary management plan for the Big River unit of Mendocino Headlands State Park in consultation with the California Department of Parks and Recreation and the California State Coastal Conservancy. The purpose of the plan was to compile existing information about the Big River unit, perform initial analyses in support of long term planning and adaptive management, and provide recommendations for future assessment, analysis and implementation.	Mendocino Land Trust, California State Coastal Conservancy, California Department of Parks and Recreation	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Big River Watershed Maps, Data and Publications.	This website contains maps of geologic and geomorphic figures, GIS data, and explanatory text.	California Geologic Survey	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Noyo River Watershed Enhancement Plan. 2007.	"The purpose of the Noyo RiverWatershed Enhancement Plan (Noyo WEP) is to compile existing information for the Noyo River Watershed and to identify and describe strategic management and restoration activities—including detailed project descriptions, cost estimates and schedules. The Noyo WEP is designed to complement other planning efforts within and proximate to the watershed, and is intended to integrate with local planning efforts as well as larger regional, state and federal planning frameworks."	California State Coastal Conservancy, Mendocino County Water Agency, Trout Unlimited	WMA: North Coast Rivers County: Mendocino

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Watershed Planning	Local Watershed Plans and Related Documents	Noyo/Big River Integrated Coastal Watershed Management Plan. In Development.	"A more detailed integrated regional water management plan for a sub area encompassed by the geographically larger North Coast Integrated Regional Water Management Plan. The objective is to develop an integrated regional water management plan for the Noyo and Big River drainages, a plan that will qualify the Noyo and Big River drainages for State and Federal grant opportunities. Funding for the preparation of this plan was obtained from the State by the Water Agency."	Mendocino County Water Agency	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Watershed Assessment and Cooperative Instream Monitoring Plan for the Garcia River Mendocino County, California. 1998.	"This report develops an Instream Monitoring Plan for the Garcia River watershed, Mendocino County, California. In so doing, it (1) estimates sediment sources through a remote analysis, (2) synthesizes impact and sensitivity data, (3) evaluates present information and data collection needs in the watershed, (4) proposes data collection protocols, an implementation plan and a budget, and (5) suggests sites for conjunctive hillslope-instream monitoring."	Forest, Soil & Water, Inc., O'Connor Environmental, Inc., and East-West Forestry	WMA: North Coast Rivers County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Watershed Guidelines for Big River Watershed, Mendocino, CA	The Big River Watershed Council developed the Watershed Guidelines for Big River Watershed in 1997 to provide the National Marine Fisheries Service with a set of practical, enforceable, and scientifically-based guidelines that will provide for immediate measures to protect coho salmon and their habitat in the Big River watershed.	Big River Watershed Council	WMA: North Coast Rivers County: Mendocino
Conservation	Local Watershed Plans and Related Documents	Laguna Watershed Research Plan. 2008.	"With the guidance of the Laguna Science Advisory Council (LSAC), a group of 28 local and regional academic and agency scientists, the Laguna Foundation Science Program has developed this five-year research plan to effectively guide the conservation and restoration in the Laguna de Santa Rosa watershed."	Laguna de Santa Rosa Foundation	WMA: Russian Bodega County: Sonoma
Conservation	Local Watershed Plans and Related Documents	Russian River/ North Coast Parcel Analysis. 2002.	"This report builds on the Sonoma County Coastal Parcel Study by presenting a strategic approach to land and resource conservation for the Sonoma Coast from the Russian River north to the Mendocino County line. A series of maps describe land use, existing conservation lands, natural resource and recreational values in this area. This information is analyzed to develop a priority list of 12 properties whose acquisition will significantly advance landscape scale conservation in the region."	Sonoma Land Trust	WMA: Russian Bodega County: Sonoma
Conservation	Local Watershed Plans and Related Documents	Sonoma County Coastal Parcel Study. 1999.	"The Sonoma Coast between the Russian River and the Marin County border is an area of spectacular beauty, diversity and abundant natural resources. This report analyzes existing land use and presents an acquisition strategy that identifies properties that have exceptional resource values, are adjacent to existing conservation lands and provide the potential for public access. Primary and secondary acquisition targets are identified; since the publication of this report, all of the primary acquisition properties have been protected for conservation."	Sonoma Land Trust	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Laguna de Santa Rosa Ecosystem Restoration and Management Plan	""Enhancing and Caring for the Laguna is a comprehensive vision for restoring and managing the Laguna watershed's biology and hydrology, created as a collaborative effort of the Laguna's many stakeholders. A two volume report, the plan reveals the Laguna watershed's interconnected ecologies and sets specific recommendations for improvement of water quality, wildlife habitat, biodiversity and public recreation.""	Laguna de Santa Rosa Foundation	WMA: Russian Bodega County: Sonoma

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Ecosystem Function	Local Watershed Plans and Related Documents	Laguna de Santa Rosa Resource Atlas and Protection Plan. 2003.	"This report provides detailed maps about the natural and social resource of the Laguna, and an action plan that describes a strategy for protecting the Laguna's critical habitat, floodplain, open space and recreational values. The Plan includes a strategy for preservation of key resource areas, development of recreational trails, and restoration and management of existing resource lands."	Sonoma Land Trust	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Laguna de Santa Rosa Weed Management Plan. In progress.	"The primary focus for restoration and management in the Laguna is to enhance populations of desirable plant and animal species in order to maintain or restore ecosystem processes such as water recharge and purification, soil retention, and biological diversity. Controlling weedy plants and animals is a necessary part of land management, but the fundamental goal is to increase the ability of the Laguna's ecosystems to resist invasion by weedy species, and to prevent the introduction of new weeds. Prioritization for weed control activities is based on actual and potential impacts to native species and communities, especially when weeds threaten species at risk of extinction."	Laguna de Santa Rosa Foundation	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	*Ludwigia hexapetala* Management Plan for the Laguna de Santa Rosa. 2006.	This plan addresses public health and standing water. Its intent is to reduce risk of West Nile virus and other mosquito-borne diseases. It sets priorities to sharply reduce Luwigia populations, alleviate negative impacts on the Laguna ecosystem, provide measurable water quality improvement, and reduce sedimentation and local flooding.	Laguna de Santa Rosa Foundation	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Salmon Creek Estuary: Study Results and Enhancement Recommendations. 2006.	"The Salmon Creek Estuary Enhancement Plan summarizes the results of sampling and assessment of factors that affect estuarine function and its value as salmonid habitat, and presents recommendation for additional data collection and habitat enhancement."	Salmon Creek Watershed Council, Occidental Arts and Ecology Center, and State Coastal Conservancy	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Santa Rosa Citywide Creek Master Plan. 2006.	"The Citywide Creek Master Plan presents a set of creek-related policies and recommendations for site-specific improvements to the nearly ninety miles of creeks that flow through Santa Rosa."	City of Santa Rosa, County of Sonoma, Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Santa Rosa Plain Ecological Reserve Yuba Unit Summary of Cleanup Activities.	"The Sonoma Resource Conservation District, under contract with the California Department of Fish and Game, implemented a series of cleanup activities on the Yuba Unit of the Santa Rosa Plain Ecological Reserve on June 19, 2006. The majority of cleanup activities took place over a 2 week period. Minor details were completed throughout the summer months of 2006."	Sonoma RCD	WMA: Russian Bodega County: Sonoma
Ecosystem Function	Local Watershed Plans and Related Documents	Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan. 1995.	"In 1991, it was recognized a plan was needed to balance land use changes in the Plain, and protect and restore natural habitat values for future generations. A congressionally appointed Vernal Pool Task Force was formed to bring together federal, state and local agencies, as well as landowners and local interest groups. A goal of the Task Force was to develop a Plan containing policies and guidance for future land use and vernal pool ecosystem protection in the Santa Rosa Plain. The Plan was completed on June 30, 1995, and is called: Phase 1 Final Report, Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan."	Sonoma County Vernal Pool Task Force	WMA: Russian Bodega County: Sonoma

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Environmental Quality	Local Watershed Plans and Related Documents	Upper Russian River Aggregate Resources Management Plan Mendocino County. 1997.	"The report presents a long-term plan for management of aggregate resources that includes in-stream and off-channel recommendations. Bar skimming is recommended as the primary method of in-stream gravel extraction, with allowance for other possible techniques as recommended by the Data Evaluation Team. However, the report also recommends the eventual phase-out of in-stream mining activities. To protect riverine resources, the report describes a series of protective measures that include: establishing a redline elevation below which no extraction should occur, protection of riparian vegetation, extracting gravel from the downstream portion of the bar, and grading the slope of the bar at 2% to prevent fish entrapment."	Mendocino County Water Agency	WMA: Russian Bodega County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	Jenner Headlands Integrated Resource Management Plan. 2012.	"This IRMP has been developed as a guiding document for the protection, restoration and enhancement of significant, undeveloped and relatively natural ecosystems and cultural resources of the Headlands. It provides opportunities for people to experience this incredible landscape while ensuring the primary goal of resource protection."	Sonoma Land Trust	WMA: Russian Bodega County: Sonoma
Land Use Planning	Local Watershed Plans and Related Documents	Management Tips to Enhance Land & Water Quality for Small Acreage Properties Laguna de Santa Rosa Watershed With tips appropriate on a regional level. 2007.	This document provides BMPs for small scale implementation.	Sonoma RCD	WMA: Russian Bodega County: Sonoma
Salmonid Recovery	Local Watershed Plans and Related Documents	Habitat Restoration and Conservation Plan for Anadromous Salmonid Habitat in Selected Tributaries of the Russian River Basin. 2007.	"NMFS recognized the value of working cooperatively with the Salmon Coalition to identify necessary measures to recover listed species in sub-watersheds within the Russian River Basin. NMFS also recognizes the value of previous habitat restoration projects to population recovery in several watersheds in the Russian River Basin. To these ends, NMFS developed a strategy for completing a plan for conserving habitat in selected streams within Dry Creek, Alexander, and Knights Valleys that were designated as critical habitat for steelhead."	National Marine Fisheries Service in collaboration with the Russian River Watershed Salmonid Coalition	WMA: Russian Bodega County: Sonoma
Salmonid Recovery	Local Watershed Plans and Related Documents	Russian River Biological Assessment Interim Report 8: Russian River Estuary Management Plan. 2001.	Report addresses implementation of the Russian River Estuary Plan with respect to breaching the sandbar at the mouth of the Estuary to prevent flooding upstream. Issues addressed in the report include: water quality juvenile salmonid rearing, flushing juveniles out of the estuary prematurely, adult upstream migration, juvenile outmigration, and predation on salmonids.	U.S. Army Corps of Engineers and Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma
Water Quality	Local Watershed Plans and Related Documents	Lake Mendocino and Lake Sonoma Mercury TMDLs.	"Lake Mendocino and Lake Sonoma in the Russian River have been listed under Section 303(d) of the Clean Water Act for mercury pollution measured in fish tissue. Mercury, also called quicksilver, is a heavy metal and potent neurotoxin that is harmful to humans and wildlife. Mercury builds up in the bodies of fish and also in people who eat contaminated fish. Possible mercury sources include mercury and gold mines, soil erosion due to human activities such as logging and road construction, and airborne sources from North America and Asia. A statewide effort to develop mercury TMDLs for at least 75 lakes and reservoirs is under development. Lake Sonoma and Lake Mendocino are part of the statewide effort."	North Coast Regional Water Quality Control Board	WMA: Russian Bodega County: Mendocino

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Water Quality	Local Watershed Plans and Related Documents	Guidelines for the Standard Urban Storm Water Mitigation Plan: Storm Water Best Management Practices for New Development and Redevelopment For the Santa Rosa Area and Unincorporated Areas around Petaluma and Sonoma. 2005.	"These guidelines have been developed to assist project sponsors and municipal staff to implement the Santa Rosa Area Standard Urban Storm Water Mitigation Plan (SUSMP) requirements that were adopted by the North Coast Regional Water Quality Control Board in June 2003. Since the SUSMP requirements apply to both privately sponsored projects and public capital improvement projects, these Guidelines should be used by development project applicants, municipal development project review staff, and municipal staff responsible for capital improvement projects."	Sonoma County, City of Santa Rosa, and Russian River Watershed Association	WMA: Russian Bodega County: Sonoma
Water Quality	Local Watershed Plans and Related Documents	Laguna de Santa Rosa Nutrients, Temperature, Low Dissolved Oxygen TMDL	"Regional Water Board staff are currently developing new TMDLs for nitrogen, phosphorus, dissolved oxygen, temperature, and sediment in the Laguna de Santa Rosa watershed to address continuing water quality impairments. These TMDLs will apply to entire Laguna de Santa Rosa watershed, including Mark West Creek, Santa Rosa Creek, and all the tributaries."	North Coast Regional Water Quality Control Board	WMA: Russian Bodega County: Sonoma
Water Quality	Local Watershed Plans and Related Documents	Russian River (Monte Rio and Healdsburg Memorial Beach) Pathogens TMDL	In development.	North Coast Regional Water Quality Control Board	WMA: Russian Bodega County: Sonoma
Water Quality	Local Watershed Plans and Related Documents	Santa Rosa Creek Pathogens TMDL	In development.	North Coast Regional Water Quality Control Board	WMA: Russian Bodega County: Sonoma
Water Quality	Local Watershed Plans and Related Documents	Stemple Creek Nutrients & Sediment TMDL. 1997.	The Stemple Creek Total Maximum Daily Load (TMDL) sets limits for nutrients and sediment loads for Stemple Creek.	North Coast Regional Water Quality Control Board	WMA: Russian Bodega County: Sonoma
Water Supply	Local Watershed Plans and Related Documents	Irrigated Agriculture Water Needs and Management in the Mendocino County Portion of the Russian River Watershed. 2008.	"This study was conducted using aerial photograph interpretation, geographic information system analysis, on-farm irrigation system evaluation, and grower focus groups and surveys to document irrigated agriculture acreage and water demand. Additionally, information was gathered on the history of water resource management and opinions and attitudes towards water conservation and alternative water sources."	Mendocino County Water Agency	WMA: Russian Bodega County: Mendocino
Watershed Planning	Local Watershed Plans and Related Documents	Walker Creek Watershed Enhancement Plan. 2001.	"The watershed plan includes goals and objectives, an erosion site assessment, vegetation study and project monitoring guidelines."	Marin County Resource Conservation District	WMA: Russian Bodega County: Marin County
Watershed Planning	Local Watershed Plans and Related Documents	Austin Creek Watershed Assessment. 2005.	"This watershed assessment primarily involves use of a Geographic Information System (GIS) to complete an analysis of the features of the Austin Creek watershed, documentation of past land uses and trends in the system. The focus of the analysis is erosion problems, areas of major vegetation changes and other features related to water quality and anadromous fish habitats. The assessment also includes recommendations to improve water quality and aquatic habitats."	Sonoma RCD	WMA: Russian Bodega County: Sonoma

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Watershed Planning	Local Watershed Plans and Related Documents	Copeland Creek Watershed Assessment. 2004.	"This watershed assessment reviews erosion sources in the watershed, the current and historic condition of the creek channel and watershed, the extent of riparian forest, water quality and temperature conditions, and land uses. The goal of the watershed assessment is to investigate a broad range of current and historic conditions in the watershed and creek and recommend enhancement projects and Best Management Practices (BMPs) to improve water quality and creek habitat conditions"	Sonoma RCD	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Estero Americano Watershed Management Plan. 2007.	"The purpose of this watershed management plan is to 1) characterize and assess the ecological processes and conditions of the Estero Americano Watershed within the context of current land uses, and 2) to provide economically viable and agreed upon recommendations for improving the natural resource base through conservation-oriented land management practices."	Gold Ridge Resource Conservation District	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Salmon Creek Integrated Coastal Watershed Management Plan. 2010.	"The Plan takes a watershed approach to addressing the issues of water quality and quantity, rather than looking at stream restoration on a site-specific basis. Through a geomorphic assessment, sediment source and water quality analysis, and water supply and demand study, a thorough base of resource knowledge was examined to better understand the current state of the Salmon Creek Watershed. Based on these assessments, it was then determined what actions should be taken to enhance and protect the natural resources of the watershed for current and future generations."	Gold Ridge RCD	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Stemple Creek/ Estero de San Antonio Watershed Enhancement Plan. 1994.	"The Enhancement Plan attempts to pull together the concerns identified and the resources available to address them into an integrated plan of action. The appendices contain five technical reports on the biology, vegetation, erosion and sedimentation, water resources and the hydrology of the Estero. Appendix F is a summary of individual landowner meetings."	Marin Resource Conservation District and Southern Sonoma County Resource Conservation District	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Towards a Healthy Wildland Watershed: Willow Creek Watershed Management Plan. 2005.	"Proposition 13 funding administered by the State Water Resources Control Board and the Sonoma County Water Agency made possible the development of an integrated watershed plan, a channel feasibility analysis, as well as a watershed education program."	Stewards of the Coast and Redwoods	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Upper Green Valley Watershed Management Plan. 2010.	"The Upper Green Valley Creek Watershed Management Plan represents the first phase in a multi-year effort to address factors that may be limiting to salmonid health in the watershed, and to provide a plan of action for landowners to conserve natural resources on their property."	Gold Ridge RCD	WMA: Russian Bodega County: Sonoma
Watershed Planning	Local Watershed Plans and Related Documents	Upper Mark West Watershed Management Plan Phase 1: Watershed Characterization and Needs Assessment. 2008.	"The purpose of this plan is to provide tools, resources and guidance for stakeholders to protect the natural environment in the upper Mark West Creek watershed, restore and enhance altered landscapes, and to steward the land in perpetuity."	Sonoma RCD	WMA: Russian Bodega County: Sonoma
Land Use Planning	Local Watershed Plans and Related Documents	Trinity County Resource Conservation District. 2006–2011.	"This document is an adaptable 5-year strategic plan for 2006-2011 that will assist in guiding Trinity County Resource Conservation District operations. This Plan defines our organization's goals and how it can best achieve it's mission. In this process the District has taken a look at its purpose, where we have been, where we are now, where we want to be in the future, and how to arrive at our destination."	Trinity County Resource Conservation District	WMA: Trinity River County: Trinity

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Watershed Planning	Local Watershed Plans and Related Documents	Big Creek Watershed Assessment Report. 2008.	"The intent of this watershed assessment report is to develop and document a scientific based understanding of the natural processes and active land management occurring in the Big Creek watershed. The report will provide the basis by which the watershed can be understood as an ecological system and will allow interested parties to understand the processes and interactions that occur within its boundaries. Of particular importance in the Big Creek watershed is the protection of water quality and water quantity for the municipal water supply for the community of Hayfork, California."	North Coast Regional Water Quality Control Board	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	Downriver Fire & Fuel Management Plan. 2005.	"The purpose of the Downriver Fire & Fuel Management Plan is to portray current fire, fuel, and access conditions and fire infrastructure and to identify management practices and projects that will promote forest succession and health while protecting the primary resources of soil and water and associated resources of wildlife and fisheries from the deleterious effects of high severity, stand replacing fires. This plan addresses residential property protection, fire control access and safety, water development for firefighting, and fuel management."	Trinity County RCD	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	East Fork Fire Management Plan. 2000.	"The East Fork (of the Stuart Fork of the Trinity River) Fire Management Plan is a community-based planning effort, which includes Covington Mill, Lake Forest Estates, and the Long Canyon residential area. It is intended to address fire safety and forest health opportunities for 300 rural residential parcels within the lower one-third of the East Fork of Stuart Fork watershed."	Trinity County RCD	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	Grass Valley Creek Watershed Fire Management Plan. 2002.	"The purpose of the Grass Valley Creek Watershed Fire Management Plan (GVC FMP) is to portray past and current fire and fuel conditions, current fire access and infrastructure, and to identify management practices and projects that will promote forest succession and health while protecting the primary resources of soil and water, and associated resources of wildlife and fisheries, from the deleterious effects of high severity, stand replacing fires in and immediately adjacent to the Grass Valley Creek (GVC) watershed. This plan addresses residential property protection, fire control access and safety, fuel management, and forest health opportunities in the watershed."	Bureau of Land Management	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	Grass Valley Creek Watershed Restoration Project: Restoration in Decomposed Granite Soils.	"The purpose of this report is to present technical design findings utilized in a large-scale restoration project undertaken in Grass Valley Creek watershed, a tributary historically known to deliver large amounts of sediment to the main stem of the Trinity River. The report also outlines a brief history of land uses in the watershed as well as an overview of the restoration project itself. In addition, some indicators of the overall success of the project are included."	Trinity County RCD and Natural Resources Conservation Service in Cooperation with the Trinity River Restoration Program	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	Trinity County Community Wildfire Protection Plan Update 2010.	This document is an update of the 2005 Community Wildfire Protection Plan using community meetings. Elements added that were not part of the original planning include an interface with the concurrent Humboldt County CWPP update; development of Wildland Urban Interface boundaries as defined in the Halthry Forest Restoration Act, and attention to treatments associated with large scale fires that have occurred since 1999.	Trinity County Resource Conservation District & The Watershed Research and Training Center	WMA: Trinity River County: Trinity

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Watershed Planning	Local Watershed Plans and Related Documents	Upper Trinity River Watershed Assessment Report & Management and Action Plan. 2006.	"The intent of this watershed assessment is to develop and document a scientifically based understanding between the natural processes and human interactions occurring within the Upper Trinity River watershed. This understanding, which focuses on specific issues, uses, and values, within the watershed, is essential for making sound management decisions. Protecting beneficial uses, such as those identified by the North Coast Region's Water Quality Control Plan (Basin Plan) mandated under the Federal Clean Water Act and the State Porter-Cologne Water Quality Act, is a fundamental motivation for this endeavor. "	Trinity County Resource Conservation District	WMA: Trinity River County: Trinity
Watershed Planning	Local Watershed Plans and Related Documents	Upper Trinity River Watershed Assessment Report and Management and Action Plan. 2006.	"The intent of this watershed assessment is to develop and document a scientifically based understanding between the natural processes and human interactions occurring within the Upper Trinity River watershed. This understanding, which focuses on specific issues, uses, and values, within the watershed, is essential for making sound management decisions."	Trinity County RCD	WMA: Trinity River County: Trinity
Conservation	Local Watershed Plans and Related Documents	Biodiversity Action Plan: Priority Actions to Preserve Biodiversity in Sonoma County. 2010.	"The objective of this plan is to answer the following questions regarding Sonoma County's natural heritage: What do we have? What are the threats? What can we do to reduce risk of losing our biodiversity? This plan is a resource for technical experts, land managers, funders, policy makers and interested citizens regarding the status and natural dynamics of local ecosystems and current threats to biodiversity. It advances a set of non-regulatory actions grounded in a collaborative multi-stakeholder approach to maintain biodiversity in Sonoma County for generations to come."	Community Foundation Sonoma County and Sonoma County Water Agency	County: Sonoma
Energy	Local Watershed Plans and Related Documents	Preliminary Biomass Fuel Availability and Feasibility Review for Siting Biomass Power Facilities in Mendocino County, California. 2006.	"The objective of this review is to determine if there is enough raw material feedstock, community support and ready markets for the sale of renewable electrical power to site appropriately-scaled commercial biomass power generation facilities within Mendocino County."	North Coast Resource Conservation and Development Council	County: Mendocino
Land Use Planning	Local Watershed Plans and Related Documents	Clam and Moonstone Beach County Parks Access Management Master Plan. 2006.	"The purpose of this Clam and Moonstone Beach County Parks Access Management Master Plan is to evaluate specific options for enhancing public access, use, and enjoyment of the parks while maintaining public safety, minimizing user conflicts, and protecting sensitive resources. "	County of Humboldt	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Ferndale Historical and Cultural Resources Element. 2011.	"The Historical and Cultural Resources Element of the City general plan sets goals, policies and implementation strategies for the City's role in planning for the unique historical aspects of Ferndale and its regional cultural setting in the Eel River Valley."	City of Ferndale	WMA: Eel River County: Humboldt Municipality: Ferndale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Fortuna General Plan Policy Document Envision 2030. 2010.	"The Fortuna General Plan formalizes a longterm vision for the City's physical evolution. It outlines policies, standards, and programs to guide day-to-day decisions concerning future development."	City of Fortuna	WMA: Eel River County: Humboldt Municipality: Fortuna
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Rio Dell General Plan 2015 Administrative Draft. 2006.	"The current Rio Dell General Plan will guide planning through 2015. Each Element conforms to that time frame, except for the Housing Element, which has a State mandated five-year review period. The most recent Housing Element was adopted in January 2004. Rio Dell will monitor the relevance of its General Plan to ensure that it remains useful to an evolving community."	Rio Dell	WMA: Eel River County: Humboldt Municipality: Rio Dell

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mill District Area Plan, Fortuna General Plan 2030. 2010.	"The purpose of this Area Plan is to formulate policies and mixed-use development concepts presented by the size, location, and physical attributes of the region and to address development options that will be consistent with the Preferred Alternative as selected by the City Council in March 2007."	City of Fortuna	WMA: Eel River County: Humboldt Municipality: Fortuna
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	State of California Department of Housing and Community Development City of Ferndale Housing Element: June, 2006.	"The primary purpose of the Housing Element is to: Preserve and improve housing and neighborhoods, Provide adequate housing sites, Assist in the provision of affordable housing, Remove governmental constraints to housing investment, and Promote fair and equal housing opportunities."	City of Ferndale	WMA: Eel River County: Humboldt Municipality: Ferndale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Brooktrails Township Specific Plan	"The Plan sets forth a goal and policy framework and implementation programs for guiding ongoing development of this semi-rural residential community."	Brooktrails Township CSD	WMA: Eel River County: Mendocino Municipality: Willits
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Willits General Plan. 1992.	"Updates consist of major amendments to the City's Zoning Ordinance, General Plan, and Second Unit Ordinance."	City of Willits	WMA: Eel River County: Mendocino Municipality: Willits
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Draft Trinidad Climate Action Plan. 2010.	"This document provides a framework for the creation of a Climate Action Plan (CAP) for the City of Trinidad, California. It provides justification of the CAP process through international, state, and local policies based on curbing emissions of anthropogenic greenhouse gasses."	City of Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Conservation	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt Bay Municipal Water District Habitat Conservation Plan for Mad River Operations. 2004.	Habitat Conservation Plan for diversion from Mad River at Essex.	Humboldt Bay Municipal Water District	WMA: Humboldt Bay County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	2025 General Plan Update. 1999–2008.	"The City Council has approved recommendations to the County for their 2005 General Plan update process, and further recommendations may be forthcoming as the City Council continues to discuss annexation ideas. Approved Council recommendations include policies on traffic circulation, alternate transportation, greenway open space, public safety, affordable housing, parkland, recycling programs and others. All Council recommendations are forwarded to County planners and decision makers to consider policies which help mitigate or lessen potential significant impacts to the City."	City of Eureka	WMA: Humboldt Bay County: Humboldt Municipality: Eureka

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Arcata General Plan 2020. 2000.	"The Arcata General Plan: 2020 will help shape how the city of Arcata will look, function, provide services, and manage resources for the next 20 years. The plan is the City's "constitution" for physical development and change within the existing and future city boundaries. The plan is a legal mandate that governs both private and public actions. The general plan is atop the hierarchy of local government laws regulating land use. Other laws and policies, such as specific plans, subdivision regulations, and the zoning ordinance are subordinate to, and must be consistent with, the general plan. Comprehensive in scope, the plan conveys the fundamental values that public decision makers will use to guide the City's evolution, from its physical development to the ever-changing network of services provided to its citizens."	City of Arcata	WMA: Humboldt Bay County: Humboldt Municipality: Arcata
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Blue Lake General Plan. 1986–2004.	The General Plan provides public policies for land use and development in the City of Blue Lake. The Plan is currently being updated and is expected to be available electronically in 2007.	City of Blue Lake	WMA: Humboldt Bay County: Humboldt Municipality: Blue Lake
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Eureka Historic Preservation Plan. 2004.	"This Plan outlines the context of Eureka's many historic resources, and establishes detailed goals and strategies for preserving these resources."	City of Eureka Community Development Department	WMA: Humboldt Bay County: Humboldt Municipality: Eureka
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Trinidad General Plan. 2001.	The General Plan provides public policies for land use and development for the City of Trinidad. The General Plan includes the Local Coastal Plan.	Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Coastal Land Use Policy, Appendix B, City of Eureka General Plan. 1997.	"The City of Eureka has determined that the most effective way to address the separate legal requirements of State Ganeral Plan law and the California Coastal Act is to combine the goals, policies, and programs addressing these requirements into a single, unified document. In doing so the City reviewed the land use maps and land use polcies of the 1984 LCP and determined which policies and programs should be incorporated into the updated citywide General Plan."	City of Eureka	WMA: Humboldt Bay County: Humboldt Municipality: Eureka
Water Quality	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Eureka Integrated Pesticide, Herbicide and Fertilizer Management Plan. 2011.	"The purpose of the Integrated Pesticide, Herbicide and Fertilizer Management Plan is to establish policies and procedures for the management of pests in parks within a clear and easily understandable framework. The framework presented here is based on a balance among maintenance levels, environmental stewardship and pesticide / herbicide / fertilizer use that fits Eureka's goals for its parks and that reflects staffing and budget level realities."	City of Eureka Public Works Department	WMA: Humboldt Bay County: Humboldt Municipality: Eureka
Water Quality	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Onsite Wastewater Treatment System Program. In progress.	"The Trinidad OWTS Management Program came about as a result of community concerns and based on public input. The City's program is modeled after other community program and is appropriate for areas with high development densities and nearby sensitive resources. These include the coastal stream and the Trinidad Kelp Beds, which have been designated as a State Area of Special Biological Significance. Trinidad's program is also being developed to be consistent with the new statewide septic regulations that will be forthcoming in the next year."	City of Trinidad.	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad

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Water Supply	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt Bay Municipal Water District Water Resource Planning Implementation Pan to Consider, Evaluate and as appropriate, Advance Recommended Water-use Options.	"The purpose of this Plan is to guide evaluation of the recommended water-use options and to define activities to advance, and hopefully pursue, a suite of options."	Humboldt Bay Municipal Water District	WMA: Humboldt Bay County: Humboldt
Watershed Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Trinidad Integrated Coastal Watershed Management Plan. 2008.	"The Trinidad-Westhaven Integrated Coastal Watershed Management Plan (ICWMP) has been developed in order to improve surface water quality in Trinidad Bay and the watersheds that drain into it. The driving forces behind this effort include regulatory requirements, the need to protect local drinking water supplies, and a general concern for the ecological health of the region. Water quality issues are of special importance in this region due to the kelp beds located offshore of Trinidad Head. The kelp beds and their surrounding waters are a State-designated Area of Special Biological Significance (ASBS). The watersheds draining into the bay are also considered a Critical Coastal Area (CCA) by the State of California. While the CCA designation is a non-regulatory tool, regulations for the ASBS prohibit the discharge of wastewater and pollutants into these areas."	City of Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Watershed Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Wastewater Management Action Plan for the Trinidad-Westhaven Coastal Watershed. 2010.	"This Action Plan has been developed as part of an integrated coastal watershed planning effort for the Trinidad Head ASBS. The objective of this planning effort is to improve water quality in the multiple watersheds on the Trinidad Plateau that ultimately drain into the ocean near Trinidad Bay."	City of Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Modoc County General Plan: Background Report. 1988.	The Plan consists of three separate documents: a background report; this policy plan, and an environmental impact report (EIR). This Plan is intended to serve as a guide for growth and change in Modoc County. Modoc County is currently working to update the information contained in the Plan.	Modoc County	WMA: Klamath River County: Modoc
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Modoc County General Plan: Goals, Policies and Action Program. 1988.	The Plan consists of three separate documents: a background report; this policy plan, and an environmental impact report (EIR). This Plan is intended to serve as a guide for growth and change in Modoc County. Modoc County is currently working to update the information contained in the Plan.	Modoc County Planning Department	WMA: Klamath River County: Modoc
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Dorris General Plan. In progress.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Dorris	WMA: Klamath River County: Siskiyou Municipality: Dorris

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Etna General Plan. 2010.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Etna Planning Department	WMA: Klamath River County: Siskiyou Municipality: Etna
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Montague General Plan. 1992.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Montague	WMA: Klamath River County: Siskiyou Municipality: Montague
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Tule Lake General Plan. 1986.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Tule Lake	WMA: Klamath River County: Siskiyou Municipality: Tulelake
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Weed General Plan. 1974–2004.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Weed Planning Department	WMA: Klamath River County: Siskiyou Municipality: Weed
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Yreka General Plan 2002–2022. 2003.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	City of Yreka	WMA: Klamath River County: Siskiyou Municipality: Yreka
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Draft Town of Fort Jones General Plan. 2006.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting minimum standards for the development of land in Siskiyou County to protect public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities. "	Town of Fort Jones	WMA: Klamath River County: Siskiyou Municipality: Fort Jones

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Land Development Manual: Improvement Standards and Specifications. Second Edition. 2011.	"These Improvement Standards and Specifications, based on sound, practical, and well-established principles of civil engineering, are for the purpose of adopting standards for the development of land in Siskiyou County to protect the public health and safety, and to minimize or avoid environmental consequences. They include: design of improvements; type and use of materials; methods of and the preparation of plans for construction; and repair or alteration of roadways, alleys, concrete structures, drainage, sewerage, and water supply facilities."	Siskiyou County	WMA: Klamath River County: Siskiyou
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Scott Valley Area Plan and Environmental Impact Report of the Siskiyou County Area Plan Number One. 1980.	"The Scott Valley Area Plan represents a combined document — the Land Use Element of the Siskiyou County General Plan for the Scott Valley Watershed and the Environmental Impact Report on this plan."		WMA: Klamath River County: Siskiyou
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Siskiyou County General Plan. 1973–2004.	"The General Plan is a community's blueprint for future development. It describes a community's development goals and policies. It also is the foundation for land use decisions made by the Planning Commission and Board of Supervisors."	Siskiyou County	WMA: Klamath River County: Siskiyou
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Fort Bragg Greenhouse Gas Emissions Inventory. 2007.	"The purpose of this study is to inventory GHGs produced by the City of Fort Bragg's government and the larger community of residents and businesses. Benchmarking the City's emissions will aid policy makers to forecast emission trends, identify the point sources of emissions generated, and set goals for future reductions and mitigation. The underlying purpose of this study is to move the Fort Bragg community towards sustainability."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Crescent City Coastal Trail — Harbor Trail Concept Plan Document. Udated.	"When completed the Coastal Trail will provide bicycle and pedestrian access from city limits-to-city limits along the coast. It is divided into three connecting segments: Pebble Beach Trail, Lighthouse Trail and Harbor Trail. This proposal is part of the last of the segment to be developed. The concept herein involves the Crescent City Harbor Trail North Segment."	City of Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Crescent City Coastal Zone Map. 2011.	This map shows coastal zone delineations. "The areas depicted with cross-hatching are within the original/ retained coastal development permitting jurisdiction of the California Coastal Commission. The standard of review for the Coastal Commission's authorization of development within these areas is consistency with the policies and standards of Chapter 3 of the California Coastal Act." "In May 2001, the City Council adopted an updated General Plan for the 2000-2020 time frame. This included the Local Coastal Plan and a pre-Annexation Plan for the adopted Urban Boundary/Urban Services Area."	City of Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Crescent City General Plan. 2001.	"This General Plan formalizes a long-term vision for the physical evolution of Crescent City and outlines policies, standards, and programs to guide day-to-day decisions conderning Crescent City's development."	City of Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Crescent City/Del Norte County Hazard Mitigation Plan Volume 1: Planning-Area-Wide Elements Draft. 2010.	"A planning partnership made up of Del Norte County, Crescent City, and several special purpose districts worked together to create this Crescent City/Del Norte County Hazard Mitigation Plan, fulfilling the Disaster Mitigation Act requirements for all participating partners."	Crescent City/ Del Norte County	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Del Norte County Coastal Plan. 1983.	The Coastal Element of the General Plan consists of the Land Use Plan text and maps which were approved by the California Coastal Commission on June 3, 1981.	County of Del Norte	WMA: North Coast Rivers County: Del Norte
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Del Norte County General Plan. 2003.	This General Plan formalizaes a long-term vision for the physical evolution of Del Norte County and outlines policies, standards, and programs to guide day-to-day decisions concerning Del Norte County's development."	County of Del Norte	WMA: North Coast Rivers County: Del Norte
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	2009 Bicycle Master Plan. 2009.	"In order to improve the cycling environment, the City has prepared this Fort Bragg Bicycle Master Plan to direct the City's efforts. The Bicycle Master Plan includes: •A review of existing conditions, opportunities and challenges; •Bicycle goals, policies and programs; •Summary of all planned and proposed bicycle lanes and facilities; •Recommendations for new bikeways and bicycle parking; •Recommendation for bicycle education and safety programs; •Proposed standards for bikeways, parking and signage; and •A variety of GIS Maps which illustrate existing and planned bikeways."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	2011 Residential Streets Safety Plan. 2011.	"The 2011 Residential Streets Safety Plan ("2011 RSSP") updates the 2005 Residential Streets Safety Plan and recommends infrastructure improvements that will enhance the safety of pedestrians, bicyclists and motorists in the residential neighborhoods of Fort Bragg. The 2011 RSSP responds to safety concerns identified through public input and City Council direction, and it incorporates the recommendations of transportation consultants, Fehr & Peers. The 2011 RSSP also helps to implement key policies of the Fort Bragg General Plan and the 2009 Bicycle Master Plan."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Fort Bragg Coastal General Plan. 2008.	"All of the City's land use regulations for the Coastal Zone, including zoning and subdivision regulations, specific plans, and redevelopment plans must conform to the Coastal General Plan. The Coastal General Plan serves the following functions: • Expresses the community's vision of the future physical development of Fort Bragg in the Coastal Zone, • Enables the Planning Commission and the City Council to establish long-range conservation and development policies in the Coastal Zone, • Provides the basis for judging whether specific private development proposals and public projects are consistent with these policies in the Coastal Zone, • Informs the residents, developers, decision makers, and other jurisdictions of the ground rules that will guide development and conservation in the Coastal Zone."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Point Arena General Plan/ Local Coastal Plan. 1995. Revised 2001 and 2006.	"The Point Arena General Plan is a comprehensive, integrated, and internally consistent statement of Point Arena's environmental preservation, economic development, land use, public safety, housing, and development goals, policies, and programs. It is intended to address goals and needs for a period of approximately five fifty years from the date of adoption. As a precautionary measure, when the population reaches 50% of projected build-out, or in 50 years (which ever comes first) the City shall undertake steps necessary to reassess and insure the continued ability to meet infrastructure requirements through build-out. Updates consist of major amendments to the City's Zoning Ordinance, General Plan, and Second Unit Ordinance."	General Plan Citizen's Advisory Committee	WMA: North Coast Rivers County: Mendocino Municipality: Point Arena
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Fort Bragg General Plan. 2002.	"The mission of the General Plan is to preserve and enhance the small town character and natural beauty that make the City a place where people want to live and to visit, and to improve the economic diversity of the City to ensure that it has a strong and resilient economy which supports its residents."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	General Plan/Local Coastal Plan	"The Point Arena General Plan is a comprehensive, integrated, and internally consistent statement of Point Arena's environmental preservation, economic development, land use, public safety, housing, and development goals, policies, and programs. It is intended to address goals and needs for a period of approximately fifty years from the date of adoption."	City of Point Arena	WMA: North Coast Rivers County: Mendocino Municipality: Point Arena
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Housing Element	"The Housing Element is an integral part of Point Arena's General Plan. A major objective of State housing law and the housing element preparation requirements is to encourage each city and county to do its "fair share" in providing for the housing needs of the State, particularly the needs of extremely low-, low- and moderate-income persons and families."	City of Point Arena	WMA: North Coast Rivers County: Mendocino Municipality: Point Arena
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino City Community Services District Sewer System Management Plan	"The intent of this SSMP is to meet the requirements of both the RWQCB and the Statewide WDR. The organization of this document is consistent with the RWQCB guidelines, but the contents address both the RWQCB and SWRCB requirements."	Mendocino City Community Services District	WMA: North Coast Rivers County: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino Town Plan. 1992.	Part of the Coastal Element of the Mendocino County General Plan, this Plan sets development standards to maintain historical character of the Town of Mendocino.	Mendocino County	WMA: North Coast Rivers County: Mendocino Municipality: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mill Site Specific Plan Preliminary Draft January. 2012.	"The Specific Plan describes the scale and character of development envisioned for the Plan Area and includes policies and development standards to help ensure that future development is consistent with the community's vision. This document is sufficiently specific to inform future land use planning efforts and guide redevelopment, while flexible to accommodate the inevitable shift in market conditions, developer interest and community priorities over time."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	South Main Street Access and Beautification Plan. 2011.	"This document is the outcome of a community-based planning process for the South Main Street Corridor in Fort Bragg, a city of approximately 7,030 residents along the Pacific Coast in Mendocino County."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg

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Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Crescent City Strategic Plan. 2012.	This plan provides goals, objectives, and priorities for the city.	City of Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Water Quality	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Crescent City Sanitary Sewer Management Plan. 2012.	"This Sewer System Management Plan (SSMP) has been prepared in compliance with requirements of the State Water Resource Control Board (SWRCB) pursuant to Order No. 2006-0003, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems"	City of Crescent City	WMA: North Coast Rivers County: Del Norte
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Climate Action Plan.2012.	"The purpose of this Climate Action Plan is to present measures which will reduce local greenhouse gas emissions, to meet state, regional, and local reduction targets, and to streamline future environmental review of projects within Santa Rosa by following the California Environmental Quality Act (CEQA) Guidelines and meeting the Bay Area Air Quality Management District's (BAAQMD) expectations for a Qualified GHG Reduction Strategy."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Green Building Ordinance and Energy Efficiency Ordinance. 2007.	"The Green Building Ordinance covers all new residential and commercial construction, all commercial tenant improvements, and residential additions greater then 500 square feet. The Green Building Ordinance will be effective for all building permit applications submitted on, or after, July 1, 2007. The Energy Efficiency Ordinance covers all new residential construction, all new swimming pools, and residential additions greater than 1,000 square feet. The Energy Efficiency Ordinance will be effective for all building permit applications submitted on, or after, April 26, 2007. "	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Ukiah — Green Building Program	"The City of Ukiah has adopted a green building education and incentive program. The program promotes the use of green building materials and techniques in construction projects to reduce waste and inefficient resource use, reduce pollution and reduce toxicity in the places we live and work, and reduce greenhouse gases."	City of Ukiah	WMA: Russian Bodega County: Mendocino Municipality: Ukiah
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Ukiah General Plan. 1995. Revised 2004.	"Updates consist of major amendments to the City's Zoning Ordinance, General Plan, and Second Unit Ordinance."	City of Ukiah	WMA: Russian Bodega County: Mendocino Municipality: Ukiah
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Draft Ukiah Valley Area Plan. 2003.	"Updates consist of major amendments to the City's Zoning Ordinance, General Plan, and Second Unit Ordinance."	Mendocino County and City of Ukiah	WMA: Russian Bodega County: Mendocino Municipality: Ukiah
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Gualala Town Plan. 2002.	"The Gualala Town Plan provides planning goals and policies establishing a scenario for growth within the Gualala Town Plan area over a 30-year planning horizon."	Mendocino County	WMA: Russian Bodega County: Mendocino Municipality: Gualala
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Ukiah Valley Area Plan Preliminary Draft Goals, Policies and Implementation Measures. 2007.	"This document provides the Ukiah Valley Area Plan Framework and preliminary draft goals, policies and implementation measures for the plan. This information provides the structure and bulk of the content for the revised Ukiah Valley Area Plan."	Mendocino County and City of Ukiah	WMA: Russian Bodega County: Mendocino Municipality: Ukiah

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Alexander Valley Resort Specific Plan. Draft December 2008.	"The Project is a planned mixed-use destination resort and residential community, with some supporting commercial and public facilities. An 18-hole regulation golf course and open space elements comprise the balance of the proposed development. Of the total acreage, approximately 14% of the property will be built on, with the balance of 86% to be golf course or open space. The Cloverdale General Plan requires that a Specific Plan must be prepared for the Project site prior to any development occurring in this portion of the planning area."	City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Background Report for The City of Cloverdale General Plan Update. 2005.	"This Background Report provides the City of Cloverdale with current information about the status of City services, programs, and plans. This information will serve as the basis for the City's General Plan update and subsequent environmental impact report."	City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Central Healdsburg Avenue Plan. Public Review Draft. 2012.	"The Central Healdsburg Avenue Plan establishes a set of guiding principles and design frameworks for the development of public infrastructure and private investment in the Central Healdsburg Avenue and depot area, following an extensive public input and review process."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Cloverdale General Plan Update Final Environmental Impact Report. 2009.	"The primary purpose of this Final Environmental Impact Report (Final EIR) is to inform agencies and the public of any significant environmental effects associated with the City of Cloverdale General Plan Update (Proposed Project). The Final EIR consists of the Draft EIR and the responses to comments on the Draft. The Draft document was distributed on October 24, 2008."	City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Cotati Downtown Specific Plan. 2006.	Plan describes goals and implementation projects to produce a traditional downtown neighborhood, with public places, mixed-use streets, a variety of housing opportunities, and boutique-style commercial development.	City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Cotati General Plan. In progress, 2012.	Updates and information can be viewed on the City's website.	City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Cotati Sustainable Building Program. 2004.	"Cotati has had a mandatory program since December 2004. Sustainable building practices are required for new residential and commercial development and for additions, remodels, and tenant improvements of 2,500 square foot or more."	City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Healdsburg 2030 General Plan Environmental Impact Report.	Environmental review documents related to the 2030 General Plan.	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Healdsburg 2030 General Plan Policy Document. 2009.	The Healdsburg 2030 General Plan is the city's aspirations for the future. It is a comprehensive, long-term document that guides the physical development of the city and land outside the city limits that is in its sphere of influence. The General Plan also identifies the community's environmental, social and economic goals. The General Plan consists of the Policy Document, including the Land Use Map and the Background Report.	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Healdsburg Specific Plan for Area A. Revised 1995.	"The Area A Specific Plan represents an effort spanning six years to create a plan which will provide the framework for future growth and development of 230+ acres in the unincorporated area immediately north of the City of Healdsburg."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Rohnert Park General Plan Fourth Edition. 2000.	"The General Plan articulates a vision for the city, but it is not merely a compendium of ideas and wish lists. Broad objectives such as "quality of life" and "community character" are meaningful only when translated into tangible, feasible actions. Thus, while each element of the General Plan articulates long-term goals, it also includes action-oriented policies that outline concrete and achievable steps to attain these goals."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Rohnert Park Southeast Specific Plan. 2010	"The Southeast Specific Plan area, the subject of this Plan document, was identified in the City's General Plan, as adopted in July of 2000 and amended in 2010. The purpose of the Plan, consistent with the aims of Chapter 17.06, SP-Specific Plan District, is to provide a vehicle for ensuring that this area of the City is master planned. It is also to ensure that the phasing and ultimate development of the property involved is consistent with a vision that is both compatible with the existing community and responsive to the vision of the General Plan."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Santa Rosa 2035 General Plan. 2009.	"The Santa Rosa General Plan addresses issues related to physical development, growth management, transportation services, public facilities, community design, energy efficiency, greenhouse gas reduction strategies, and conservation of resources in the Planning Area."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Sebastopol Bicycle and Pedestrian Master Plan. 2011.	"This Sebastopol Bicycle & Pedestrian Master Plan was developed as a component of the Sonoma County Transportation Authority's (SCTA's) 2008 Countywide Bicycle & Pedestrian Master Plan. While part of the Master Plan, the Sebastopol plan is also a stand-alone document to be used by the City of Sebastopol to guide implementation of local projects and programs and document city policy. It is also designed to be a component of the SCTA Countywide Bicycle & Pedestrian Master Plan to improve coordination in realizing the countywide bicycle and pedestrian system."	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Sebastopol Housing Element Update (2009–2014). 2010.	This Housing Element reflects input from a wide variety of sources. The primary mechanism to gather public input for the Housing Element was a series of community meetings, study sessions, and hearings. The workshops were noticed on the City's website, in the local newspaper, and to a special mailing list that was created for this project. The public review draft Housing Element was also posted on the City's website. Residents were encouraged to contact the Planning Department with comments and questions.	City of Sebastopol Planning Department	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Cloverdale Bicycle & Pedestrian Master Plan. 2008.	"This Cloverdale Bicycle & Pedestrian Master Plan was developed as a component of the Sonoma County Transportation Authority's (SCTA's) 2008 Countywide Bicycle and Pedestrian Master Plan. While part of the Master Plan, the Cloverdale plan is also a stand-alone document to be used by the City of Cloverdale to guide implementation of local projects and programs and document city policy. It is also designed to be a component of the SCTA Countywide Bicycle & Pedestrian Master Plan to improve coordination in realizing the countywide bicycle and pedestrian system."	Sonoma County Transportation Authority and City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Cloverdale General Plan. 2009, Amended 2010.	"The Cloverdale General Plan includes goals, policies, and implementation programs that constitute the formal policy of the City for land use, development, and environmental quality. This is an update of the General Plan adopted in 1993."	City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Cotati Bicycle & Pedestrian Master Plan. 2008, revised 2010.	"This Cotati Bicycle and Pedestrian Plan was developed as a component of the Sonoma County Transportation Authority's (SCTA's) 2008 Countywide Bicycle and Pedestrian Master Plan. While part of the Master Plan, the Cotati plan is also a stand-alone document to be used by the City of Cotati to guide implementation of local projects and programs and document city policy. It is also designed to be a component of the SCTA Countywide Bicycle and Pedestrian Master Plan to improve coordination in realizing the countywide bicycle and pedestrian system."	Sonoma County Transportation Authority and City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Cotati Redevelopment Project Five-Year Implementation Plan 2010–2014	"This document constitutes the 2010 through 2014 ("Planning Period") Implementation Plan ("Plan") for the Cotati Redevelopment Project Area ("Project Area") administered by the Cotati Community Redevelopment Agency ("Agency"). This Plan outlines the programs of revitalization, economic development, and affordable housing activities for the Agency during the Planning Period"	Cotati Community Redevelopment Agency	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Downtown Station Area Specific Plan. 2007.	"The Downtown Station Area Specific Plan is the result of a community based vision for the downtown area of the City of Santa Rosa. Centered on a proposed Sonoma Marin Area Rail Transit (SMART) station site, the Specific Plan defines the framework for future development in the Plan Area."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Foss Creek Pathway Plan. 2006.	"This Plan establishes the alignment and design standards the City of Healdsburg will use to construct the Foss Creek Pathway alongside the Northwestern Pacific Railroad and Foss Creek between Front Street and the city's north boundary. The pathway will complete a 4.1-mile long bicycle and pedestrian facility through the city by connecting to the existing bike lane along South Healdsburg Avenue, which continues south along Old Redwood Highway to the Town of Windsor."	City of Healdsburg Metropolitan Transportation Commission	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Franz Valley Area Plan. 2012.	"The Franz Valley Plan Area (91,520 acres) is located in the northeastern part of Sonoma County (see Location Map on page 10). The southern and western sections of the area are oriented toward Santa Rosa and Healdsburg, and are within a thirty minute drive to one of these cities. The northern section is oriented to Napa County, Calistoga, and the Northern Napa Valley."	Sonoma County	WMA: Russian Bodega County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	General Plan City of Sebastopol. 1994. Amended 2008.	The General Plan responds to citizens' desire to maintain and enhance Sebastopol's small town feeling and rural character by improving downtown, limiting residential growth rate, reducing annexation, and preserving environmentally sensitive areas.	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Green Building. 2008.	This program promotes manadatory Green Building practices as the standard for all new residential and commercial construction. The Town's Green Building Ordinance, 2007-215, is available on the website.	Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Grove Street Neighborhood Plan. 2000.	"The purpose and intent of preparing a Neighborhood Plan for the Grove Street area is to provide a cohesive planning framework that both recognizes and attempts to retain or enhance the neighborhood's distinctive and positive qualities, in the event that properties are annexed into the City for development purposes."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Healdsburg Bicycle & Pedestrian Master Plan. 2008	"This Healdsburg Bicycle & Pedestrian Master Plan was developed as a component of the Sonoma County Transportation Authority (SCTA) 2008 Countywide Bicycle and Pedestrian Master Plan to improve coordination in realizing the countywide bicyclist and pedestrian system. While part of the Countywide Master Plan, the Healdsburg Bicycle & Pedestrian Master Plan is also a stand-alone document to be used by the City of Healdsburg to guide implementation of local projects and programs and document city policy."	Sonoma County Transportation Authority and City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Healdsburg Community Based Transportation Plan. 2009.	"The Healdsburg Community Based Transportation Plan was conceived to create a transportation plan based on community input. funded by the Metropolitan Transportation Commission (MTC) and conducted by the Sonoma County Transportation Authority (SCTA), the plan emphasized community outreach to ensure a collaborative process inclusive of residents, employers, community-based and faith-based organizations, transportation and service providers, governmental agencies, and the business community."	Sonoma County Transportation Authority	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Healdsburg Downtown Streetscape Plan. 1989	The Plan is designed to enhance and extend the renovation and redevelopment efforts in Downtown Healdsburg in three ways.	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Laguna de Santa Rosa Park Master Plan Volumes I, II.	"This plan addresses many recreational, environmental, developmental, and management issues that affect the Laguna. It offers a program that will protect, preserve and enhance the Laguna while recognizing and incorporating recreation and commercial development necessary for the social and economic well being of the Community."	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Laguna Vista Final Environmental Impact Report. 2005.	This document includes the Recirculated Draft Environmental Impact Report, which was prepared to assess the revised project, and all public comments received during the public review process and responses to those comments.	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Lower Russian River Community Based Transportation Plan. 2009.	"Funded by the Metropolitan Transportation Commission (MTC) and conducted by the Sonoma County Transportation Authority, this Lower Russian River Community Based Transportation Plan focused on outreach to the Lower Russian River community to identify transportation problems and potential solutions. The plan describes existing conditions and services, as well as future plans, to provide context to the plan. The methods used for outreach are also described. The key components of the plan, however, are the public outreach findings and "action plan" in Chapter 5 derived from them."	Sonoma County Transportation Authority	WMA: Russian Bodega County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino Avenue Corridor Plan. 2009.	"The Mendocino Avenue Corridor Plan is the result of city and neighborhood inspired effort to address multi-modal transportation, pedestrian safety, beautification, and land use issues along Mendocino Avenue."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	North Santa Rosa Station Area Specific Plan. Draft, 2012.	"The North Station Area Plan outlines strategies to promote ridership and ensure connections to and from the proposed station. Because the area is already developed, with a few exceptions, a transit-supportive environment will need to be created through increasing residential density, promoting economic development, improving pedestrian, bicycle, auto and transit connections between the station and adjacent destinations, and enhancing the aesthetics of the area."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Rohnert Park Bicycle & Pedestrian Master Plan. 2008.	"This Rohnert Park Bicycle and Pedestrian Plan was developed as a component of the Sonoma County Transportation Authority's (SCTA's) 2008 Countywide Bicycle and Pedestrian Master Plan. While part of the Master Plan, the Rohnert Park plan is also a stand-alone document to be used by the City of Rohnert Park to guide implementation of local projects and programs and document city policy. As a component of the Countywide Bicycle and Pedestrian Master Plan this plan is also designed to improve coordination in realizing the countywide bicycle and pedestrian system."	Sonoma County Transportation Authority and City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Russian River Redevelopment Project Strategic Plan. 2009.	"The Russian River Redevelopment Project Strategic Plan was drafted through a comprehensive, citizen-based planning process and provides direction for community development efforts in the Russian River communities of western Sonoma County. The process was sponsored by the Russian River Redevelopment Oversight Committee (RRROC) through Sonoma County Community Development Commission, and led by a Strategic Planning Subcommittee (SPS) consisting of four RRROC members and five local citizens. The Strategic Plan, which prioritizes projects and expenditures based on community values and vision for the future, was adopted by the Board of Supervisors on June 9, 2009."	Sonoma County Community Development Commission	WMA: Russian Bodega County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Saggio Hills Area Plan. 2010.	"The Saggio Hills project area (Plan Area) is a 258.5± acre property located east of Healdsburg Avenue just north of Parkland Farms that was annexed to the City in 2009.. The Plan Area is the last large undeveloped property with significant development potential remaining within the city limits and comprises the majority of what is known in the Healdsburg 2030 General Plan as Development Subarea C."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Santa Rosa Avenue Corridor Plan. 2011.	"The goal of the Santa Rosa Avenue Corridor Plan (the Plan) is to create a comprehensive and long-term vision for this corridor and surrounding area, including recommendations for capital improvements, design guidelines, and a discussion of next steps required to implement the Plan. The Plan includes the area along Santa Rosa Avenue from Sonoma Avenue to Highway 12."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Santa Rosa Bicycle and Pedestrian Master Plan 2010.	"The BPMP is a critical tool for guiding city staff and the development community in building a multi-modal transportation system that is pedestrian and bicycle "friendly" and encourages residents to use these modes of transportation. The ultimate goal being a modal shift from driving the single occupancy vehicle to more walking and bicycling "as a normal part of life.""	City of Santa Rosa Transit Department	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Santa Rosa Green Building Requirements	This program was initially adopted as a voluntary program in 2004, but phased into a mandatory program in late 2007. The city adopted green building guidelines for all new construction.	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sebastopol Downtown Plan. 1990.	This plan seeks to provide an implementable roadmap for future development of Sebastopol's commercial/cultural/ civic downtown based on community input and consensus.	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sebastopol Road Corridor Plan. 2007.	"This report provides an overview of the Corridor Plan purpose, a detailed description of the elements of the Corridor Plan, how this plan will be implemented, and finally, the relationship of this report to the Sebastopol Road Urban Vision Plan and other City and Sonoma County planning documents."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sebastopol Road Urban Vision Plan. 2007.	"The Urban Vision Plan for Sebastopol Road Corridor affects that stretch of Sebastopol Road between Dutton Avenue to the east and Stony Point Road to the west, linking both sides of Sebastopol Road as well as the area north of Sebastopol Road, ending at the Highway 12 right-of-way."	City of Santa Rosa and Sonoma County	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Shiloh Road Village Vision Plan and Guiding Principles. 2001.	"The community desires that Shiloh Road Village convey an image that is both unique and consistent with regional architecture and one that evokes a strong sense of place and promotes walking and bicycling. The Shiloh Road Vision plan is a tool to communicate key concepts, which will assist Shiloh Road Village in realizing its full design potential. Through application of the plan, the Shiloh Road Village will yield a high quality and distinct aesthetic environment that benefits property owners, merchants, residents, and visitors alike."	Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County Aggregate Resources Management (ARM) Plan. 2010	"The County's intent expressed in this Management Plan is to be able to meet future aggregate needs using the resources that are available or could be developed in the County while recognizing that continued production from both terrace and instream sources must be regulated with standards that avoid or minimize significant impacts and promote the efficient use of the resource. The Management Plan presents policies and procedures that will result in a balanced development of the County's aggregate resources that recognizes all of these factors."	Sonoma County	WMA: Russian Bodega County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma Mountain Village Draft EIR. 2009.	"This Environmental Impact Report (EIR) has been prepared for the proposed Sonoma Mountain Village project (the project) to be located on the approximately 175-acre parcel immediately northwest and south west of the junction of Valley House Drive and Bodway Parkway in southeast Rohnert Park."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	South Santa Rosa Area Plan. 2008.	"The South Santa Rosa Area Plan reflects several key elements: (1) Revision of the urban boundary, (2) Accommodation of a variety of rural life styles, (3) Protection and maintenance of agriculture, (4) Direction of most new housing to locations closest to the community center, (5) Provision of urban services before or concurrent with urban development. The South Santa Rosa Land Use Plan and Open Space Plan are consistent with the General Plan."	Sonoma County	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Stadium Area Master Plan. 2008.	"The purpose of this "PD" Planned Development Zoning District is to set forth the standards for the development of a this Final Development Plan (hereafter referred to as the Stadium Area Master Plan or SAMP) through the adoption of the development standards, the listing of the permitted uses, and the phasing plan."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Station Area / Downtown Plan. 2010	"The Cloverdale Station Area/Downtown Plan is a guide for integrating the City and the new passenger rail service to the Cloverdale Depot, with a particular emphasis on the depot, the opportunity development sites at Citrus Fair Drive and Cloverdale Boulevard, and the Cloverdale Downtown."	City of Cloverdale	WMA: Russian Bodega County: Sonoma Municipality: Cloverdale
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sustainable Sebastopol Policy Statement and Program Listing. 2006.	This webpage provides guidelines for Sebastopol's sustainability policy and the programs that it has created to support sustainability.	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Taylor Mountain Regional Park and Open Space Preserve Master Plan. 2012.	"The Master Plan is intended to guide and direct the permanent conservation, resource management, recreational amenities, and operations of Taylor Mountain for the many benefits the project will provide to the residents and visitors of Sonoma County. The importance of balancing the protection of resources with the provision of public access is a consistent theme and a guiding principle of the Master Plan."	Sonoma County Agricultural Preservation and Open Space District and Sonoma County Regional Parks	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Town of Windsor General Plan — 2015. Revised 2011.	Goals and objectives to guide development and conservation of the Town's resources include community development; safe, affordable housing; management and conservation of natural, cultural, and scenic resources; and protection of public health and safety.	Planning and Building Department, Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Town of Windsor Townwide Trail and Bikeways Plan. Second Edition. 2002.	"This document, the second edition of the plan incorporates changes to trail surfaces, adds signage, some use restrictions, and updates completed work, goals and priorities. The goal of this plan remains to be providing guidelines for implementation of a coherent and comprehensive town-wide system of trails and bikeways."	Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Village Park Feasibility and Planning Study	"The Village Park Feasibility and Planning Study outlines planning and design recommendations for the Village Park property, located on Sebastopol Avenue (State Highway 12) at the eastern gateway to Sebastopol."	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Water Supply Assessment Northeast Area Specific Plan Sebastopol, California. 2007.	This study was conducted to comply with SB 610, which requires that water suppliers prepare a WSA for any proposed project that meets one of seven definitions. The City of Sebastopol commissioned this study to maintain compliance with SB 610 as it prepares a Specific Plan for the 54-acre Northeast Area.	City of Sebastopol Planning Department	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Wilfred/Dowdell Village Specific Plan. 2008.	"The Wilfred Dowdell Specific Plan is proposed to provide additional services and retail uses to meet the needs of the City — a vital commercial center with a wide variety of stores and services with pedestrian-oriented linkages connecting the various components. This center will have the qualities of a convenient shopping center with commercial businesses and personal services arranged in a manner that will be attractive to visitors."	City of Rohnert Park Community Development Department	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Windsor Bicycle & Pedestrian Master Plan. 2008.	"This Windsor Bicycle and Pedestrian Plan was developed as a component of the Sonoma County Transportation Authority's (SCTA's) 2008 Countywide Bicycle and Pedestrian Master Plan. While part of the Master Plan, the Windsor plan is also a stand-alone document to be used by the Town of Windsor to guide implementation of local projects and programs and document Town policy. It is also designed to be a component of the SCTA Countywide Bicycle and Pedestrian Master Plan to improve coordination in realizing the countywide bicycle and pedestrian system."	Sonoma County Transportation Authority and Town Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Windsor Station Area/ Downtown Specific Plan. 2012.	"The Plan includes guiding principles that provide an overall vision for the area, goals and policies for each topic, as well development standards/ zoning regulations and design guidelines for development. It also includes an implementation program, with timelines and responsibilities."	Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor

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Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	City of Cotati Food and Alcohol Environment Profile. 2010	"This assessment seeks to identify the ratio of less healthy to healthy food sources in Cotati in an effort to provide information that may be useful in developing policies that may positively influence future development, making the healthy choice the easy choice for residents of Cotati."	Sonoma State University Department of Environmental Studies and Planning and Sonoma County Department of Health Services Prevention and Planning Division	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Water Supply	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Draft North Sonoma County Agricultural Reuse Project. 2007.	"The purpose of the NSCARP is to provide a reliable alternative source of water for agricultural water users in the Russian River, Dry Creek, and Alexander Valley areas (North Sonoma County area) to reduce reliance on natural regional water supplies and address regional water supply and regulatory issues. The NSCARP would include the design and construction of storage reservoirs, conveyance and distribution pipelines, and pump stations in the North Sonoma County area."	Sonoma County Water Agency and USDI Bureau of Reclamation	WMA: Russian Bodega County: Sonoma
Water Supply	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County Water Agency Proposed 2012 Strategic Plan.	An outline of Organizational, Sanitation, Energy, Water Supply, and Flood Control Goals and Strategies.	Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Climate Action Plan A Strategy for Greenhouse Gas Reduction and Adaptation to Global Climate Change. Draft. 2012.	This Plan is the result of Humboldt County's December 2007 resolve to join the International Council for Local Environmental Initiatives and participate in the Cities for Climate Protection Campaign. The County agreed to 1) conduct a GHG emission inventory and forecast to determine sources and quantity of GHG emissions in the County; 2) establish a CO2 or GHG emissions reduction target; 3) develop an action plan with both existing and future actions that, when implemented, will help meet the local GHG reduction target; 4) implement the action plan; and 5) monitor and report progress.	Humboldt County Department of Community Development Services	County: Humboldt
Climate Change	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County Community Climate Action Plan: Blueprint for the Future. 2008.	"This Plan presents a package of solutions that, when implemented as a large scale public works project, will meet Sonoma County's bold goal for reducing greenhouse gas (GHG) emissions — 25 percent below 1990 levels by 2015. All nine Sonoma cities and the County established this goal in 2005."	Climate Protection Campaign	County: Sonoma
Conservation	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Connecting Communities and the Land: A Long-Range Acquisition Plan. 2006.	"With "Connecting Communities and the Land: A Long-Range Acquisition Plan," the District presents refined goals, objectives, policies and implementation/ action items, based on an assessment of conservation success and identification and prioritization of lands still needing protection. The District will develop an annual work plan to review objectives, action items and land acquisition priorities, and to measure performance."	Sonoma County Agricultural Preservation and Open Space District	County: Sonoma
Energy	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma Green Business Program. 2008.	"The Sonoma Green Business Program is a partnership of government agencies and utilities that assists, recognizes, and promotes local organizations, focusing on small- to medium-sized consumer-oriented businesses that volunteer to operate in a more environmentally responsible way. To be certified, participants must be in compliance with all environmental regulations and meet program standards for conserving resources, preventing pollution, and minimizing waste."	Sonoma County	County: Sonoma

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Avenue of the Giants Community Plan. Including the Communities of: Stafford, Pepperwood, Shively, Holmes, Larabee, Redcrest, Weott, Myers Flat, Miranda and Phillipsville. 2000.	"The Avenue of the Giants Community Plan (AGCP) and the related Humboldt County Framework Plan, are long range statements of public policy for the use of public and private lands. The Community Plan contains specific policies and information applicable to the Avenue of the Giants Planning Area. Together the Framework Plan and the Community Plan comprise the Humboldt County General Plan. The Framework Plan covers countywide issues while the Avenue of the Giants Community Plan deals with land use within the Avenue of the Giants Planning Area."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Beach & Dunes Management Plan. 1992.	"This report is intended to be a management plan to address all resource and recreational management issues effecting the planning area."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Blue Lake Community Action Plan: Community Visioning and Strategic Planning. 2003.	"The intended outcomes of the CAP update process in Blue Lake were to understand the goals and accomplishments of the 1997 CAP, identify next steps, and draft an updated strategic planning document."	Humboldt County Department of Community Development Services	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Bridgeville Area Community Action Plan. 2003.	"This document serves as a record of all the accomplishments shared and ideas generated over the past several months. The updated CAP can be used as a springboard for community improvement projects and future community planning processes. Furthermore, those who are seeking financial assistance from both public agencies and private foundations can use the plan as a supporting document."	Humboldt County Department of Community Development Services	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Carlotta/Hydesville Community Plan. Undated.	"The Carlotta/Hydesville Area Community Plan deals with land use within the Carlotta/Hydesville Planning Area."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Eel River Area Plan of the Humboldt County Local Coastal Program. 1995.	"This area plan, representing one of six County coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Eureka Community Plan. 1995.	The Eureka Community Plan is a long range statement of public policy for the use of public and private lands. The Eureka Community Plan shall act as a blueprint, guiding development throughout the Planning Area during the next 20 years."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Fortuna Area Community Plan. 1985.	"The Fortuna Area Community Plan, as is the Humboldt County Framework Plan, is a long range statement of public policy for the use of public and private lands. The Framework Plan, Community Plans and Coastal Area Plans comprise the Humboldt County General Plan. The Framework Plan covers countywide issues while the Fortuna Area Community Plan deals with land use within the Fortuna Planning Area."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Freshwater Community Plan. 1985.	"This plan contains specific policies and information applicable to the Freshwater Planning Area. "	Humboldt County Planning Department	County: Humboldt

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Garberville Redway Alderpoint Benbow Community Plan. 2006.	"The Garberville/Redway/Benbow/Alderpoint ("GRBA") Community Plan, as is the Humboldt County Framework Plan, is a long-range statement of public policy for the use of public and private lands."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt 21st Century Genral Plan; Humboldt County General Plan Update. Planning Commission Approved Draft. 2012.	"The general plan establishes the kinds, locations, and intensities of land uses as well as applicable resource protection and development policies. Land use maps are used to show land use plan designations, constraints, and public facilities."	Humboldt County	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt Bay Area Plan of the Humboldt County Local Coastal Program. 1995.	"This area plan, representing one of six County coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt County General Plan Volume II McKinleyville Community Plan. 2002.	"This plan contains specific policies and information applicable to the McKinleyville Planning Area."	Humboldt County	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Jacoby Creek Community Plan. 1982.	"The Jacoby Creek Community Plan is based on the residential community located along Old Arcata Road and Jacoby Creek Road. The Plan also encompasses the territory of the Jacoby Creek County Water District and adjoining unincorporated lands that help define the community boundaries."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	McKinleyville Area Plan of the Humboldt County Local Coastal Program. 1995.	"This area plan, representing one of six County coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	McKinleyville Community Plan. 2002.	"The McKinleyville Community Plan, as is the Humboldt County Framework Plan, is a long range statement of public policy for the use of public and private lands. Together the Framework Plan and the Community Plan comprise the Humboldt County General Plan. The Framework Plan covers countywide issues while the McKinleyville Community Plan deals with land use within the McKinleyville Planning Area."	Humboldt County	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	North Coast Area Plan of the Humboldt County Local Cosstal Program. 1982.	"This Area Plan, representing one of six County coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Orick Community Action Plan. 2003.	"The updated CAP can be used as a springboard for community improvement projects and future community planning processes."	Humboldt County Department of Community Development Services	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	South Coast Area Plan of the Humboldt County Local Coastal Program. 1990.	"This area plan, representing one of six County coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Trinidad Area Plan of the Humboldt County Local Coastal Program. 1995.	"This Area Plan, representing one of six county coastal planning areas identifies land uses and standards by which development will be evaluated within the Coastal Zone."	Humboldt County Planning Department	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Willow Creek Community Action Plan. 2003.	"The updated CAP can be used as a springboard for community improvement projects and future community planning processes."	Humboldt County Department of Community Development Services	County: Humboldt
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino County Airport Comprehensive Land Use Plan. 1993. Revised 1996.	"This Airport Land Use Compatibility Plan sets forth the criteria and policies which the Mendocino County Airport Land Use Commission will use in assessing the compatibility between the public use airports in Mendocino County and proposed land use development in the areas surrounding them."	Mendocino County	County: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino County General Plan — Coastal Element. 1985.	The Coastal Element consists of four major chapters. Chapter 1 reviews the California Coastal Act; Chapter 2 describes plan organization and lists land use classifications; Chapter 3 reviews resources and development issues and prescribes policy; Chapter 4 describes the Land Use Plan for each of the 13 planning areas in the County and lists applicable policies. "Fort Bragg's Local Coastal Program consists of the Coastal Element of the General Plan as well as other coastal-related policies and programs of the General Plan, the Land Use Map, and implementing regulations in the Fort Bragg Municipal Code."	Mendocino County	County: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino County General Plan. 2009.	This General Plan for Mendocino County seeks to manage... issues, and to chart a course for County government over the next 20 years. The goals, policies, and action items in this General Plan represent the County's statement of how Mendocino County should grow or change in the coming decades, (or where it should remain the same), and how today's challenges will be met."	Mendocino County	County: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Mendocino County Housing Element. 2010.	"The Housing Element is one of the seven required elements in the County's General Plan. It contains an overview of the housing needs in the unincorporated area of the County. The Element includes an analysis of both the constraints that may impact housing development as well as the resources available to facilitate it."	Mendocino County	County: Mendocino
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	2009 Comprehensive Transportation Plan for Sonoma County. 2009.	"The purpose of the Plan is primarily to update past transportation planning efforts in order to prioritize trans-portation needs throughout Sonoma County for the next 25 years."	Sonoma County Transportation Authority.	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Balancing Multiple Objectives: Work Plan July 2012–June 2015. 2012.	"The Work Plan is grounded in the mission of the District as defined in its enabling legislation, as well as the goals in the Board-adopted Acquisition Plan and Strategic Plan."	Sonoma County Agricultural Preservation & Open Space District	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Bennet Valley Area Plan. 2011.	"The Bennett Valley Area Plan is guided by goals, objectives and policy framework of the adopted Sonoma County General Plan. Four major land use categories are used in the Bennett Valley Plan to achieve the desired balance of residential and agricultural use."	Sonoma County	County: Sonoma Municipality: Santa Rosa

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Draft Sonoma County Outdoor Recreation Plan, Volumes I & II. 2003.	"The primary purposes of the Outdoor Recreation Plan (Plan) are to facilitate cooperation and coordination among agencies in planning, acquiring, managing and funding outdoor recreation facilities in the unincorporated areas of Sonoma County, and to provide public access and recreation opportunities on public lands."	County of Sonoma Board of Supervisors	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Fee Lands Strategy. 2012.	"The District currently owns 7,500 acres, and has developed this Fee Land Strategy to document its current holdings, assess current land management practices, describe pending property transfers, and develop criteria for evaluating options for conveyance of the remainder of the properties to appropriate responsible entities."	Sonoma County Agricultural Preservation and Open Space District	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Local Hazard Mitigation Plan. 2008.	This Plan was developed to mitgate interruptions to clean drinking water and water for fire fighting in the event of the occurrence of a natural hazard.	Sonoma County Water Agency	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	SCTA Countywide Bicycle & Pedestrian Master Plan. 2010.	"The Sonoma County Bicycle and Pedestrian Plan is intended to establish goals, objective, policies, and project priorities for bicycle and pedestrian transportation network in the unincorporated area outside of the cities of Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, and the Town of Windsor. Each of these cities has developed their own individual bicycle and pedestrian plans to guide implementation of the network inside their respective city boundaries. The Sonoma County Transportation Authority's Countywide Bicycle & Pedestrian Master Plan is intended to coordinate development of facilities proposed by the individual plans in order to provide a seamless regional bicycle and pedestrian network."	Sonoma County Transportation Authority, and Cloverdale, Cotati, Healdsburg, Rohnert Park, Sonoma, Windsor, Unincorporated Sonoma County	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County General Plan 2020. 2008.	"The broad purpose of GP 2020 is to express policies which will guide decisions on future growth, development, and conservation of resources through 2020 in a manner consistent with the goals and quality of life desired by the county's residents. Under State law many actions on private land development, such as Specific Plans, Area Plans, zonings, subdivisions, public agency projects and other decisions must be consistent with the General Plan. The Goals, Objectives, and Policies set forth in the plan will be applied in a manner to insure their constitutionality."	Sonoma County	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County Hazard Mitigation Plan. 2011.	"The purpose of the Sonoma County Hazard Mitigation Plan (SCHMP) is to significantly reduce deaths, injuries, property losses and community disruption caused by natural hazards in the unincorporated County through a process of assessing and analyzing those hazards to which the County is most vulnerable (i.e. hazard risk assessment), identifying what tools we have in our tool box, (i.e. capabilities assessment) for taking, requiring or encouraging actions to reduce the adverse effects of such hazards, and then identifying mitigation actions establishing prioritized mitigation goals, and adopting a five-year implementation which the County will seek to implement subject to the limitations of funding and staff. This Plan also reports on progress made on mitigation actions identified in the prior 2006-2011 implementation plan."	Sonoma County Permit and Resource Management Department under the direction of Sonoma County Department of Fire and Emergency Services	County: Sonoma

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Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Sonoma County Local Coastal Plan. Updated 2001.	The Sonoma County Local Plan (LCP) is contained within the current General Plan and sets policy for development and other activities on the Sonoma Coast. It is currently being updated into a separate document. The updated LCP will be formatted similarly to the General Plan 2020 and will contain a water resources element and will address water quality impacts. It is expected to be completed by 2009 (Lisa Pasternak pers. Comm. 12/06)	Sonoma County	County: Sonoma
Land Use Planning	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Trinity County General Plan. 2003.	The Housing Element, Open Space Element, and Safety Element are available online. Additionally, Trinity County has prepared community plans for Douglas City, Hayfork, Lewiston, Junction City, and Weaverville. The Plan is scheduled to be updated beginning in 2007 and should be completed/adopted by 2010 (John Jelicich, pers. Comm. 12/1/06).	Trinity County	County: Trinity
Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Del Norte Fire Safe Plan Community Wildfire Protection Plan. 2005.	The Plan... identifies risks and mitigations to reduce risks from wildfire in Del Norte County. It also provides residents with a step-by-step guide on how to fire-safe their homes, structures, and community, and how to best deal with an impending wildfire. It contains several pages that can be copied or removed for ongoing local reference. "	Del Norte Fire Safe Council	County: Del Norte
Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt County Master Fire Protection Plan FSC DRAFT Plan. 2006.	"The MFPP is intended to serve as the guiding document for reducing the risk of fire to Humboldt County communities. Policy recommendations from the MFPP will supplement the Natural Resources and Hazards Report that supports the preparation of the Humboldt County General Plan, thus influencing future development patterns. Additionally, the MFPP is designed to meet Healthy Forest Restoration Act criteria for Community Wildfire Protection Plans (CWPP) by engaging in a collaborative process, prioritizing fuel reduction activities, and recommending treatments for reducing structural ignitability."	Humboldt County	County: Humboldt
Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Humboldt Operational Area — Hazard Mitigation Plan (HMP). 2008.	"The Plan inventoried potential natural hazards that the defined planning area is most vulnerable to, assessed the risk to the planning area's citizens, buildings and critical facilities and developed a mitigation strategy to educe the risk of exposure and allow a swift and organized recovery should a disaster occur. The natural hazards that this plan addresses include: Flood Wildfire Earthquake Tsunami Severe Weather Landslides and Other Mass Movement Dam Failure Fish Losses Drought."	Humboldt County	County: Humboldt

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Social	Municipal Plans, General Plans, Local Coastal Plans, and Other Local Plans	Healthy by Design: A Public Health and Land Use Planning Workbook. 2010.	"This Workbook focuses on how land use planning can contribute to improving health through reducing obesity and chronic disease."	Sonoma County Planning and Community Development, County of Sonoma Department of Health Services, Sonoma County Agricultural Preservation and Open Space District, Sonoma County Transportation Authority, Leadership Institute for Ecology and the Economy	County: Sonoma
Land Use Planning	Nort Coast Regional Plans	Eco-Cultural Resource Management Plan	"This plan is intended to integrate Traditional Ecological Knowledge and the best western science into a format that outlines programmatic resource concerns, goals, and objectives. The ECRMP also outlines historical, current, and future desired conditions of ecological, social and/or physical interactions of humans and the environment in the interest of developing standardized Cultural Environmental Management Practices for the Karuk Aboriginal Territory."	Karuk Tribe	Tribe: Karuk Tribe of California Shasta/Upper Klamath WMA: Klamath River County: Humboldt
Conservation	Nort Coast Regional Plans	Mendocino County Coastal Conservation Plan (Coastal Plan)	"The Land Trust is implementing the Mendocino County Coastal Conservation Plan that was prepared over a two-year span in collaboration with over 50 local experts. The plan can serve as a roadmap for coastal land conservation in Mendocino County for the next decade."	Mendocino Land Trust	County: Mendocino
Land Use Planning	Nort Coast Regional Plans	MacKerricher State Park General Plan. 1995.	"The general plan is meant to guide the management of the park for the next ten to twenty years. It sets forth goals for park management and use and also identifies and analyzes the relative importance of the park's many resources, providing guidelines as to how they should be preserved and managed. The document also portrays the patterns and intensities of desirable uses and the nature and location of proposed development."	California State Parks	County: Mendocino
Land Use Planning	Nort Coast Regional Plans	Van Damme State Park General Plan. 1995.	"This general plan was prepared to guide the management and development of this state park for the next ten to twenty years. It sets forth goals and objectives for park management and use and analyzes the physical, economic, and social context in which the park exists. This plan also identifies and analyzes the relative importance of the park's many natural, cultural, scenic, and recreation resources and provides guidelines as to how they should be preserved and managed. Finally, this document portrays the patterns and intensities of desirable uses and the nature and location of proposed development."	California State Parks	County: Mendocino
Land Use Planning	Nort Coast Regional Plans	Klamath National Forest Land and Resource Management Plan. 1995.	"This proposed National Forest Land and Resource Management Plan (Forest Plan) has been prepared to guide all natural resource management activities and establishes management standards and guidelines for the Klamath National Forest (Forest). It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. A goal of this Forest Plan is to integrate a mix of management activities that allow for the use, management and protection of Forest resources."	U.S.D.A. Forest Service	County: Siskiyou

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Land Use Planning	Nort Coast Regional Plans	Sonoma Coast State Beach Preliminary General Plan & Draft Environmental Impact Report. 2007.	"The General Plan contains a comprehensive and cohesive set of park-wide and zone-specific goals and guidelines for the long-term direction of the Sonoma Coast State Beach. Two park management zones are identified in the plan, providing detailed direction tailored to the particular environmental resource characteristics of each zone. The two zones — Coastline Management Zone and Inland Watershed Management Zone — provide high-quality park experiences for visitors while enhancing and preserving features that make the Sonoma Coast State Beach a unique destination. A number of improvements are identified in the General Plan's goals and guidelines. The Plan also proposes a change in classification from State Beach to State Park."	California State Parks	County: Sonoma
Water Quality	Nort Coast Regional Plans	Water Quality Control Plan Hoopa Valley Indian Reservation. 2006.	"The goal of this plan is to provide a definitive program of actions designed to preserve and enhance water quality on the Reservation, and to protect the beneficial uses of water for the next 10 years to 20 years. The plan is concerned with all factors and activities that might affect water quality. However, the plan emphasizes actions to be taken by the Riparian Review Committee, the Hoopa Valley Tribal Fisheries, Forestry, Public Utility Departments, and Tribal Environmental Protection Agency, as they have responsibility for maintaining water quality on the Reservation."	Hoopa Valley Tribe	Tribe: Wiyot Hoopa Valley Indian Reservation County: Humboldt
Watershed Planning	Nort Coast Regional Plans	Watershed Improvement Network	"The long-term goal of the Watershed Improvement Network project is to improve the health and productivity of Humboldt County's natural resources and economy. WIN enhances the effectiveness of watershed restoration work by facilitating the exchange of expertise, resources and information, encouraging collaboration, and providing a forum for creative problem solving and strategic planning."	Natural Reources Services: A Division of Redwood Community Action Agency	County: Humboldt
Groundwater	Salinity Management Plans	Salt and Nutrient Management Plan for the Santa Rosa Plain Subbasin. In progress.	"In response to the SWRCB's Recycled Water Policy, the City is leading the development of a Salt and Nutrient Management Plan for the Santa Rosa Plain Subbasin."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Land Use Planning	State	Tribal Consultation Guidelines: Supplement to General Plan Guidelines. 2005.	"The 2005 Supplement (also known as Tribal Consultation Guidelines) provides advisory guidance to cities and counties on the process for consulting with Native American Indian tribes during the adoption or amendment of local general plans or specific plans, in accordance with the statutory requirements of Senate Bill 18 (Chapter 905, Statutes of 2004). It reflects recent changes to the California Public Records Act which will facilitate this consultation process."	Governor's Office of Planning and Research	Tribe: All County: All
Water Quality	Stormwater Management Plans	City of Fortuna SWMP. 2006.	"The goal of this SWMP is to protect water quality from the impacts of storm water runoff through compliance with Phase II NPDES Permit requirements and applicable regulations, and to foster maximum public involvement and awareness of storm water issues. This SWMP outlines activities to be implemented during the first five-year NPDES permit period."	City of Fortuna	WMA: Eel River County: Humboldt Municipality: Fortuna
Water Quality	Stormwater Management Plans	Drainage Master Plan Update City of Ferndale. 2004.	"The 2003 Drainage Master Plan Update is an update to the 1990 Drainage Master Plan. It addresses the current state of stormwater drainage in the City of Ferndale by identifying changes and improvements in stormwater drainage that have occurred since 1990, identifying current and future drainage problems, establishing a list of recommended drainage improvement projects, addressing drainage revenues and the drainage fee rate structure, and recommending changes to the City's drainage ordinance to better address the City's current needs."	City of Ferndale	WMA: Eel River County: Humboldt Municipality: Ferndale

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Water Quality	Stormwater Management Plans	2005 Storm Drainage Master Plan. 2005.	"This 2005 Storm Drainage Master Plan has been prepared as an update to the City of Fortuna's (City) 1982 Storm Drainage Master Plan. Its purpose is to provide a detailed overview of the adequacy of the major storm drainage facilities serving the City."	City of Fortuna	WMA: Humboldt Bay County: Humboldt Municipality: Fortuna
Water Quality	Stormwater Management Plans	City of Arcata SWMP. 2005.	"The goal of this SWMP is to protect the health of the recreational public and the environment, meet Clean Water Act mandates through compliance with Phase II NPDES Permit requirements and applicable regulations, and foster heightened public involvement and awareness."	City of Arcata	WMA: Humboldt Bay County: Humboldt Municipality: Arcata
Water Quality	Stormwater Management Plans	City of Eureka Phase II NPDES Storm Water Management Plan. Revised 2005.	"This Storm Water Management Plan (SWMP) has been developed to comply with the Federal Storm Water Phase II Final Rule (Phase II Rule), which requires operators of small municipal separate storm sewer systems (MS4s) to obtain a National Pollutant Discharge Elimination System (NPDES) permit."	Public Works Department City of Eureka	WMA: Humboldt Bay County: Humboldt Municipality: Eureka
Water Quality	Stormwater Management Plans	City of Trinidad Stormwater Management Plan. 2010.	"The Action Plan defines activities needed to achieve the goals of the Watershed Management Plan. These activities may be undertaken voluntarily, and we have identified lead and supporting partners for each task and we look to those entities to act. Some of the recommended actions are already being implemented, while others have yet to be initiated. The City will generally support implementation of this Plan, taking on specific programs and projects that are beyond the mission or capacity of individual organizations/agencies or established partnerships. The City will also continue to provide a forum where programs and projects are discussed and considered."	City of Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Water Quality	Stormwater Management Plans	Community of McKinleyville Storm Water Management Program. 2005.	"The goal of this SWMP is to protect water quality from the impacts of storm water runoff through compliance with Phase II NPDES Permit requirements and applicable regulations, and to foster maximum public involvement and awareness of storm water issues. This SWMP outlines activities to be implemented during the first 5-year NPDES permit period ."	County of Humboldt Department of Public Works	WMA: Humboldt Bay County: Humboldt
Water Quality	Stormwater Management Plans	Winzler & Kelly Stormwater Action Plan. Undated.	"The Action Plan defines activities needed to achieve the goals of the Watershed Management Plan. These activities may be undertaken voluntarily, and we have identified lead and supporting partners for each task and we look to those entities to act. Some of the recommended actions are already being implemented, while others have yet to be initiated."	City of Trinidad	WMA: Humboldt Bay County: Humboldt Municipality: Trinidad
Water Quality	Stormwater Management Plans	City of Etna Storm Water Management Plan.		City of Etna	WMA: Klamath River County: Siskiyou Municipality: Etna
Water Quality	Stormwater Management Plans	City of Yreka Ecologic Stormwater Plan. In progress.	The City of Yreka recently issued and RFP to complete the Plan, which will propose ecological solutions for the existing drainage system.	City of Yreka	WMA: Klamath River County: Siskiyou Municipality: Yreka

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Water Quality	Stormwater Management Plans	City of Yreka Master Plan of Drainage. 2005.		City of Yreka	WMA: Klamath River County: Siskiyou Municipality: Yreka
Water Quality	Stormwater Management Plans	City of Yreka Water Master Plan. 2006.	Plan assesses existing water supply inventory and projected need.	City of Yreka	WMA: Klamath River County: Siskiyou Municipality: Yreka
Water Quality	Stormwater Management Plans	Storm Water Pollution Prevention Plan for City of Crescent City Municipal Wastewater Treatment Plan. 2006.	"This storm water pollution prevention plan (SWPPP) covers the operations at the City of Crescent City's Water Pollution Control Facility."	Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Water Quality	Stormwater Management Plans	Stormwater Management Plan for City of Crescent City Municipal Wastewater Treatment Plan. 2006.	"This storm water pollution prevention plan (SWPPP) covers the operations at the City of Crescent City's Water Pollution Control Facility. It has been developed as required under State Water Resources Control Board (SWRCB) Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) for storm water discharges and in accordance with good engineering practices. "	Crescent City Public Works Department	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Water Quality	Stormwater Management Plans	City of Fort Bragg Storm Water Management Program FY 2003/04 to FY 2007/08. 2005.	"It is the intent of the SWMP to build the "foundation" of the program in the early years of the program and build on the program in subsequent years. Foundation activities include, establishing regulatory requirements for non-stormwater discharges, enforcement authority, enforcement sanctions or penalty system for non-compliance, staff training, development of educational materials, and public involvement."	City of Fort Bragg	WMA: North Coast Rivers County: Mendocino Municipality: Fort Bragg
Water Quality	Stormwater Management Plans	Town of Windsor Phase II NPDES Storm Water Management Plan. 2005.	"In order to achieve compliance with the Phase II (NPDES) Rule, the Town is required to prepare a Storm Water Management Plan (Plan) and submit a Notice of Intent and a permit fee. The Plan will serve as the Town's permit, describing actions that include Best Management Practices (BMPs), measurable goals, and timetables for what are defined as Minimum Control Measures (MCMs)."	Town of Windsor	WMA: North Coast Rivers County: Sonoma Municipality: Windsor
Water Quality	Stormwater Management Plans	City of Cotati Phase II NPDES Storm Water Management Plan. 2005.	"This Storm Water Management Plan (SWMP) has been developed to comply with the federal Storm Water Phase II Final Rule (Phase II Rule), which requires operators of small municipal separate storm sewer systems (MS4s) to obtain a National Pollutant Discharge Elimination System (NPDES) permit."	City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Water Quality	Stormwater Management Plans	City of Healdsburg Storm Water Management Program. 2005.	"This SWMP details the City's proposed actions for each of the six required Phase II plan components (Public Education and Outreach on Storm Water Impacts, Public Involvement/Participation, Illicit Discharge Detection and Elimination, Construction Site Storm Water Runoff Control, Post-Construction Storm Water Management in New Development and Redevelopment, and Pollution Prevention/ Good Housekeeping for Municipal Operations). In many cases, existing programs or efforts that have already been implemented are incorporated into the SWMP."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg

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Water Quality	Stormwater Management Plans	City of Ukiah Storm Water Management Plan. 2006.	"The purpose of the City of Ukiah Storm Water Management Plan (CUSWMP) is to implement and enforce a series of management practices, referred to herein as "Best Management Practices" (BMPs). These BMPs are designed to reduce the discharge of pollutants from urban runoff or municipal separate storm sewer systems (MS4s) to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act. The achievement of these objectives will be gauged using a series of Measurable Goals, which also are contained in the plan. "	City of Ukiah Department of Public Works	WMA: Russian Bodega County: Sonoma Municipality: Ukiah
Water Quality	Stormwater Management Plans	Guidelines for the Standard Urban Storm Water Mitigation Plan: Storm Water Best Management Practices for New Development and Redevelopment. 2005.	"These guidelines have been developed to assist project sponsors and municipal staff to implement the Santa Rosa Area Standard Urban Storm Water Mitigation Plan (SUSMP) requirements that were adopted by the North Coast Regional Water Quality Control Board in June 2003."	Sonoma County, City of Santa Rosa, and Russian River Watershed Association	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Water Quality	Stormwater Management Plans	National Pollutant Discharge Elimination System for Storm Water Discharges from the Santa Rosa Area Storm Water Management Plan. Revised 2003.	"The Storm Water Management Plan (SWMP) has been prepared to supplement the joint National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Storm Water permit to be issued to the City of Santa Rosa (City), the County of Sonoma (County), and the Sonoma County Water Agency (Water Agency), collectively referred to as co-permittees, by the North Coast Regional Water Quality Control Board (NCRWQCB)."	County of Sonoma, City of Santa Rosa, & Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Water Quality	Stormwater Management Plans	National Pollutant Discharge Elimination System for Storm Water Discharges Storm Water Management Plan Phase II. 2004.	"Part I contains a description of the context in which this SWMP will be implemented, including the land uses, pollutant of concern, and administrative structure of each copermittee. Parts II and III contain individual SWMPs for the County of Sonoma (County) and the Sonoma County Water Agency (Water Agency). Each is divided into sections corresponding to the six Minimum Control Measures (MCM). Most Best Management Practices (BMPs) listed for each MCM contain measurable goals. Measurable goals include a description of the activity, implementation schedule and quantifiable target."	County of Sonoma and Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Water Quality	Stormwater Management Plans	Phase II NPDES Storm Water Management Plan. 2005.	"This Storm Water Management Plan (SWMP) has been developed to comply with the federal Storm Water Phase II Final Rule (Phase II Rule), which requires operators of small municipal separate storm sewer systems (MS4s) to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The Phase II Rule automatically requires compliance for all small MS4s that are located in urbanized areas as defined by the Census Bureau and which are not already permitted under the Phase I program. The City of Cotati (City) was automatically designated by the US EPA due to meeting the "urbanized area" criteria.""	City of Cotati	WMA: Russian Bodega County: Sonoma Municipality: Cotati
Water Quality	Stormwater Management Plans	Phase II NPDES Storm Water Management Plan. 2005.	"The Plan will serve as the Town's permit, describing actions that include Best Management Practices (BMPs), measurable goals, and timetables for what are defined as Minimum Control Measures (MCMs). MCMs are storm water program areas that must be addressed by all regulated MS4s. During the first five-year permit term, the Town must submit annual reports to the North Coast Regional Water Quality Control Board (Regional Board) that document and convey progress in implementing the six MCMs."	Town of Windsor	WMA: Russian Bodega County: Sonoma Municipality: Windsor

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Water Quality	Stormwater Management Plans	Revised Draft Storm Water Management Plan for the City of Sebastopol. 2005.	"This Draft Storm Water Management Plan (SWMP) for the City of Sebastopol constitutes a work plan for the City to achieve the goals of the NPDES Phase II Permit. The Final SWMP, to be developed over the first year of the permit cycle, will consist of a series of Objectives, Existing and Proposed Activities (BMPs), Measurable Goals and Timetables for Implementation that will be developed through a collaborative process by City Staff and consultants, elected officials and the public."	City of Sebastopol	WMA: Russian Bodega County: Sonoma Municipality: Sebastopol
Water Quality	Stormwater Management Plans	Revised Phase II NPDES Storm Water Management Plan. 2005.	"With this Revised Plan, the City formalizes and documents the BMPs already implemented. Other SWMP elements will be implemented over the five-year term of the first (NPDES) permit."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma
Water Quality	Stormwater Management Plans	Santa Rosa Area Urban Runoff and Storm Water NPDES Permit Standard Urban Storm Water Mitigation Plan. 2002.	"This Standard Urban Storm Water Mitigation Plan (SUSMP) has been developed as part of the Santa Rosa Area Permit municipal storm water program to address post-development storm water pollution and peak flows from new development and redevelopment projects. Implementation of this SUSMP constitutes the maximum extent practicable for development and redevelopment projects."	City of Santa Rosa, County of Sonoma, Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Water Quality	Stormwater Management Plans	Guidelines for the Standard Urban Storm Water Mitigation Plan: Storm Water Best Management Practices for New Development and Redevelopment. Undated.	"These guidelines have been developed to assist project sponsors and county staff to implement the Mendocino County Storm Water Management Plan (SWMP) requirements that were adopted by the North Coast Regional Water Quality Control Board in December, 2005."	Mendocino County and the Russian River Watershed Association	County: Mendocino
Water Quality	Stormwater Management Plans	Second Revised Mendocino County Storm Water Management Program. 2005.	"The purpose of the Mendocino County Storm Water Management Program (MCSWMP) is to develop, implement and enforce a series of storm water management practices, referred to herein as "Best Management Practices" (BMPs). These BMPs are designed to reduce the discharge of pollutants from urban runoff, or municipal separate storm sewer systems (MS4s) to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act. The achievement of these objectives will be gauged using a series of Measurable Goals, which are organized into six categories of Minimum Control Measures."	Mendocino County Water Agency	County: Mendocino
Environmental Quality	Tribal Plans	Programmatic Environmental Assessment Comprehensive Integrated Resource Management Plan. 2012.	"The Comprehensive IRMP provides goals and preferred management objectives for the natural, cultural and human resources of the Round Valley Indian Reservation. The plan was developed based on an inventory of resource conditions and issues compiled from existing studies, assessments, and agency data, management workshops, focus groups and a community survey."	Round Valley Indian Tribe	Tribe: Round Valley Tribes WMA: Eel River County: Mendocino
Water Quality	Tribal Plans	Wiyot Tribe Water Pollution Control Program. 2002.	"In October 2002 the Wiyot Tribe established a waterpolution control grogram under authority of sections 106 and 319 of the federal Clean Water Act. The goals of the program are to: assess and better understand the Tribe's water resources to identify threats and negative stressors to water quality, and monitor and protect the quality of the Tribe's water resources and their uses."	Wiyot Tribe	Tribe: Wiyot Tribe WMA: Eel River County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Land Use Planning	Tribal Plans	Eco-Cultural Resource Management Plan	"This plan is intended to integrate Traditional Ecological Knowledge and the best western science into a format that outlines programmatic resource concerns, goals, and objectives. The ECRMP also outlines historical, current, and future desired conditions of ecological, social and/or physical interactions of humans and the environment in the interest of developing standardized Cultural Environmental Management Practices for the Karuk Aboriginal Territory."	Karuk Tribe	Tribe: Karuk Tribe of California Shasta/Upper Klamath WMA: Klamath River County: Humboldt
Water Quality	Tribal Plans	Water Quality Control Plan Hoopa Valley Indian Reservation. 2006.	"The goal of this plan is to provide a definitive program of actions designed to preserve and enhance water quality on the Reservation, and to protect the beneficial uses of water for the next 10 years to 20 years. The plan is concerned with all factors and activities that might affect water quality. However, the plan emphasizes actions to be taken by the Riparian Review Committee, the Hoopa Valley Tribal Fisheries, Forestry, Public Utility Departments, and Tribal Environmental Protection Agency, as they have responsibility for maintaining water quality on the Reservation."	Hoopa Valley Tribe	Tribe: Wiyot Hoopa Valley Indian Reservation County: Humboldt
Water Quality	Tribal Plans	Yurok Tribe Water Quality Control Plan for the Yurok Indian Reservation. 2004.	"The water quality standards outlined in this document and its subsequent amendments are designed to fully protect the beneficial uses of Reservation waters. This Water Quality Control Plan (WQCP) is not a management document and therefore does not set forth actions or recommendations for the implementation of projects that may impact beneficial uses. Rather, it is a regulatory document used by the Tribe to permit, deny, or condition proposed actions that have the potential to affect the beneficial uses of waters of the Reservation."	Yurok Tribe Environmental Program	Tribe: Yurok Tribe County: Multiple
Water Supply	Urban Water Management Plans	City of Fortuna UWMP. 2011.	"This Urban Water Management Plan (UWMP) has been prepared in compliance with requirements of the California Department of Water Resources (DWR) pursuant to the Urban Water Management Act (UWMP Act) and the Water Conservation Bill of 2009."	City of Fortuna	WMA: Eel River County: Humboldt Municipality: Fortuna
Water Supply	Urban Water Management Plans	City of Arcata UWMP 2010. 2010.	"This UWMP for the City of Arcata has been prepared in accordance with the California Urban Water Management Planning Act of 1983 (AB797) (UWMP Act) as amended, including amendments made per the Water Conservation Bill of 2009 (SBX7-7) and AB 1420. The objective of an UWMP is to document an urban water supplier's water supplies and demands, and conservation efforts."	City of Arcata	WMA: Humboldt Bay County: Humboldt Municipality: Arcata
Water Supply	Urban Water Management Plans	City of Eureka UWMP 2010 Update. 2011.	"This Urban Water Management Plan (UWMP) for the City of Eureka has been prepared in compliance with Assembly Bill 797 of the 1983-1984 Regular Session of the California Legislature (Water Code Section 10610 et. Seq.). The 2010 UWMP serves as a long-term planning document to ensure a reliable water supply at the local level. The City has made great progress in promoting water use efficiency since the 2005 UWMP."	City of Eureka	WMA: Humboldt Bay County: Humboldt Municipality: Eureka
Water Supply	Urban Water Management Plans	Humboldt Bay Municipal Water District Urban Water Management Plan. 2010.	"The level of water management planning and the details provided in this UWMP reflects the size and complexity of the District, including the number of customers served and the volume of water supplied. Unlike many regions in the state, the District has an abundant supply of water to fully meet the regional demand for water, not only in this planning period but beyond."	Humboldt Bay Municipal Water District Urban Water Management District	WMA: Humboldt Bay County: Humboldt

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Water Supply	Urban Water Management Plans	Humboldt Bay Municipal Water District UWMP. 2011.	"The level of water management planning and the details provided in this UWMP reflects the size and complexity of the District, including the number of customers served and the volume of water supplied. Unlike many regions in the state, the District has an abundant supply of water to fully meet the regional demand for water, not only in this planning period but beyond."	Humboldt Bay Municipal Water District	WMA: Humboldt Bay County: Humboldt
Water Supply	Urban Water Management Plans	McKinleyville Community Services District UWMP. 2010.	"This Urban Water Management Plan (UWMP) for the McKinleyville Community Services District (MCSD or District) has been prepared in accordance with the California Urban Water Management Planning Act of 1983 (AB 797) (UWMP Act) as amended, including amendments made per the Water Conservation Bill of 2009 (SBX7-7) and AB 1420 (addressing Demand Management Measures, DMMs). The overall intent of the UWMP is to describe an urban water supplier's water supplies and demands, as well as conservation efforts."	McKinleyville Community Services District	WMA: Humboldt Bay County: Humboldt Municipality: McKinleyville
Water Supply	Urban Water Management Plans	Yreka 2010-11 Urban Water Management Plan. 2011.	"This UWMP documents the City of Yreka's current and future water supplies and demands, and discusses relevant drivers of water demands and demand management potential, as well as supply reliability. This section provides background information regarding the UWMP, coordination with other agencies, and public participation and adoption of the plan."	City of Yreka	WMA: Klamath River County: Siskiyou
Water Supply	Urban Water Management Plans	2010 Urban Water Management Plan, Crescent City. 2012.	"This 2010 Urban Water Management Plan (UWMP) has been prepared for Crescent City, California in compliance with requirements of the California Department of Water Resources (DWR) pursuant to the Urban Water Management Act (UWMP Act) and the Water Conservation Bill of 2009."	Crescent City	WMA: North Coast Rivers County: Del Norte Municipality: Crescent City
Water Supply	Urban Water Management Plans	2010 Urban Water Management Plan. 2011.	"This wholesale Urban Water Management Plan (Plan) addresses the Sonoma County Water Agency (Water Agency) water transmission system and includes a description of the water supply sources, historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years."	Sonoma County Water Agency	WMA: Russian Bodega County: Sonoma
Water Supply	Urban Water Management Plans	City of Santa Rosa 2005 Urban Water Management Plan. 2006.	"This Plan addresses the City water system and includes a description of the water supply sources, historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and ultiple-dry years. This Plan also addresses new water use efficiency legislation, including the City's 2015 and 2020 water use targets, as required by the WC Act, and the implementation plan for meeting the City's 2015 and 2020 water use targets."	City of Santa Rosa	WMA: Russian Bodega County: Sonoma Municipality: Santa Rosa
Water Supply	Urban Water Management Plans	Final Healdsburg Urban Water Management Plan. 2005.	"The purpose of developing an Urban Water Management Plan (UWMP) is to evaluate whether a water supplier can meet the water demands of its water customers as projected over a 20-year period. This evaluation is accomplished through analysis of current and projected water supply and demand for normal or average conditions, as well as during water shortages. The City of Healdsburg (City) supplies water to approximately 12,200 residents and 500 businesses within its service area, according to the Association of Bay Area Governments (ABAG) projections. The City's potable water sources come from wells that are adjacent to the Russian River and Dry Creek."	City of Healdsburg	WMA: Russian Bodega County: Sonoma Municipality: Healdsburg

PRIMARY PLAN SUBJECT	PLAN TYPE	PLAN TITLE	PLAN DESCRIPTION/ EXCERPT	PLANNING ENTITY/ ENTITIES	PLANNING LOCATION
Water Supply	Urban Water Management Plans	Final Urban Water Management Plan. 2010.	"TThis Urban Water Management Plan (UWMP) was prepared in conjunction with City of Rohnert Park (City) staff to ensure that it is reasonable in addition to meeting the requirements of the Urban Water Management Planning Act as envisioned by the Legislature. Since the adoption of the City's previous 2005 UWMP, the State has enacted the Water Conservation Act of 2009 (Water Conservation Act), which requires a 20 percent reduction in per capita water consumption by 2020. This UWMP establishes the City's baseline per capita water consumption and conservation targets, as well as outlining the methods for achieving the necessary water efficiencies."	City of Rohnert Park	WMA: Russian Bodega County: Sonoma Municipality: Rohnert Park
Water Supply	Urban Water Management Plans	Town of Windsor UWMP. 2000. Update is in progress.	"This Urban Water Management Pla addresses the Town of Windsor water system and includes a description of the water supply sources, historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years."	Town of Windsor Water District	WMA: Russian Bodega County: Sonoma Municipality: Windsor
Water Supply	Urban Water Management Plans	City of Ukiah 2005 Urban Water Management Plan.	"The purpose of the UWMP is for water suppliers to evaluate their long-term resource planning and establish management measures to ensure adequate water supplies are available to meet existing and future demands. The UWMP provides a framework to help water suppliers maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions."	Ukiah Utilities	WMA: Russian Bodega County: Sonoma Municipality: Ukiah

TABLE 8 SELECT GENERAL PLANS OF NORTH COAST ENTITIES

GENERAL PLANS
City of Arcata General Plan 2020
City of Cloverdale General Plan 2009
City of Crescent City General Plan 2001
Del Norte County General Plan 2004
City of Fort Bragg General Plan 2002
City of Fortuna General Plan 2009
City of Fortuna GP Final Program Environmental Impact Report
City of Healdsburg 2030 General Plan
Humboldt County General Plan 1984
Mendocino County General Plan 1981
Modoc County General Plan 1988
City of Point Arena General Plan/Local Coastal Plan 2006
City of Rio Dell General Plan 2015.
City of Rohnert Park General Plan
City of Santa Rosa 2020 General Plan
City of Sebastopol General Plan 2008
Siskiyou County General Plan 1973
Sonoma County General Plan 2020
City of Ukiah General Plan Growth Management Program 2004
City of Weed General Plan 2004
Town of Windsor General Plan — 2015
Trinity County General Plan
City of Yreka General Plan Update 2002 — 2022
Sonoma County General Plan 2020 Draft Environmental Impact Report, 2006

GENERAL PLANS
City of Crescent City General Plan Local Coastal Plan Extract Policy Document 2011
City of Crescent City General Plan Policy Document. 2001
City of Crescent City General Plan Final EIR. 2001
City of Blue Lake Strategic Plan. 2013
Siskiyou County Strategic Plan

TABLE 9 STORMWATER MANAGEMENT & HAZARD MITIGATION PLANS OF NORTH COAST ENTITIES

Table 9 retains listing of the SWMPs developed before 2005 (e.g. for smaller municipalities). However, the State requirement for a SWMP has been replaced by a more site-specific permitting process.

STORMWATER MANAGEMENT PLANS
City of Arcata Stormwater Management Plan.2005
City of Arcata Stormwater Mbest Management Practices. 2003
City of Cotati Phase II NPDES Stormwater Management Plan 2005
Storm Water Pollution Prevention Plan for City of Crescent City Municipal Wastewater Treatment Plant 2006
City of Crescent City Sanitary Sewer Management Plan 2005
City of Etna Storm Water Management Plan
City of Eureka Phase II NPDES Storm Water Management Plan Revised 2005
City of Eureka Integrated Pesticide, Herbicide and Fertilizer Management Plan. 2011
Drainage Master Plan Update City of Ferndale 2004
City of Fort Bragg Storm Water Management Program FY 2003/04 to FY 2007/08
2004 Storm Drainage Master Plan City of Fort Bragg California 2004
City of Fortuna SWMP
City of Fortuna Storm Draine Master Plan 2005
City of Healdsburg Storm Water Management Program. 2005
Community of McKinleyville Stormwater Management Program 2005
Second Revised Mendocino County Storm Water Management Program 2005
Revised Phase II NPDES Storm Water Management Plan Rohnert Park. 2005
Revised Draft Storm Water Management Plan for the City of Sebastopol. 2005
National Pollutant Discharge Elimination System for Storm Water Discharges from Santa Rosa Area Storm Water Mgt. Plan
Waste Discharge Requirements for the City of Santa Rosa, the County of Sonoma, and the Sonoma County Water Agency. Storm Water and Non-Storm Water Discharges from Municipal Separate Storm Sewer Systems. 2009
City of Trinidad Stormwater Management Plan. 2010
City of Ukiah Storm Water Management Plan. 2006
Town of Windsor Phase II NPDES Storm Water Management Plan. 2005
City of Yreka Water Master Plan. 2006
City of Yreka Ecologic Stormwater Plan. In progress
City of Yreka Master Plan of Drainage. 2005
Guidelines for the Standard Urban Storm Water Mitigation Plan: Storm Water Best Management Practices for New Development and Redevelopment. 2005
Winzler & Kelly Stormwater Action Plan for the City of Trinidad. Undated
Guidelines for the Standard Urban Storm Water Mitigation Plan: Storm Water Best Management Practices for New Development and Redevelopment For the Santa Rosa Area and Unincorporated Areas around Petaluma and Sonoma. 2005
NPDES Stormwater, NCRWQCB
Russian River Watershed Association
North Coast Stormwater Coalition
HAZARD MITIGATION PLANS
Siskiyou County Hazard Mitigation Plan 2012
Trinity County Local Hazard Mitigation Plan DRAFT. In development January 2014
Mendocino County Draft 2013 Multi-Hazard Mitigation Plan & Appendices
Sonoma County Hazard Mitigation Plan 2011
Modoc County Emergency Operations Plan 2013
2012 Update Sonoma County Water Agency Local Hazard Mitigation Plan. 2012
Annex to 2010 Association of Bay Area Governments Local Hazard Mitigation Plan Taming Natural Disasters. Rohnert Park. 2011
Annex to 2010 Association of Bay Area Governments Local Hazard Mitigation Plan Taming Natural Disasters. Town of Windsor 2011
City of Healdsburg Resolution No. 81 -2005. A Resolution of the City Council of Healdsburg Adopting the ABAG Report ¨Taming Natural Disasters¨ As the City of Healdsburg Local Hazard Mitigation Plan
Humboldt Operational Area Hazard Mitigation Plan 2013 Update. 2013

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APPENDIX F
INDICATORS OF NCIRWM PLAN & PROJECT PERFORMANCE

APPENDIX F: INDICATORS OF NCIRWM PLAN & PROJECT PERFORMANCE

Table 10 provides a listing of measurable indicator metrics that form the basis for Plan process and project evaluation. Refer to **Section 11** ("Performance Monitoring & Evaluation") for a description of the framework the NCRP will utilize to regularly assess and continually refine the NCIRWMP.

TABLE 10 INDICATORS TO EVALUATE NCIRWMP GOALS, OBJECTIVES & PROJECT PERFORMANCE

	NCIRWMP PROCESS SUCCESS MEASURES			NCIRWMP PROJECT SUCCESS MEASURES	
GOAL #	NCIRWMP OBJECTIVE	QUALITATIVE INDICATOR(S)	QUANTITATIVE INDICATOR(S)	PROJECT-LEVEL PRIORITY (example)	PROJECT-LEVEL INDICATOR METRIC (example)
1	**Objective 1** — Respect local autonomy and local knowledge in Plan and project development and implementation	Inclusion of projects that meet goals stated in local plans.	Number of projects in NCIRWMP that meet goals stated in local plans.	NA *(Plan-level priority and indicator)*	
	Objective 2 — Provide an ongoing framework for inclusive, efficient intraregional cooperation and effective, accountable NCIRWMP project implementation	1. Publically noticed, publically held meetings that provide opportunity for public participation; 2. Inclusion of and opportunity for public input in planning and project prioritization process.	Number of publically noticed, publically held meetings that provide opportunity for public participation.	NA *(Plan-level priority and indicator)*	
2	**Objective 3** — Ensure that economically disadvantaged communities are supported and that project implementation enhances the economic vitality of disadvantaged communities	Inclusion of DAC considerations in project prioritization process.	Number of projects implemented in DACs	Economic Benefits	1. Number of jobs created/ maintained through project implementation in DACs 2. Economic analysis of benefits provided by project implementation in DACs (e.g., $80 per acre-foot per year for environmental purposes) (Brown 2007)
	Objective 4 — Conserve and improve the economic benefits of North Coast Region working landscapes and natural areas	Inclusion of projects that benefit working landscapes and natural areas.	Number of projects that benefit working landscapes and natural areas.	Economic Benefits	1. Number of jobs created/ maintained through project implementation in working landscapes and natural areas 2. Economic analysis of benefits provided by project implementation in working landscapes and natural areas (e.g., $80 per acre-foot per year for increased instream flow for environmental purposes) (Brown 2007)
3	**Objective 5** — Conserve, enhance, and restore watersheds and aquatic ecosystems, including functions, habitats, and elements that support biological diversity	Inclusion of projects that conserve, enhance, and restore watersheds and aquatic ecosystems and ecosystem function.	Number of projects that conserve, enhance, and restore watersheds and aquatic ecosystems and ecosystem function.	Watershed/ Habitat Improvement	1. % survival of seedlings planted 2. Number of acres of revegetation 3. Number of acres of invasive species removed 4. Number of acres of permanent seasonal wetland 5. Number of linear feet of streambank stabilized
	Objective 6 — Enhance salmonid populations by conserving, enhancing, and restoring required habitats and watershed processes	Inclusion of projects that conserve, enhance, and restore salmonid habitat and watershed processes that support salmonids.	Number of projects that conserve, enhance, and restore salmonid habitat and watershed processes that support salmonids.	Salmonid Habitat Improvement	1. Number of river miles made accessible for potential rearing habitat 2. Habitat inventory (i.e. instream features — pools, riffles etc., large woody debris, substrate) 2a. Thalweg surveys to determine pool depth and frequency and channel degradation 2b. Cross-sectional surveys to determine thalweg degradation and bank stability 2c. D50 surveys to determine coarsening of spawning gravels 3. Percent canopy closure 4. Spawning surveys, snorkel surveys 5. % reduction in fisheries closures

	NCIRWMP PROCESS SUCCESS MEASURES			NCIRWMP PROJECT SUCCESS MEASURES	
GOAL #	NCIRWMP OBJECTIVE	QUALITATIVE INDICATOR(S)	QUANTITATIVE INDICATOR(S)	PROJECT-LEVEL PRIORITY (example)	PROJECT-LEVEL INDICATOR METRIC (example)
4	**Objective 7** — Ensure water supply reliability and quality for municipal, domestic, agricultural, cultural, and recreational uses while minimizing impacts to sensitive resources	NA	Number of projects that provide water supply reliability or improve water quality for municipal, domestic, agricultural, cultural, or recreational uses.	Water Quality Improvement	1. % reduction in sanitary sewer overflows 2. Percentage of volume of wastewater discharge that meets state water quality standards 3. Water quality monitoring: DO, temperature, contaminants, etc. 4. Post-treatment erosion cavity measurements (per *DFW Salmonid Habitat Restoration Manual, Part X: Upslope Assessment and Restoration Practices*) 5. % reduction in beach closures due to pathogen contamination 6. Number of Low Impact Development techniques/ practices implemented
	Objective 8 — Improve drinking water quality and water related infrastructure to protect public health, with a focus on economically disadvantaged communities	NA	1. Number of drinking water quality and water related infrastructure projects; 2. Number of drinking water quality and water related infrastructure projects implemented in DACs.	Water Supply Reliability	1. Stream flow measurements 2. Amount of water supplied by alternatives — such as offstream storage or recycled tailwater or wastewater 3. Reduction in system water losses 4. Number of new or improved drinking water connections 5. % of time that drinking water meets or exceeds federal and state drinking water quality requirements
	Objective 9 — Protect groundwater resources from over-drafting and contamination	NA	Number of projects that provide alternative sources of water to groundwater use and/ or reduce groundwater contamination.	Drinking Water Improvement	1. Percent reduction of percolation from oxidation ponds to groundwater
5	**Objective 10** — Assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors	NA	Number of projects (implemented by NCRP or project proponents) that assess climate change effects, impacts, vulnerabilities, and strategies for local and regional sectors.	[TBD at project level]	
	Objective 11 — Promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation	NA	Number of projects (implemented by NCRP or project proponents) that promote local energy independence, water/ energy use efficiency, GHG emission reduction, and jobs creation.	Energy Independence	1. Amount of energy generated using green technology 2. Amount of energy saved through water/ energy use efficiencies 3. Percentage reduction in GHG emissions 4. Number of jobs created/ maintained through project implementation
6	**Objective 12** — Improve flood protection and reduce flood risk in support of public safety	NA	Number of projects included in the NCIRWMP that improve flood protection and reduce flood risk.	Public Safety	1. Percent reduction in flood events given historic rainfall patterns

TABLE 11 INDICATORS TO MEASURE ATTRIBUTES OF SOCIAL & ENVIRONMENTAL EQUITY

ATTRIBUTE	QUALITATIVE/ QUANTITATIVE INDICATOR	EXAMPLE METRICS
Quality of Life	Access to parks and open space	# new public access points in DACs
	Access to water-contact recreation	# of water quality warnings/ beach closures on public beaches — both coastal and inland — for DACs
	Presence of living wage jobs	# FTE funded by NCIRWMP project implementation
Preservation of Local Heritage and Autonomy	Projects that support/ maintain local heritage or local autonomy	# local individuals — farmers, ranchers, property owners, voluntarily participating to implement TMDLs prior to enforcement/fines
		# DACs receiving assistance for critical water supply/ wastewater treatment infrastructure repair
		# energy efficiency and energy independence projects funded or enabled through the NCIRWMP
Community Empowerment	Alliance building	# partners in NCIRWMP/ signatories to MOMU
		Increased levels of collaboration for project types (local to regional/state/Tribal/federal)
		Increased breadth/diversity of partnership — sections of community represented
		# of groups who come together to work on a project
		# new connections formed between groups — e.g., WS/ WWTP outreach — documentation of meeting attendance, partnerships formed (potential resource pooling), etc.
Public Participation	Increased levels of participation in decision-making	# meeting/ conference attendees
		Increased breadth of participation (i.e., the extent to which participants reflect community diversity)
		# comments on draft NCIRWMP documents/ policies
	Increased number of grant applications	# applicants
Public Knowledge	Increased awareness of community-wide issues	% knowledgeable survey respondents
		# visits to NCIRWMP website
		# downloads of specific documents from NCIRWMP website

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APPENDIX G
MONITORING PROTOCOLS FOR NCIRWMP EVALUATION

APPENDIX G: MONITORING PROTOCOLS FOR NCIRWMP EVALUATION

NCRP and staff work with project proponents and responsible parties to develop simple monitoring plans to track project progress toward project-specific goals. The NCIRWMP intends to develop with and provide to project proponents a comprehensive listing, akin to a menu, of accepted monitoring protocols from which they may choose a suite to suit their project monitoring needs and available financial, human, and temporal resources. It is not necessary, nor appropriate, for a project to use *all* the protocols in their monitoring and reporting). In this way, monitoring/evaluation and adaptive management efforts for the NCRIWMP (and potentially other NCRP projects) will be based on a standard set of methods that can produce "apples-to-apples" comparisons between and among individual Plan projects, and of projects' relative contribution to Plan success. The listing below describes the data management responsibilities related to the project and program evaluation.

DATA MANAGEMENT AND DISSEMINATION TASK	FREQUENCY
Responsible Party: Project Proponents	
Develop QAPP, determine relevant state agency/program/portal for environmental monitoring upload	Upon grant award
Compile, maintain, and upload project monitoring information to relevant state agency/program/portal	Quarterly or as dictated by grant agreement
Perform quality assurance and quality control to ensure validity of monitoring data	Ongoing
Provide project interim implementation reports and final project report to Humboldt County	Quarterly or as dictated by grant agreement
Responsible Party: NCIRWMP Staff	
Consolidate and present regional information, including detailed analyses of socioeconomic factors (including economic benefits) related to project implementation as appropriate or required	Upon conclusion of grant cycles or periodically
Develop spatial data layers of project locations and other attributes specific to the NCIRWMP as appropriate and add to NCIRWMP website interactive application	Periodically
Obtain and provide spatial data layers of interest for planning efforts in the North Coast and add to NCIRWMP website interactive mapping application	Periodically
Provide project application data on NCIRWMP website	Periodically
Compile and provide grant application, meeting, conference, and workshop materials online in the NCIRWMP website's library	Periodically when appropriate

The following list of monitoring protocols for NCIRWMP project evaluation provides links to websites that contain the most relevant and useful (to state data integration efforts) monitoring protocols for NCIRWMP implementation projects. Most of the SWAMP, GAMA, and/or CEDEN comparable and compatible monitoring protocols listed below have been used in NCIRWMP projects.

Salmonid Habitat Improvement

1. **SWAMP Data Management System.** Provides a database, templates, field data sheets, QAPP guidance and templates, and webinar trainings. http://swamp.mpsl.mlml.calstate.edu/resources-and-downloads/database-management-systems

   Standard Operating Procedures. Provides detailed SOPs for:

   - Macroinvertebrate samples and associated physical and chemical data for ambient bioassessments
   - Stream algae samples and associated physical habitat and chemical data for ambient bioassessments
   - Field measurements and field collections of water and bed sediment samples
   - Lab processing and identification of benthic macroinvertebrates

2. **CDFW California Stream Bioassessment Procedure.** Provides a scoring template for stream habitat conditions, a Bioassessment worksheet, biological metrics, sampling design, and sampling metrics. http://www.dfg.ca.gov/abl/Field/csbpwforms.asp

3. **CDFW Salmonid Stream Habitat Restoration Manual. 2010.** Provides assessment and monitoring methods as well as project evaluation and monitoring protocols. http://www.dfg.ca.gov/fish/REsources/HabitatManual.asp

4. **CDFW Qualitative Implementation and Effectiveness Monitoring of Fisheries Habitat, 2006.** Includes recommendations for field-tested monitoring protocols. http://cesonoma.ucanr.edu/files/27291.pdf
5. **Monitoring the Implementation and Effectiveness of Fisheries Habitat Restoration Projects, 2005.** Provides descriptions of study design, sampling considerations, and monitoring procedures. http://forestry.berkeley.edu/comp_proj/DFG/Monitoring%20the%20Implementation%20and%20Effectiveness%20of%20Fisheries.pdf

Watershed/ Habitat Improvement

1. **California Watershed Assessment Manual. Volume II.** Provides sampling guidance, measurement techniques, and discusses limitations of and appropriate use of data. http://cwam.ucdavis.edu/Volume_2/TOC.htm

   Monitoring Methods. Provides detailed information about monitoring and/ or assessing:

   - Water Quality
   - Fluvial and Geomorphological Processes
   - Periphyton
   - Benthic Macroinvertebrates
2. **California Rapid Assessment Method.** Provides a "cost-effective and scientifically defensible rapid assessment method for monitoring the conditions of wetlands throughout California." Provides access to data spatially in an interactive map, data entry, SOPs for several types of wetland habitats, and other informational and guidance documents. http://www.cramwetlands.org/
3. **California Native Plant Society Vegetation Program.** Provides Rapid Vegetation Assessment and Releve Protocol and field forms. Requests that those who use these protocols send a copy of their datasheets to update statewide CNPS database. http://www.cnps.org/cnps/vegetation/protocol.php
4. **CDFW Survey and Monitoring Protocols and Guidelines.** Protocols from various sources that have been tested and reviewed by CDFW. Survey and monitoring protocols provided for plants, invertebrates, specific amphibians, reptiles, birds and mammals. Also provides a photo point monitoring handbook from the US Forest Service. http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html
5. **Monitoring the Effectiveness of Upland Restoration (Weaver et al. 2005).** http://forestry.berkeley.edu/comp_proj/DFG/Monitoring%20the%20Implementation%20and%20Effectiveness%20of%20Fisheries.pdf
6. **USDA Forest Service Photo Point Monitoring Handbook, 2002.** Provides specific field procedures and concepts and analysis techniques. http://www.fs.fed.us/pnw/pubs/gtr526/
7. **SWRCB Methodology for On-the-Ground Photo Monitoring, 2014.** Specific methodology for establishing and documenting monitoring points. http://www.swrcb.ca.gov/centralcoast/water_issues/programs/ag_waivers/docs/resources4growers/photomonitoringprotocol30april2014_.pdf
8. **SWRCB CWT Stream and Shoreline Photo Documentation SOP.** Available as part of the Guidance Compendium for Watershed Monitoring and Assessment, this SOP provides an equipment list, methods, and forms. http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_guidance.shtml

Water Quality Improvement

1. **SWAMP — Clean Water Team Citizen Monitoring Tool Box, 2014.** Provides a tool box with templates to help manage and organize water quality monitoring data. Field data sheets, calibration data sheets, advanced tools, and project monitoring. http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_toolbox.shtml
2. **SWAMP — Field Methods Course.** This is a training resource for SWAMP Field Methods. Subjects include water quality, flow, water and sediment sampling, and physical assessments. http://swamp.waterboards.ca.gov/swamp/qapp_advisor/FieldMethods/start.html
3. **SWAMP — CWT Guidance Compendium for Watershed Monitoring and Assessment, 2011.** Comprehensive source for monitoring and assessment — from setting up the monitoring strategy to SOPs for water quality, nutrients, bacteria, biological communities, physical attributes, toxicity, and pollution. http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_guidance.shtml

4. **CDFW Quantitative Effectiveness Monitoring of Bank Stabilization and Riparian Vegetation Restoration, 2007.** Reports on field testing specific protocols for bank stabilization and riparian vegetation restoration. http://cesonoma.ucanr.edu/files/27283.pdf
5. **UCCE Sediment Delivery Inventory and Monitoring**. Contains inventory worksheet and photo records to provide landowners with tools to inventory and monitor sites that have potentially deliverable sediment. http://ucce.ucdavis.edu/files/repositoryfiles/8014-54088.pdf
6. **Measuring the Effectiveness of Road System Upgrading and Decommissioning at the Watershed Scale.** http://forestry.berkeley.edu/comp_proj/DFG/Monitoring%20the%20Implementation%20and%20Effectiveness%20of%20Fisheries.pdf

Water Supply Reliability

1. **SWAMP — CWT Guidance Compendium for Watershed Monitoring and Assessment, 2011.** Section 4. Provides methods and SOPs for measuring flow. http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_guidance.shtml

TABLE 12 MONITORING PLANS OF THE NORTH COAST REGION

PROGRAM	PROGRAM DESCRIPTION/ PURPOSE	PROGRAM APPLICABILITY
California Environmental Protection Agency, State Water Resources Control Board/ Regional Water Quality Control Board		
California Water Quality Monitoring Council (CWQMC)	Mandated by SB 1070 to develop specific recommendations to improve coordination and cost-effectiveness of water quality and ecosystem monitoring and assessment; enhance the integration of monitoring data across departments and agencies; and increase public accessibility to information (web portals). Includes beach water quality, CA wetlands, bioaccumulation workgroups.	Statewide
Surface Water Ambient Monitoring Program (SWAMP)	Monitors and assesses condition of all surface waters. Current focus on bioaccumulation in fish; characterizing "stream health" throughout the state by use of benthic macroinvertebrate (BMI) community composition and physical habitat assessments in high-gradient streams; misc. special studies. SWAMP is "umbrella" and provides ambient context for additional monitoring efforts.	Statewide
Statewide Water Analysis Network (SWAN)	Network being developed to collaborate with interested stakeholders to improve analytical tools and share data. Currently three pilot programs: forecasting water demand; integrating state UWMP data; and describing physical features/ connections in the state water management system.	Regional pilot projects; anticipated to be statewide
California Rapid Assessment Method (CRAM)	Methodology and software designed for assessing ambient conditions within watersheds, regions, and throughout the State. It can also be used to assess the performance of compensatory mitigation projects and restoration projects.	Statewide
California Wetland Tracker	Web portal that provides information about the wetlands of selected regions of California (including North Coast). Wetland information currently available for the North Coast region includes: Habitat (modern habitat map); North Coast Projects (exist but information has not yet been compiled)	Statewide
California Integrated Water Quality System Project (CIWQSP)	Computer system the state uses to track water quality regulatory data. CIWQS makes data available to the public through reports that display the regulatory data that CIWQS contains.	Statewide
TMDL implementation monitoring	Monitors water quality conditions in some individual streams/ rivers of the North Coast. May include numeric targets for water quality indicators.	Statewide (not systematic)
Areas of Special Biological Significance (ASBS) monitoring	Forthcoming.	Statewide
Coordinated Wetland Mitigation monitoring	Forthcoming.	Statewide
Nonpoint Source Program (NPS) ambient monitoring	Ambient water quality monitoring under the NPS	Statewide (not systematic)
National Pollutant Discharge Elimination System (NPDES) permit ambient monitoring	Ambient water quality monitoring required under NPDES permits the permit program controls water pollution by regulating and monitoring point sources (e.g. stormwater, animal feeding facilities, sewer overflow) that discharge pollutants into waters.	Permit-specific
Grant project ambient monitoring	Ambient water quality monitoring under various grant projects.	Grant-specific

PROGRAM	PROGRAM DESCRIPTION/ PURPOSE	PROGRAM APPLICABILITY
Grant project effectiveness monitoring	Effectiveness monitoring of grant-funded implementation projects.	Grant-specific
California Environmental Protection Agency, Department of Pesticide Regulation		
Pesticide Use Inventory	Tracks pesticide/ hazardous waste use	Statewide
Surface Water Protection Program	Characterize pesticide residues, identify sources of contamination, determine mechanisms of off-site to surface water, and develop site-specific mitigation strategies.	Statewide
Department of Toxic Substances Control	DTSC regulates and provides information about hazardous waste control and clean up. Collects and analyzes data on water, soil, sediment concentrations.	Permit-specific
Resources Agency, California Department of Fish and Game		
Marine Protection Areas impact monitoring	Monitors a network of protected ocean regions (MPAs) to preserve biological diversity, promote recovery of wildlife populations and improve ecosystem health.	Statewide (coast)
California Natural Diversity Database (CNDDB)	Inventories the status and locations of rare plants and animals in California. Maintains current lists of rare species a database of GIS-mapped locations for these species.	Statewide (non-random, not systematic)
Department of Fish and Game (DFG) Marine Region	One of seven geographic CDFG regions. Specific statewide projects deal with fisheries and habitat management, environmental review, and water quality monitoring. The Project Review/ Water Quality Unit staff reviews activities that impact marine habitat and resources, such as dredging, new construction, and wave energy. Includes monitoring of marine invasive species.	Statewide (coast) out to approximately three nautical miles , including offshore islands
Biogeographic Information and Observation System (BIOS)	A system designed to enable the management, visualization, analysis and sharing of biogeographic data collected by the Department of Fish and Game and its Partner Organizations.	
Aquatic Bioassessment Laboratory	Performs assessments of water quality based on organisms in the water. Field sampling protocols include targeted riffle and multiple habitat sampling of benthic macroinvertebrates (BMIs), fish and algae as well as associated physical habitat and chemical monitoring. Current research efforts focus on developing IBIs for different regions, developing objective reference condition selection methods and establishing quantitative tolerance values.	Statewide
Resources Assessment Program	Address resource assessment priorities and existing efforts in the collection, analysis, and use of data on native fish, wildlife, plants, and communities.	Statewide
Invasive Species Program	Involved in efforts to prevent the introduction of invasive species (plant, animal, microbe, terrestrial, aquatic) into the state; detect and respond to introductions when they occur; and prevent the spread of non-native invasive species that have become established.	Statewide
Marine Invasive Species Monitoring Program	See "DFG Marine Region" above	Statewide (coast)
Office of Oil Spill Prevention and Recovery	Administers the Scientific Study and Evaluation Program that investigates and evaluates new oil spill response and cleanup methods, potential adverse effects of oil spills, and development of natural resource damage assessment tools.	Statewide
Cooperative Research and Assessment of Nearshore Ecosystems (CRANE)	Involves the integration of several study (e.g., habitat mapping, life history research, oceanography) and sampling approaches (e.g., fishery-dependent and independent CPUE estimates, ROV surveys, plankton-larval surveys) in shallow rocky reef ecosystems.	Central California/ Monterey (only?)
Resources Agency, California Coastal Commission		
Critical Coastal Areas Program	Guides and coordinates state agencies on oceans and coastal resources protection. Recommends legislative policy for protecting these resources. (No monitoring)	Regional Pilot Projects
Coastal Cleanup Day debris tracking		Statewide (coast)
Resources Agency, Coastal Conservancy		
Coastal Oceans Currents Monitoring Program	Emphasizes technology to measure and map surface currents.	Statewide (coast)
Resources Agency, State Lands Commission		
Ballast Water Monitoring Program	Evaluate effectiveness of ballast water discharge regulations.	Statewide (coast)
Resources Agency, Department of Parks and Recreation		

PROGRAM	PROGRAM DESCRIPTION/ PURPOSE	PROGRAM APPLICABILITY
The Inventory, Monitoring, and Assessment Program (IMAP)	Evaluates the natural resources of the State Park System. Data are generally quantitative. Examples include measuring stream water quality; the distribution of various species of plants in an area; and counting the number of offspring of endangered animals. The data can be used to make status assessments of a unit's natural resources, such as what resources are present, where the resources are distributed, and how much of a resource is present.	Regional pilot projects; not yet statewide [as of 2008]
Resources Agency, Department of Forestry and Fire Protection (CalFire)		
The Fire and Resource Assessment Program (FRAP)	Provides a variety of products including the Forest and Range Assessment, a detailed report on California's forests and rangelands. FRAP provides extensive technical and public information for statewide fire threat, fire hazard, watersheds, socio-economic conditions, environmental indicators, and forest-related climate change.	Statewide, including monitoring at the Caspar Creek watershed, Judd Creek, SF Wages Creek, Garcia River, Elk River, Little Creek.
Hillslope Monitoring Program	1996-2002	na
Modified Completion Report monitoring	2001 to 2004	na
Forest Practice Rule implementation monitoring	This monitoring program (anticipated for 2007-2011) uses a random sample of completed Timber Harvest Plans to test the implementation and effectiveness of Forest Practice Rules related to water quality.	Statewide (random)
Resources Agency, Department of Water Resources		
Integrated Water Resources Information System (IWRIS)	Data management tool for water resources data. Web based GIS application allows one to access, integrate, query, and visualize multiple sets of data. Some of the databases include DWR Water Data Library, California Data Exchange Center (CDEC), USGS streamflow, Local Groundwater Assistance Grants (AB303), and data from local agencies.	Statewide
Division of Environmental Services	Provides data related to drinking water quality and provides a central focal point for the collection and dissemination of water quality information.	Regional (Sacramento-San Joaquin Delta and the State Water Project)
Division of Operations and Maintenance: California Aqueduct water quality program	Routinely monitors chemical, physical and biological parameters including more than 40 sites and over 200 individual chemicals. Both discrete grab samples and continuous automated station data comprise a comprehensive water quality monitoring program.	Regional (throughout the SWP from the Feather River drainage in the north and to Lake Perris in the south)
Real-time Water Quality Management Program	Uses telemetered stream stage, salinity data and computer models to simulate and forecast water quality conditions along the lower San Joaquin River.	Regional (Lower San Joaquin River)
Fish Passage Improvement Program (FPIP)	Interdisciplinary team of biologists and engineers identifies and evaluates the potential to modify or remove structures that impede the migration of anadromous fish within the Central Valley.	Regional (Central Valley)
Division of Flood Management: real-time decision support system	Maintains a real-time decision support system to DWR Flood Management and other flood emergency response organizations, providing operational and historical hydrologic and meteorological data, forecasts, and reports.	Statewide?
Resources Agency, Department of Conservation		
Farmland Mapping and Monitoring Program	The Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status. The maps are updated every two years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance.	Statewide
California Geological Services	Provides data on seismic, as well as landslide and erosion hazards. It develops and maintains watershed maps of geologic and geomorphic features.	Statewide
Resources Agency, California Environmental Resources Evaluation System (CERES)		
California Environmental Information Clearinghouse/ Catalog	Provides information about geographic information resources in an effort to improve their efficient use through information sharing.	Statewide
California Spatial Information Library (CSIL)	Online repository geospatial data.	Statewide
Land Use Planning Information Network (LUPIN)	Spatial and planning data by bioregion, county, and watershed.	Statewide

PROGRAM	PROGRAM DESCRIPTION/ PURPOSE	PROGRAM APPLICABILITY
Wetlands Information System	Compilation of public and private sector information, including maps, environmental documents, agency roles in wetlands management, restoration and mitigation activities, regulatory permitting, and wetland policies.	Statewide
California Watershed Portal	Forthcoming. Website and other online tools will identify ongoing watershed activities; provide access to important data and information; and links to the larger California Watershed community.	Statewide (in development)
California Ocean and Coastal Environmental Access Network (CalOcean)	Web-based virtual library for access to ocean and coastal data (water quality) and information from a wide variety of sources and in a range of types and formats (maps, spatial data).	Statewide
Resources Agency, California Department of Public Health		
Marine Biotoxin Monitoring Program	Surveys, classifies & monitors commercial shellfish growing areas	Statewide (coast)
Drinking Water Source Assessment and Protection Program	Assess risks to public drinking water sources. Provides guidance and information to local communities to delineate the area around a drinking water source through which contaminants might move and reach that drinking water supply; to inventory possible contaminating activities that might lead to the release of microbiological or chemical contaminants within the delineated area; and to determine the possible contaminating activities to which the drinking water source is most vulnerable.	Statewide
California Beaches and Recreational Waters Program	The California Beaches Program provides guidance and methods for monitoring recreational beaches (ocean, and fresh water).	Statewide (coast)
Interagency Programs		
Groundwater Ambient Monitoring and Assessment (GAMA)	Collects data by testing the untreated, raw water in different types of wells for naturally-occurring and man-made chemicals. GAMA compiles these test results with existing groundwater quality data from several agencies into a publicly-accessible internet database, GeoTracker GAMA.	Statewide
Interagency Ecological Environmental Monitoring Program	Provides necessary information for compliance with flow-related water quality standards specified in the water right permits	Regional (San Francisco Estuary)
The North Coast Watershed Assessment Program (NCWAP)	Provides a consistent scientific foundation for collaborative watershed restoration efforts and to better meet the State needs for protecting and restoring salmon species and their habitats. NCWAP is one of the sources of data used in regional TMDL development to understand existing conditions within a watershed	Regional (North Coast)
CalFish, Anadromous Abundance	Data collected by a variety of agencies and organizations and reflect current and historic abundance of anadromous fish in a selected stream or river.	Statewide
CalFish, Anadromous Distribution	Recently developed a method for deriving salmonid distribution from existing observation data. Distribution and Range datasets are now available for winter and summer steelhead and coho salmon.	Statewide
CalFish, Passage Assessment Database (PAD)	Contains information on actual, potential and remediated barriers to anadromous fish distribution.	Statewide
California Habitat Restoration Project Database	Contains data and information about stream restoration projects funded by a variety of agencies and organizations in California; the most complete source of California stream restoration projects' data.	Project-specific
CalFish, Routed 100-k Hydrography	Most current and complete 1:100,000 scale routed hydrography for California.	Statewide
CalFish, In-stream Habitat Database	Historic and current reach summaries of in-stream habitat data.	Regional
California Ecological Restoration Projects Inventory; Watershed Projects Inventory; and Noxious Weed Control Inventory	Online information resource for maps, models, reports, and other related information regarding environmental protection in California.	Statewide
Pacific Northwest Aquatic Monitoring Partnership	Forum for coordinating state, federal, and tribal aquatic habitat and salmonid monitoring programs. Includes watershed and project effectiveness monitoring.	Pacific Northwest, including Northern California
Northwest Forest Plan Interagency Regional Monitoring Program	Annual reports website has the latest Watershed condition evaluations, field protocols, watershed boundary maps and data summaries.	Northern California, Oregon, Washington

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX H
REGION DESCRIPTION

APPENDIX H: REGION DESCRIPTION

OVERVIEW OF THE NORTH COAST REGION'S KEY ATTRIBUTES

Table 13 below presents a summary of the Region's diverse attributes. Tables in this Appendix present data for each of these attributes, summarized for the Region. Tables in Appendix P ("Factsheets") present equivalent data tables for each (1) WMA and (2) County. Maps associated with most of these attributes are presented in the main body of the Plan document.

TABLE 13 SUMMARY OF NORTH COAST REGION ATTRIBUTES

ATTRIBUTE	DESCRIPTION
Total Area	50,246 sq. km. (19,400 square miles; 12,424,617 acres)
Proportion of California (%)	Approximately 12%
Length of coastline	547 km. (340 miles)
Counties in Region (all or portions)	10: Del Norte, Humboldt, Trinity, Mendocino; large parts of Siskiyou and Sonoma; small portions of Glenn, Lake, Marin, and Modoc
Counties in NCRP (all or portions)	7: Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma, Trinity
Watershed Management Areas	6: Eel River, Humboldt Bay, Klamath River, North Coast Rivers, Russian/Bodega, and Trinity River
Drainage Basins	2: Klamath River Basin (5 Hydrologic Units HUs) and North Coastal Basin (9 HUs)
Hydrologic Units (HUs)	14: the Klamath, Rogue, Smith, Trinity, Winchuck (=Klamath River Basin); Bodega, Cape Mendocino, Eel, Eureka Plain, Mad River, Mendocino Coast, Redwood Creek, Russian, and Trinidad (=North Coastal Basin) HUs
Native American Tribes/ Tribal Lands	Yurok (most populous Tribe); Hoopa and Round Valley Reservations (two largest in area); others including but not limited to Karuk, Paiute, Pomo, Tolowa, and Wiyot
Land Ownership (% Region area)	Private/ Other (51.21%), Federal (46.23%), State (2.27%), Non-Profit (0.19%), Special District (0.071%), County (0.03%), City (0.02%)
Total Population (2010)	1,148,520 (up from 1,097,727 in 2000; estimated at 1,157,425 in 2012)
Percent of State Population	Approximately 2%
Most Populous Counties (2010)	Sonoma (483,878), Humboldt (134,623)
Least Populous Counties (2010)	Modoc (9,686), Trinity (13,786)
Total Population Density (2010)	97.03 persons/ sq. mi.
Percent Change Population (2010-2012)	Down 0.72% (estimated)
Highest Population Density (persons per sq. mi.)	Sonoma County (307.1), Humboldt County (37.7)
Lowest Population Density (persons per sq. mi.)	Modoc (2.5), Trinity (4.3)
Range of Median Age	37.1 (Humboldt) to 49.3 (Trinity)
Range of Education Attainment (bachelor's degree or higher)	14.3 (Del Norte) to 31.8 (Sonoma)
Range of Percent Change in Employment (private non-farm, 2012-2011)	-4.5% (Trinity) to +1.3% (Sonoma)
Range of Percent Unemployed (May 2013)	6.10% (Sonoma) to 11.3% (Trinity)
Range of Per Capita Retail Sales (2007)	$4,966 (Trinity) to $14,716 (Mendocino)
Range in Median Household Income (2007-2011)	Modoc $19,247 to $33,119 (Sonoma)
Native American Tribal Population (percent in 2010 census)	4.0% Region total; range 2.2% (Sonoma) to 8.8% (Del Norte)
Disadvantaged and Severely Disadvantaged (DAC, SDAC) Population (2010)	36% of Region total
DAC and SDAC Area (2010)	84% of Region total (10,464,758 acres)
Major Economic Sectors	Tourism, recreation, logging, service (health, education), timber milling, aggregate mining, commercial/ sport fisheries, sheep/ beef/ dairy production, vineyards, wineries, wildlife/ resource management
Land Use Types (% cover)	Conifer forest (60.28%), hardwood forest/ woodland (14.97%), shrub/ brush rangeland (10.54%), cropland/ pasture (3.57%), barren (0.86%), rural development (0.71%), non-forested wetland (0.48%), residential (0.1%), commercial/ service/ transportation/ communication/ other built (0.05%)
Land Cover Types (% cover)	Conifer forest/ woodland (60.31%), hardwood forest/ woodland (15.01%), herbaceous rangeland (7.26%), shrub (10.5%), herbaceous (7.3%), agriculture (3.57%), water/ wetland (1.65%), barren/other (0.86%), urban (0.72%)
Total Length of Rivers and Streams	34,586 kilometers (21,491 miles)
Groundwater Basins and Subbasins	64
Designated Beneficial Uses of Water for Hydrologic Units	28: Includes agricultural, municipal/ domestic, fisheries, flood attenuation, and recreation in bays, estuaries, minor coastal streams, ocean waters, wetlands, inland surface waters, and groundwaters

ATTRIBUTE	DESCRIPTION
Marine Managed Areas/ Critical Coastal Areas	21: Includes 19 Marine Protected Areas, 8 State Water Quality Protection Areas that are Areas of Special Biological Significance (CCAs may include designated "impaired" streams below)
303(d)-listed "Impaired" Streams (2011)	32,667 kilometers (20,298 miles) total stream length (94% of stream length)
National Wilderness Preservation System Areas	11 totaling 1,073,735 acres
Plant and Animal Species Documented for the Region	526 species
Listed (State/ Federal) Endangered and Threatened Plant and Animal Species Documented for the Region	86 threatened, endangered, or candidate species (34 plants, 52 animals)
Protected Lands Percent Cover	Approximately 49%

See other tables and text herein for sources of data/statistics.

TABLE 14 LAND OWNER TYPES OF THE NORTH COAST REGION

OWNERSHIP TYPE	ACREAGE (%), 2007	ACREAGE (%), 2013
City	2,214.9 (0.02%)	5,387.75 (0.02%)
County	3,757.9 (0.03%)	4,567.39 (0.03%)
Tribal	-	256,280 (2.01%)
Federal	5,743,166.6 (46.23%)	5,732,223.11 (46.23%)
Non-Profit	24,118.3 (0.19%)	62,622.42 (0.19%)
Special District	5,429.9 (0.04%)	8,804.68 (0.07%)
State	282,597.7 (2.27%)	291,877.01 (2.27%)
Private/Other	6,362,931.8 (51.21%)	6,317,931.75 (51.21%)

Source: California Protected Areas Database (CPAD — www.calands.org)

TABLE 15 MUNICIPALITIES & CENSUS DESIGNATED PLACES OF THE NORTH COAST REGION

COUNTY	CITY/ TOWN NAME	MUNICIPALITY OR CDP	POPULATION (2010)
Del Norte			28,610
	Crescent City	Incorporated municipality	7,643
Humboldt			134,623
	Alderpoint	Census-designated place	
	Arcata	Incorporated municipality	17,231
	Blue Lake	Incorporated municipality	
	Eureka	Incorporated municipality	27,919
	Ferndale	Incorporated municipality	
	Fortuna	Incorporated municipality	11,926
	Garberville	Census-designated place	
	McKinleyville	Census-designated place	15,177
	Orick	Census-designated place	
	Redway	Census-designated place	
	Rio Dell	Incorporated municipality	
	Trinidad	Incorporated municipality	
Mendocino			87,841
	Fort Bragg	Incorporated municipality	7,273
	Gualala	Census-designated place	
	Laytonville	Census-designated place	
	Mendocino	Census-designated place	
	Point Arena	Incorporated municipality	
	Ukiah	Incorporated municipality	16,075
	Willits	Incorporated municipality	
Siskiyou			44,900
	Dorris	Incorporated municipality	
	Etna	Incorporated municipality	
	Fort Jones	Incorporated municipality	
	Hornbrook	Census-designated place	
	Montague	Incorporated municipality	
	Tulelake	Incorporated municipality	
	Weed	Incorporated municipality	
	Yreka	Incorporated municipality	7,765
Sonoma			483,878
	Cotati	Incorporated municipality	7,265
	Healdsburg	Incorporated municipality	11,254
	Rohnert Park	Incorporated municipality	40,971
	Santa Rosa	Incorporated municipality	167,815
	Sebastopol	Incorporated municipality	7,379
	Windsor	Incorporated municipality	26,801
Trinity			13,786

Source: California Department of Water Resources (http://www.water.ca.gov/irwm/grants/resourceslinks.cfm)

TABLE 16 HYDROLOGIC UNITS OF THE NORTH COAST REGION

HU NAME	HA NAME	HSA NAME
Bodega	Bodega Harbor	Bodega Bay
		Bodega Head
	Estero Americano	na
	Estero San Antonio	na
	Salmon Creek	na
Cape Mendocino	Capetown	na
	Mattole River	na
	Oil Creek	na
Eel River	Lower Eel River	Ferndale
		Larabee Creek
		Scotia
	Middle Fork Eel River	Black Butte River
		Eden Valley

HU NAME	HA NAME	HSA NAME
		Round Valley
		Wilderness
		Sequoia
		Spy Rock
	North Fork Eel River	na
	South Fork Eel River	Benbow
		Laytonville
		Weott
	Upper Main Eel River	Lake Pillsbury
		Outlet Creek
		Tomki Creek
	Van Duzen River	Bridgeville
		Hydesville
		Yager Creek
Eureka Plain	na	na
Klamath River	Butte Valley	Bray
		Macdoel — Dorris
		Tennant
	Lost River	Boles
		Clear Lake
		Mt. Dome
		Tule Lake
	Lower Klamath River	Klamath Glen
		Orleans
	Middle Klamath River	Beaver Creek
		Copco Lake
		Happy Camp
		Hornbrook
		Iron Gate
		Seiad Valley
		Ukonom
	Salmon River	Cecilville
		Lower Salmon
		Sawyers Bar
		Wooley Creek
	Scott River	Scott Bar
		Scott Valley
	Shasta Valley	na
Mad River	Blue Lake	na
	Butler Valley	na
	North Fork Mad River	na
	Ruth	na
Mendocino Coast	Albion River	na
	Big River	na
	Garcia River	na
	Gualala River	Buckeye Creek
		Gualala
		North Fork

HU NAME	HA NAME	HSA NAME
		Rockpile Creek
		Wheatfield Fork
	Navarro River	na
	Noyo River	na
	Point Arena	Alder Creek
		Brush Creek
		Elk Creek
		Greenwood Creek
	Rockport	Ten Mile River
		Usal Creek
		Wages Creek
	Russian Gulch	na
Redwood Creek	Beaver	na
	Lake Prairie	na
	Orick	na
Rogue River	Applegate River	na
	Illinois River	na
Russian River	Lower Russian River	Austin Creek
		Guerneville
	Middle Russian River	Geyserville
		Laguna
		Mark West
		Santa Rosa
		Sulphur Creek
		Warm Springs
	Upper Russian River	Coyote Valley
		Forsythe Creek
		Ukiah
Smith River	Lower Smith River	Mill Creek
		Rowdy Creek
		Smith River Plain
	Middle Fork Smith River	na
	North Fork Smith River	na
	South Fork Smith River	na
	Wilson Creek	na
Trinidad	Big Lagoon	na
	Little River	na
Trinity River	Lower Trinity River	Burnt Ranch
		Helena
		Hoopa
		New River
		Willow Creek
	Middle Trinity River	Douglas City
		Weaver Creek
	South Fork Trinity River	Corral Creek
		Forest Glen
		Grouse Creek
		Hayfork Valley

HU NAME	HA NAME	HSA NAME
		Hyampom
	Upper Trinity River	na
Winchuck River	na	na

Source: California Interagency Watershed Mapping Committee (DWR) a.k.a. CalWater

Table 17 (below) lists major named streams of the Region, organized by basin Watershed Management Area (i.e. basin). The total length of streams in the Region is approximately 34,586 km. (21,491 mi.). The total length of streams in each WMA (basin) is indicated in the table. Included is the subset of streams and tributaries that are designated 303(d) listed streams, meaning they are considered "impaired" due to water quality issues (NCRWQCB 2011). Approximately 85% of the Region's streams are listed impaired, due primarily to temperature and sediment.

TABLE 17 RIVERS & STREAMS OF THE NORTH COAST REGION

WMA (TOTAL KM. STREAMS)	STREAMS IN THE WMA BOUNDARY
Eel River (8,350)	Chamise Creek, Estell Creek, Little Van Duzen River, Pine Creek, Tom Long Creek **303d Listed Streams** Anderson Creek, Black Butte River, Cedar Creek, Cold Creek, Dobbyn Creek, East Branch South Fork Eel River, East Fork North Fork Eel River, Eel River, Elk Creek, Indian Creek, Larabee Creek, Lawrence Creek, Middle Fork Eel River, Mill Creek, Mitchell Creek, North Fork Eel River, North Fork Middle Fork Eel River, Outlet Creek, Rattlesnake Creek, Salt River, South Fork Eel River, Spanish Creek, Tomki Creek, West Fork North Fork Eel River, West Fork Van Duzen River, Williams Creek
Humboldt Bay (2,260)	Little River, Little South Fork Elk River, Lower North Fork Mad River, Lower South Fork Little River, Maple Creek, North Branch North Fork Elk River, North Fork Elk River, South Branch North Fork Elk River, South Fork Elk River, South Fork Little River, South Fork Mad River, Upper South Fork Little River, West Fork North Fork Elk River **303d Listed Streams** Boulder Creek, East Fork North Fork Mad River, Elk River, Mad River, North Fork Mad River, Pilot Creek, Redwood Creek
Klamath River (9,056)	East Branch Lost River, East Fork Scott River, Lost River, Right Hand North Fork Salmon River, Saint Claire Creek 303d Listed Streams Blue Creek, Bluff Creek, Bogus Creek, Boise Creek, Camp Creek, Deadwood Creek, Dillon Creek, East Fork South Fork Salmon River, Grider Creek, Gumboot Creek, Kidder Creek, Klamath River, Little North Fork Salmon River, Little Shasta River, Little South Fork Salmon River, Moffett Creek, North Fork Salmon River, Noyes Valley Creek, Parks Creek, Red Cup Creek, Roach Creek, Salmon River, Scott River, Seiad Creek, Shackleford Creek, Shasta River, Shovel Creek, South Fork Salmon River, South Fork Scott River, Summit Lake, Tectah Creek, Thompson Creek, Tully Creek, Willow Creek, Wooley Creek
North Coast Rivers (6,082)	Alder Creek, Applegate River, Bear River, Butte Fork Applegate River, Coon Creek, Diamond North Fork North Fork Smith River, Goose Creek, Greenwood Creek, Hare Creek, Little North Fork Big River, Little North Fork of South Fork Albion River, Middle Fork Applegate River, Middle Fork of North Fork Noyo River, Middle Fork Smith River, North Fork Albion River, North Fork Smith River, Prescott Fork South Fork Smith River, Siskiyou Fork Smith River, Smith River, South Branch North Fork Navarro River, South Fork Albion River, South Fork Bear River, South Fork Siskiyou Fork Smith River, South Fork Smith River, South Fork Winchuck River, Upper North Fork Mattole River **303d Listed Streams** Albion River, Big River, Buckeye Creek, Dougherty Creek, East Branch North Fork Big River, East Branch North Fork Mattole River, Garcia River, Gualala River, Little North Fork Gualala River, Little North Fork Navarro River, Little North Fork Noyo River, Little North Fork Ten Mile River, Mattole River, Middle Fork Ten Mile River, Navarro River, North Fork Big River, North Fork Garcia River, North Fork Gualala River, North Fork Mattole River, North Fork Navarro River, North Fork North Fork Navarro River, North Fork Noyo River, North Fork of South Fork Noyo River, North Fork Ten Mile River, Noyo River, Pudding Creek, Robinson Creek, Rockpile Creek, South Fork Big River, South Fork Garcia River, South Fork Gualala River, South Fork Noyo River, South Fork Ten Mile River, Ten Mile River, Wheatfield Fork Gualala River
Russian River/ Bodega Bay (3,270)	Fife Creek, Morrison Creek, Porter Creek, Salmon Creek **303d Listed Streams** Big Sulphur Creek, Dry Creek, East Austin Creek, East Fork Russian River, Forsythe Creek, Franz Creek, Green Valley Creek, Little Sulphur Creek, Pieta Creek, Russian River, Sausal Creek, York Creek
Trinity River (5,567)	Grizzly Creek, Little Trinity River **303d Listed Streams** Browns Creek, Canyon Creek, East Fork New River, East Fork North Fork Trinity River, East Fork South Fork Trinity River, East Fork Trinity River, Eightmile Creek, Hayfork Creek, Mumbo Creek, New River, North Fork Trinity River, Reading Creek, South Fork East Fork New River, South Fork Trinity River, Stuart Fork, Swift Creek, Tish Tang Creek, Trinity River

Source: US Environmental Protection Agency (2011 list) and California Department of Fish & Wildlife

TABLE 18 LAND COVER TYPES OF THE NORTH COAST REGION

TYPE (WHR13)	ACRES NORTH COAST REGION	PERCENT OF REGION
Agriculture	444,089.70	3.57
Barren/Other	107,291.68	0.86
Conifer Forest	7,143,268.13	57.49
Conifer Woodland	350,371.74	2.82
Hardwood Forest	1,771,367.86	14.26
Hardwood Woodland	92,812.37	0.75
Herbaceous	907,293.36	7.3

TYPE (WHR13)	ACRES NORTH COAST REGION	PERCENT OF REGION
Shrub	1,310,707.48	10.55
Urban	89,839.43	0.72
Water	145,468.46	1.17
Wetland	60,243.89	0.48

Source: California Department of Forestry and Fire Protection (CALFIRE)

TABLE 19 PROTECTED AREAS OF THE NORTH COAST REGION

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
California Academy of Sciences	Pepperwood Ranch Natural Preserve	Sonoma
California Dept. of Fish & Wildlife	Atascadero Creek Ecological Reserve	Sonoma
California Dept. of Fish & Wildlife	Bracut Tidelands	Humboldt
California Dept. of Fish & Wildlife	Butte Valley WA	Siskiyou
California Dept. of Fish & Wildlife	Cedar Point	Siskiyou
California Dept. of Fish & Wildlife	Cemetery Hole FA	Trinity
California Dept. of Fish & Wildlife	China Point ER	Siskiyou
California Dept. of Fish & Wildlife	Crescent City Marsh WA	Del Norte
California Dept. of Fish & Wildlife	Deadwood Hole FA	Trinity
California Dept. of Fish & Wildlife	Eel River WA	Humboldt
California Dept. of Fish & Wildlife	Eel River--Rio Dell FA	Humboldt
California Dept. of Fish & Wildlife	Elk Creek Wetlands WA	Del Norte
California Dept. of Fish & Wildlife	Fay Slough WA	Humboldt
California Dept. of Fish & Wildlife	Grass Lake WA	Siskiyou
California Dept. of Fish & Wildlife	Harrison Grade Serpentine	Sonoma
California Dept. of Fish & Wildlife	Healdsburg FA	Sonoma
California Dept. of Fish & Wildlife	Horseshoe Ranch WA	Siskiyou
California Dept. of Fish & Wildlife	Indian Creek PA	Trinity
California Dept. of Fish & Wildlife	Irongate FH	Siskiyou
California Dept. of Fish & Wildlife	Klamath River FA	Siskiyou
California Dept. of Fish & Wildlife	Klamathon Station	Siskiyou
California Dept. of Fish & Wildlife	Laguna De Santa Rosa ER	Sonoma
California Dept. of Fish & Wildlife	Laguna Wildlife Area	Sonoma
California Dept. of Fish & Wildlife	Lake Earl WA	Del Norte
California Dept. of Fish & Wildlife	Lewiston FA	Trinity
California Dept. of Fish & Wildlife	Little Butte ER	Mendocino
California Dept. of Fish & Wildlife	Little Red Mountain ER	Mendocino
California Dept. of Fish & Wildlife	Luffenholtz Creek FA	Humboldt
California Dept. of Fish & Wildlife	Mad River FH	Humboldt
California Dept. of Fish & Wildlife	Mad River Slough WA	Humboldt
California Dept. of Fish & Wildlife	Mattole River ER	Mendocino
California Dept. of Fish & Wildlife	Mill Creek	Mendocino
California Dept. of Fish & Wildlife	Mud Lake WA	Siskiyou
California Dept. of Fish & Wildlife	Noyo River FA	Mendocino
California Dept. of Fish & Wildlife	Owl Creek ER	Humboldt
California Dept. of Fish & Wildlife	Pebble Beach FA	Del Norte
California Dept. of Fish & Wildlife	Samoa Peninsula PA	Humboldt
California Dept. of Fish & Wildlife	Shasta River FA	Siskiyou
California Dept. of Fish & Wildlife	Shasta Valley WA	Siskiyou
California Dept. of Fish & Wildlife	Sheepy Ridge WA	Siskiyou
California Dept. of Fish & Wildlife	Smith River FA	Del Norte
California Dept. of Fish & Wildlife	South Fork Eel River FA	Humboldt
California Dept. of Fish & Wildlife	South Kibesillah Gulch FA	Mendocino
California Dept. of Fish & Wildlife	South Spit Humboldt Bay	Humboldt
California Dept. of Fish & Wildlife	Table Bluff ER	Humboldt
California Dept. of Fish & Wildlife	Theiller Sebastopol Meadowfoam ER	Sonoma
California Dept. of Fish & Wildlife	Trinity River FA	Trinity
California Dept. of Fish & Wildlife	WAukell Creek WA	Del Norte
California Dept. of Fish & Wildlife	Yorkville ER	Mendocino

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
California Dept. of Fish & Wildlife	Yreka Screen Shop	Siskiyou
CDF/ CAL FIRE	Ellen Pickett State Forest	Trinity
CDF/ CAL FIRE	Jackson Demonstration State Forest	Mendocino
California Dept of Parks & Recreation	Admiral William Standley State Recreation Area	Mendocino
California Dept of Parks & Recreation	Annadel State Park	Sonoma
California Dept of Parks & Recreation	Armstrong Redwoods State Reserve	Sonoma
California Dept of Parks & Recreation	Austin Creek State Recreation Area	Sonoma
California Dept of Parks & Recreation	Benbow Lake State Recreation Area	Humboldt
California Dept of Parks & Recreation	Bothe-Napa Valley State Park	Sonoma
California Dept of Parks & Recreation	Caspar Headlands State Beach	Mendocino
California Dept of Parks & Recreation	Caspar Headlands State Natural Reserve	Mendocino
California Dept of Parks & Recreation	Del Norte Redwoods State Park	Del Norte
California Dept of Parks & Recreation	Fort Humboldt SHP	Humboldt
California Dept of Parks & Recreation	Fort Ross State Historic Park	Sonoma
California Dept of Parks & Recreation	Greenwood State Beach	Mendocino
California Dept of Parks & Recreation	Grizzly Creek Redwoods State Park	Humboldt
California Dept of Parks & Recreation	Harry A. Merlo State Recreation Area	Humboldt
California Dept of Parks & Recreation	Hendy Woods State Park	Mendocino
California Dept of Parks & Recreation	Humboldt Lagoons State Park	Humboldt
California Dept of Parks & Recreation	Humboldt Redwoods State Park	Humboldt
California Dept of Parks & Recreation	Jedediah Smith Redwoods State Park	Del Norte
California Dept of Parks & Recreation	John B. Dewitt Redwoods State Reserve	Humboldt
California Dept of Parks & Recreation	Jug Handle State Reserve	Mendocino
California Dept of Parks & Recreation	Kruse Rhododendron State Reserve	Sonoma
California Dept of Parks & Recreation	Little River State Beach	Humboldt
California Dept of Parks & Recreation	MacKerricher State Park	Mendocino
California Dept of Parks & Recreation	Mailliard Redwoods State Reserve	Mendocino
California Dept of Parks & Recreation	Manchester State Park	Mendocino
California Dept of Parks & Recreation	Mendocino Headlands State Park	Mendocino
California Dept of Parks & Recreation	Montgomery Woods State Reserve	Mendocino
California Dept of Parks & Recreation	Navarro River Redwoods State Park	Mendocino
California Dept of Parks & Recreation	Patrick's Point State Park	Humboldt
California Dept of Parks & Recreation	Pelican State Beach	Del Norte
California Dept of Parks & Recreation	Point Cabrillo Light Station	Mendocino
California Dept of Parks & Recreation	Prairie Creek Redwoods State Park	Humboldt
California Dept of Parks & Recreation	Reynolds Wayside Campgrounds	Mendocino
California Dept of Parks & Recreation	Richardson Grove State Park	Humboldt
California Dept of Parks & Recreation	Robert Louis Stevenson State Park	Sonoma
California Dept of Parks & Recreation	Russian Gulch State Park	Mendocino
California Dept of Parks & Recreation	Salt Point State Park	Sonoma
California Dept of Parks & Recreation	Schooner Gulch State Beach	Mendocino
California Dept of Parks & Recreation	Sinkyone Wilderness State Park	Mendocino
California Dept of Parks & Recreation	Smithe Redwoods State Reserve	Mendocino
California Dept of Parks & Recreation	Sonoma Coast State Beach	Sonoma
California Dept of Parks & Recreation	Standish-Hickey State Recreation Area	Mendocino
California Dept of Parks & Recreation	Sugar Loaf Ridge State Park	Sonoma
California Dept of Parks & Recreation	Tolowa Dunes State Park	Del Norte
California Dept of Parks & Recreation	Trinidad State Beach	Humboldt
California Dept of Parks & Recreation	Van Damme State Park	Mendocino
California Dept of Parks & Recreation	Weaverville Joss House State Historic Park	Trinity
California State Coastal Conservancy	Santa Rosa Plain Vernal Pool ER	Sonoma
California State Lands Commission	California State Lands Commission	Trinity
California State University, Sonoma	Fairfield Osborn Preserve	Sonoma
Cloverdale, City of	Cloverdale River Park	Sonoma
Cotati, City of	Helen Putnam Park	Sonoma
Cotati, City of	Kotate Park	Sonoma
Cotati, City of	La Plaza Park	Sonoma

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
Cotati, City of	Sunflower Park	Sonoma
Cotati, City of	Veterans Park	Sonoma
Healdsburg, City of	Badger Park and Community Garden	Sonoma
Healdsburg, City of	Gibbs Park	Sonoma
Healdsburg, City of	Healdsburg Rec Park	Sonoma
Healdsburg, City of	Plaza Park	Sonoma
Healdsburg, City of	Railroad Park	Sonoma
Land Trust of Napa County	McCord	Sonoma
Other State	Other State	Siskiyou
Rohnert Park, City of	Alicia Park	Sonoma
Rohnert Park, City of	Benicia Park	Sonoma
Rohnert Park, City of	Caterpillar Park	Sonoma
Rohnert Park, City of	Colegio Vista Park	Sonoma
Rohnert Park, City of	Dorotea Park	Sonoma
Rohnert Park, City of	Eagle Park	Sonoma
Rohnert Park, City of	Golis Park	Sonoma
Rohnert Park, City of	Honeybee Park	Sonoma
Rohnert Park, City of	Ladybug Park	Sonoma
Rohnert Park, City of	Magnolia Park	Sonoma
Rohnert Park, City of	Rainbow Park	Sonoma
Rohnert Park, City of	San Simeon Park	Sonoma
Rohnert Park, City of	Sunrise Park	Sonoma
Santa Rosa, City of	A Place to Play Park	Sonoma
Santa Rosa, City of	Alpha Farm	Sonoma
Santa Rosa, City of	Bellevue Ranch	Sonoma
Santa Rosa, City of	Bicentennial Park	Sonoma
Santa Rosa, City of	Brendon Park	Sonoma
Santa Rosa, City of	Brown Farm	Sonoma
Santa Rosa, City of	Brush Creek Park	Sonoma
Santa Rosa, City of	Coffey Park	Sonoma
Santa Rosa, City of	Colgan Creek Park	Sonoma
Santa Rosa, City of	DeMeo Park	Sonoma
Santa Rosa, City of	DeTurk Park	Sonoma
Santa Rosa, City of	Doyle Park	Sonoma
Santa Rosa, City of	Dutch Flohr Park	Sonoma
Santa Rosa, City of	Eastside Park	Sonoma
Santa Rosa, City of	Finley Community Center	Sonoma
Santa Rosa, City of	Fir Ridge Park	Sonoma
Santa Rosa, City of	Fountain Grove Park	Sonoma
Santa Rosa, City of	Francis Nielsen Ranch	Sonoma
Santa Rosa, City of	Franklin Park	Sonoma
Santa Rosa, City of	Fremont Park	Sonoma
Santa Rosa, City of	Galvin Park	Sonoma
Santa Rosa, City of	Haydn Village Park	Sonoma
Santa Rosa, City of	Hidden Valley Park	Sonoma
Santa Rosa, City of	Howarth Park	Sonoma
Santa Rosa, City of	Humboldt Park	Sonoma
Santa Rosa, City of	Jacobs Park	Sonoma

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
Santa Rosa, City of	Jennings Park	Sonoma
Santa Rosa, City of	Julliard Park	Sonoma
Santa Rosa, City of	Kelly Farm	Sonoma
Santa Rosa, City of	Live Oak Park	Sonoma
Santa Rosa, City of	Martin Luther King Park	Sonoma
Santa Rosa, City of	Matanzas Park	Sonoma
Santa Rosa, City of	Mesquite Park	Sonoma
Santa Rosa, City of	North Park	Sonoma
Santa Rosa, City of	Northwest Community Park	Sonoma
Santa Rosa, City of	Oak Lake Green Park	Sonoma
Santa Rosa, City of	Olive Park	Sonoma
Santa Rosa, City of	Palm Terrace	Sonoma
Santa Rosa, City of	Paulin Creek Preserve	Sonoma
Santa Rosa, City of	Pear Blossom Park	Sonoma
Santa Rosa, City of	Peter Springs Park	Sonoma
Santa Rosa, City of	Peterson Lane Park	Sonoma
Santa Rosa, City of	Pioneer Park	Sonoma
Santa Rosa, City of	Rae Park	Sonoma
Santa Rosa, City of	Red Hawk Park	Sonoma
Santa Rosa, City of	Rincon Ridge Park	Sonoma
Santa Rosa, City of	Rincon Valley Community Park	Sonoma
Santa Rosa, City of	Rinconada Park	Sonoma
Santa Rosa, City of	Sebastopol Railroad	Sonoma
Santa Rosa, City of	Skyhawk Parks	Sonoma
Santa Rosa, City of	Sonoma Avenue Park	Sonoma
Santa Rosa, City of	South Davis Park	Sonoma
Santa Rosa, City of	Southwest Community Park	Sonoma
Santa Rosa, City of	Steele Lane Park	Sonoma
Santa Rosa, City of	Stone Farm	Sonoma
Santa Rosa, City of	Strawberry Park	Sonoma
Santa Rosa, City of	Tanglewood Park	Sonoma
Santa Rosa, City of	Upper Brush Creek Park	Sonoma
Santa Rosa, City of	Village Green Park	Sonoma
Santa Rosa, City of	West Park	Sonoma
Santa Rosa, City of	Youth Community Park	Sonoma
Sebastopol, City of	Ives Park	Sonoma
Sebastopol, City of	Laguna Youth Park	Sonoma
Sebastopol, City of	Spooner Park	Sonoma
Sebastopol, City of	Willard Libby Park	Sonoma
Sonoma County Agricultural Preservation & Open Space District (SCAPOSD)	Bath/Watt	Sonoma
SCAPOSD	Cloverdale City Park	Sonoma
SCAPOSD	Carrington Ranch	Sonoma
SCAPOSD	Clover Springs	Sonoma
SCAPOSD	Coopers Grove	Sonoma
SCAPOSD	Cramer	Sonoma
SCAPOSD	Cresta	Sonoma

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
SCAPOSD	Furber Park	Sonoma
SCAPOSD	Haroutunian	Sonoma
SCAPOSD	Haroutunian — North	Sonoma
SCAPOSD	Ho	Sonoma
SCAPOSD	Hood Mountain Regional Park	Sonoma
SCAPOSD	Indian Valley	Sonoma
SCAPOSD	Jacobs Ranch	Sonoma
SCAPOSD	Keegan & Coppin	Sonoma
SCAPOSD	Nunes	Sonoma
SCAPOSD	Oken	Sonoma
SCAPOSD	Quailbrook Ranch	Sonoma
SCAPOSD	San Francisco Archdiocese	Sonoma
SCAPOSD	San Francisco Archdiocese II	Sonoma
SCAPOSD	Skiles	Sonoma
SCAPOSD	Tarman Park	Sonoma
SCAPOSD	Taylor Moutain Ranch	Sonoma
SCAPOSD	Van Alstyne	Sonoma
SCAPOSD	Wilroth — Donation	Sonoma
SCAPOSD	Wright Hill Ranch	Sonoma
SCAPOSD	Young — Armos	Sonoma
Sonoma County Regional Parks Dept	Andersen	Sonoma
Sonoma County Regional Parks Dept	Crane Creek	Sonoma
Sonoma County Regional Parks Dept	Doran Park	Sonoma
Sonoma County Regional Parks Dept	Doran Regional Park	Sonoma
Sonoma County Regional Parks Dept	Foothill Oaks	Sonoma
Sonoma County Regional Parks Dept	Gualala Point	Sonoma
Sonoma County Regional Parks Dept	Healdsburg Beach	Sonoma
Sonoma County Regional Parks Dept	Maddux Ranch Regional Park	Sonoma
Sonoma County Regional Parks Dept	Moms Beach	Sonoma
Sonoma County Regional Parks Dept	Pinnacle Gulch	Sonoma
Sonoma County Regional Parks Dept	Ragle Ranch	Sonoma
Sonoma County Regional Parks Dept	Sea Ranch Trail Access	Sonoma
Sonoma County Regional Parks Dept	Shiloh Ranch	Sonoma
Sonoma County Regional Parks Dept	Soda Springs	Sonoma
Sonoma County Regional Parks Dept	Sonoma Mountain Woodlands	Sonoma
Sonoma County Regional Parks Dept	Spring Lake Park	Sonoma

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
Sonoma County Regional Parks Dept	Spud Pt Marina	Sonoma
Sonoma County Regional Parks Dept	Steelhead Beach	Sonoma
Sonoma County Regional Parks Dept	Stillwater Cove Regional Park	Sonoma
Sonoma County Regional Parks Dept	Sunset Beach	Sonoma
Sonoma County Regional Parks Dept	Treadwell	Sonoma
Sonoma County Regional Parks Dept	Unity	Sonoma
Sonoma County Regional Parks Dept	Watson School/Wayside Park	Sonoma
Sonoma County Regional Parks Dept	West County Trail	Sonoma
Sonoma County Regional Parks Dept	Westside Park	Sonoma
Sonoma County Regional Parks Dept	Wohler Bridge Fishing Access	Sonoma
Sonoma County Water Agency	Hanson Aggregates	Sonoma
Sonoma County Water Agency	SCWA	Sonoma
Sonoma Land Trust	Freezeout Redwoods	Sonoma
Sonoma Land Trust	Laufenberg Ranch	Sonoma
Sonoma Land Trust	Little Black Mountain	Sonoma
Sonoma Land Trust	Spring Lake Regional Park	Sonoma
Sonoma Land Trust	White Rock Preserve	Sonoma
Sonoma Land Trust	Wild Turkey Hill	Sonoma
The Conservation Fund, California	Big River Salmon Creek	Mendocino
The Nature Conservancy	Nelson	Siskiyou
The Nature Conservancy	Pygmy Forest	Mendocino
The Nature Conservancy	Sonoma Mountain Ranch	Sonoma
US Army Corps of Engineers	Lake Sonoma Recreation Area	Sonoma
US Army Corps of Engineers	Lake Sonoma Wildlife Mgt Area	Sonoma
US Bureau of Land Management	BLM	Trinity
UD Bureau of Land Management	Modoc National Forest	Siskiyou
US Bureau of Land Management	The Geysers	Sonoma
US Fish & Wildlife Service	Clear Lake National Wildlife Refuge	Modoc
US Fish & Wildlife Service	Humboldt Bay NWR	Humboldt
US Fish & Wildlife Service	Lower Klamath National Wildlife Refuge	Siskiyou
US Fish & Wildlife Service	Ma-le'l Dunes Cooperative Management Area	Humboldt
US Fish & Wildlife Service	Tule Lake National Wildlife Refuge	Siskiyou
US Forest Service	Klamath National Forest	Siskiyou
US Forest Service	Mendocino National Forest	Trinity

ANGENCY/ ENTITY NAME	UNIT NAME	LOCATION
US Forest Service	Rough River	Siskiyou
US Forest Service	Shasta-Trinity National Forest	Trinity
US Forest Service	Six Rivers National Forest	Trinity
US National Park Service	Lava Beds National Monument	Siskiyou
US National Park Service	Redwood National Park	Humboldt
US National Park Service	Whiskeytown-Shasta-Trinity NRA	Shasta
University of California	Bodega Marine Reserve	Sonoma
Windsor, Town of	Acorn Park	Sonoma
Windsor, Town of	Esposti Park	Sonoma
Windsor, Town of	Hiram Lewis Park	Sonoma
Windsor, Town of	Keiser Park	Sonoma
Windsor, Town of	Lakewood Meadows Park	Sonoma
Windsor, Town of	Los Robles Park	Sonoma
Windsor, Town of	Michael Hall Park	Sonoma
Windsor, Town of	Mitchell Park	Sonoma
Windsor, Town of	Old Vineyard Park	Sonoma
Windsor, Town of	Pleasant Oak Park	Sonoma
Windsor, Town of	Pueblo Viejo Park	Sonoma
Windsor, Town of	Robbins Park	Sonoma
Windsor, Town of	Sutton Park	Sonoma
Windsor, Town of	Vintage Oaks Park	Sonoma
Windsor, Town of	Wilson Ranch Soccer Park	Sonoma

California Protected Areas Database (CPAD) www.calands.org

TABLE 20 MARINE MANAGED AREAS OF THE NORTH COAST REGION

CCA (TOTAL 21)	MPA (TOTAL 38)	ASBS/ SWQPA (TOTAL 8)
Klamath River	False Klamath Rock SC	Bodega Marine Life Refuge
Redwood Creek	Reading Rock SMCA	Del Mar Landing Ecological Reserve
Redwood National Park	Reading Rock SMR	Gerstle Cove
Trinidad Head	Samoa SMCA	Kelp Beds at Saunders Reef
Mad River	South Humboldt SMRNA	Kelp Beds at Trinidad Head
Eel River	Sugar Loaf Island SC	Kings Range Natl Conservation Area
Mattole River	South Cape Mendocino SMR	Pygmy Forest Ecological Staircase
King Range	Steamboat Rock SR	Redwood National and State Parks
Pudding Creek	Mattole Canyon SMR	
Noyo River	Sea Lion Gulch SMR	
Jughandle Cove	Big Flat SMCA	
Big River	Double Cone Rock SMCA	
Albion River	Rockport Rocks SC	
Navarro River	Vizciano Rock SC	
Garcia River	Ten Mile SMR	
Saunders Reef	Ten Mile Beach SMCA	
Del Mar Landing	Ten Mile Estuary SMCA	
Gerstle Cove	Mac Kerricher SMCA	
Bodega	Point Cabrillo SMR	
Estero Americano	Russian Gulch SMCA	
Estero de San Antonio	Big River Estuary SMCA	
	Van Damme SMCA	
	Navarro SMCA	
	Point Arena SMR	
	Point Arena SMCA	
	Sea Lion Cove SMCA	
	Saunders Reef SMCA	
	Del Mar Landing SMR	
	Stewarts Point SMCA	
	Stewarts Point SMR	
	Salt Point SMCA	
	Gerstle Cove SMR	
	Russian River SMRMA	
	Russian River SMCA	
	Bodega Head SMR	
	Bodega Head SMCA	
	Estero Americano SMRMA	
	Estero de San Antonio SMRMA	

Source: California Coastal Commission, California Department of Fish and Wildlife, and State Water Resources Control Board

TABLE 21 WILD & SCENIC RIVERS OF THE NORTH COAST REGION

NORTH COAST IMPAIRED STREAMS FLOWING INTO WILD & SCENIC RIVERS			
Albion River	Eel River, Middle Fork	Mill Creek	Smith River
Albion River, The Lagoon	Eel River, North Fork	Monkey Creek	Smith River (Middle Fork)
Bear Creek	Eel River, South Fork	Muzzleloader Creek	Smith River, Middle Fork
Black Butte River	Eightmile Creek	Myrtle Creek	Smith River, North Fork
Blackhawk Creek	Goose Creek	New River	Smith River, North Fork Tributary
Buck Creek	Gordon Creek	Packsaddle Creek	Smith River, South Fork
Bummer Lake Creek	Griffin Creek	Patrick Creek	South Fork Rowdy Creek
Canthook Creek	Gualala River	Prescott Fork	South Siskiyou Fork
Cold Creek	Hardscrabble Creek	Quartz Creek	Still Creek
Coon Creek	Harrington Creek	Rock Creek	Stony Creek
Craigs Creek	High Plateau Creek	Rowdy Creek	Trinity River
Diamond Creek	Hurdygurdy Creek	Salmon River	Trinity River, North Fork
Diamond Creek, North Fork	Jones Creek	Salmon River, North Fork	Trinity River, South Fork
Dominie Creek	Kelly Creek	Salmon River, South Fork	Van Duzen River
East Fork Goose Creek	Klamath River	Savoy Creek	West Branch Mill Creek
East Fork Mill Creek	Knopti Creek	Scott River	West Fork Patrick Creek
East Fork Patrick Creek	Little Jones Creek	Shelly Creek	Williams Creek
Eel River	Little Mill Creek	Siskiyou Fork Smith River	Wooley Creek

Source: California Department of Fish and Wildlife

TABLE 22 IMPAIRED STREAMS THAT FLOW DIRECTLY TO NORTH COAST WILD & SCENIC RIVERS

NORTH COAST IMPAIRED STREAMS FLOWING INTO WILD & SCENIC RIVERS			
Albion River	Devils Elbow Creek	Little North Fk	Rodeo Creek
Alder Gulch	Division Creek	Laurel Creek	Salmon Creek
Ash Creek	Don Juan Creek	Limestone Gulch	Salmon River
Beaver Creek	Dona Creek	Little Bogus Creek	Salmon River, N Fk
Big French Creek	Doolittle Creek	Little Ferry Creek	Salmon River, S Fk
Black Butte River	Dora Creek	Little Grider Creek	Scott River
Blue Rock Creek	Dutch Creek	Little Mingo Creek	Steinacher Creek
Browns Creek	Dutton Creek	Little Rock Creek	Salmon Creek
Butter Creek	Eel River	Little Twin Creek	Salt Creek
Badger Creek	Eel River, M Fk	Logan Gulch	Sand Bank Creek
Baldy Creek	Eel River, N Fk	Lousy Creek	Sandy Bar Creek
Barker Creek	Eel River, S Fk	Low Gap Creek	Sawmill Creek
Bear Canyon	Elk Creek	Lumgrey Creek	Sawmill Gulch
Bear Creek	Eltapom Creek	Mill Creek	Smith Creek
Beaver Creek	Eddy Gulch	Maxwell Creek	Sniktaw Creek
Big Bar Creek	Elder Creek	Mccann Creek	Snipe Gulch
Big Creek	Fish Creek	Mcguffy Creek	Somes Creek
Big Ferry Creek	Fly Creek	Mckinney Gulch	Sulphur Glade Creek
Black Oak Creek	Fox Creek	Meamber Creek	Surprise Creek
Bloody Nose Creek	Franklin Gulch	Meamber Gulch	Surveyors Canyon
Bluff Creek	Grass Valley Creek	Middle Creek	Swiss Gulch
Boulder Gulch	Gualala River	Mill Creek	Tenmile Creek
Bridge Creek	Gualala River, N Fk	Mills Creek	Thompson Creek
Brock Creek	Garvey Gulch	Mingo Creek	Trinity River

NORTH COAST IMPAIRED STREAMS FLOWING INTO WILD & SCENIC RIVERS			
Bull Creek	Grapevine Creek	Mitchell Creek	Trinity River, N Fk
Burger Creek	Horse Creek	Mowry Creek	Trinity River, S Fk
Cold Creek	Hostler Creek	Muddy Gulch Creek	Tatu Creek
Cable Creek	Hale Creek	New River	Thomas Creek
Cape Horn Creek	Hawkins Creek	Negro Creek	Tish Tang A Tang Creek
Caraway Creek	Hayshed Creek	North Fork Gulch	Tom Martin Creek
Carr Creek	Hicks Gulch	O-Farrill Gulch	Townsend Gulch
Carson Gulch	Hogshed Creek	Oak Flat Creek	Truss Creek
Cave Creek	Hotelling Gulch	Pacific Ocean	Tunnel Creek
China Creek	Howards Gulch	Pat Ford Creek	Tuttle Creek
China Gulch	Hudson Creek	Pelletreau Creek	Van Duzen River
Cody Creek	Indian Creek	Plummer Creek	Willow Creek
Coleman Creek	Icebox Creek	Pothole Creek	Wooley Creek
Connick Creek	Independence Creek	Prairie Creek	Walker Creek
Coon Creek	Jack Of Hearts Creek	Printer Gulch	Walker Gulch
Cronan Gulch	Jackass Gulch	Queatchumpah Creek	White Hawk Creek
Croy Gulch	Jennings Gulch	Rancheria Creek	Whitney Creek
Cummings Creek	Johnson Creek	Rattlesnake Creek	Wilson Creek
Deadwood Creek	Klamath River	Red Mountain Creek	Wilson Gulch
Deep Creek	Kinsman Creek	Robinson Creek	Woodman Creek
Deep Gulch	Kirkham Creek	Rocky Basin Creek	Yager Creek
Deer Creek	Knownothing Creek	Rocky Glen Creek	

Source: California Department of Fish and Wildlife, Environmental Protection Agency

TABLE 23 NATIONAL WILDERNESS PRESERVATION SYSTEM AREAS OF THE NORTH COAST REGION

NAME	ACREAGE
Chanchelulla Wilderness	5,705
Lava Beds Wilderness	28,058
Marble Mountain Wilderness	221,161
Mount Shasta Wilderness	14,859
North Fork Wilderness	7,978
Red Buttes Wilderness	18,070
Russian Wilderness	11,065
Siskiyou Wilderness	154,751
Snow Mountain Wilderness	9,037
Trinity Alps Wilderness	499,894
Yolla Bolly-Middle Eel Wilderness	103,155
TOTAL	1,073,735 acres

Source: Bureau of Land Management

Beneficial Uses of Water

Table 24 (below) presents the designated "beneficial uses "of waters as assigned by the North Coast Regional Water Quality Control Board to the Region's waterbodies (NCRWQCB 2011). The basis for the discussion of beneficial water uses, which follows, is Section 13050(f) of California's Porter-Cologne Water Quality Control Act, which states:

> "Beneficial uses" of the waters of the state that may be protected against water quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves."

In 1972, the State Water Board adopted a uniform list of beneficial uses, including descriptions, to be applied throughout all basins of the State. This list was updated in 1996, with additions for the North Coast Region in 2011[1]. Waterbodies with designated actual or potential beneficial uses include all major streams (i.e. Hydrologic Units, HU), minor coastal streams, ocean waters, bays, saline wetlands, freshwater wetlands, estuaries, and groundwater. The beneficial uses of any specifically identified waterbody generally apply to all its tributaries.

TABLE 24 BENEFICIAL USES OF WATER IN THE NORTH COAST REGION, 2011

BENEFICIAL USE	DEFINITION
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Aquaculture (AQUA)	Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.
Cold Freshwater Habitat (COLD)	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Commercial and Sport Fishing (COMM)	Uses of water for commercial, recreational (sport) collection of fish, shellfish, or other aquatic organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
Estuarine Habitat (EST)	Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).
Flood Peak Attenuation/ Flood Water Storage (FLD)	Uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.
Freshwater Replenishment (FRSH)	Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
Groundwater Recharge (GWR)	Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
Hydropower Generation (POW)	Uses of water for hydropower generation.
Industrial Process Supply (PRO)	Uses of water for industrial activities that depend primarily on water quality.
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
Inland Saline Water Habitat (SAL)	Uses of water that support inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates.
Marine Habitat (MAR)	Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).
Migration of Aquatic Organisms (MIGR)	Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Native American Culture (CUL)	Uses of water that support the cultural and/or traditional rights of indigenous people such as subsistence fishing and shellfish gathering, basket weaving and jewelry material collection, navigation to traditional ceremonial locations, and ceremonial uses.
Navigation (NAV)	Uses of water for shipping, travel, or other transportation by private, military or commercial vessels.
Non-Contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Preservation of Areas of Special Biological Significance (ASBS)	Includes marine life refuges, ecological reserves and designated areas of special biological significance, such as areas where kelp propagation and maintenance are features of the marine environment requiring special protection.
Rare, Threatened, or Endangered Species (RARE)	Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.
Shellfish Harvesting (SHELL)	Uses of water that support habitats suitable for the collection of filter- feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.
Spawning, Reproduction, and/ or Early Development (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
Subsistence Fishing (FISH)	Uses of water that support subsistence fishing.

1 In addition to the beneficial uses identified on the statewide list, the following uses have been identified in this Region: Three wetland beneficial uses, recognizing the value of protecting these unique waterbodies: Wetland Habitat (WET); Water Quality Enhancement (WQE); and Flood Peak Attenuation/ Flood Water Storage (FLD). The Native American Cultural (CUL) use and Subsistence Fishing (FISH) use have been added, identifying the traditional and cultural uses of waters within the Region. See the North Coast Basin Plan (NCRWQCB 2011, Table 2-1) for a full listing of North Coast beneficial uses by waterbody type and HU.

BENEFICIAL USE	DEFINITION
Warm Freshwater Habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs.
Water Quality Enhancement (WQE)	Uses of waters, including wetlands and other waterbodies, that support natural enhancement or improvement of water quality in or downstream of a waterbody including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.
Wetland Habitat (WET)	Uses of water that support natural and man-made wetland ecosystems, including, but not limited to, preservation or enhancement of unique wetland functions, vegetation, fish, shellfish, invertebrates, insects, and wildlife habitat.
Wildlife Habitat (WILD)	Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

TABLE 25 SECTION 303(D) IMPAIRED WATERS OF THE NORTH COAST REGION (2011)

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Bodega HU, Bodega Harbor HA	Bay & Harbor	810	Acres	Invasive Species	Source Unknown	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, Americano Creek	River & Stream	38	Miles	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Nutrients	Agriculture	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Habitat Modification	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Hydromodification	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Unspecified Nonpoint Source	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Agriculture	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Hydromodification	2019
Bodega HU, Estero Americano HA, estuary	Estuary	199	Acres	Sedimentation/Siltation	Habitat Modification	2019
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Nutrients	Source Unknown	USEPA-approved 2001
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Sediment	Agriculture	USEPA-approved 2001
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Sediment	Agriculture	USEPA-approved 2001
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Sediment	Construction/Land Development	USEPA-approved 2001
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Sediment	Habitat Modification	USEPA-approved 2001
Bodega HU, Estero de San Antonio HA, Stemple Creek/Estero de San Antonio	River & Stream	61	Miles	Sediment	Unspecified Nonpoint Source	USEPA-approved 2001
Campbell Cove	Coastal & Bay Shoreline	0	Miles	Indicator Bacteria	Source Unknown	2019
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Natural Sources	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Silviculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Construction/Land Development	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Cape Mendocino HU, Mattole River HA, Mattole River	River & Stream	503	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Clam Beach	Coastal & Bay Shoreline	1	Miles	Indicator Bacteria	Source Unknown	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Agriculture	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Source Unknown	2019
Copco Lake	Lake & Reservoir	776	Acres	Cyanobacteria hepatotoxic microcystins	Natural Sources	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Aluminum	Natural Sources	2021
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Oxygen, Dissolved	Source Unknown	2021
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Temperature, water	Habitat Modification	2007
Eel River HU, Lower Eel River HA (incl Eel River Delta)	River & Stream	426	Miles	Temperature, water	Unspecified Nonpoint Source	2007
Eel River HU, Middle Fork HA, Eden Valley & Round Valley HSAs	River & Stream	596	Miles	Aluminum	Natural Sources	2021
Eel River HU, Middle Fork HA, Eden Valley & Round Valley HSAs	River & Stream	596	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Fork HA, Eden Valley & Round Valley HSAs	River & Stream	596	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Fork HA, Eden Valley & Round Valley HSAs	River & Stream	596	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, Middle Fork HA, Wilderness & Black Butte HSAs	River & Stream	642	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Fork HA, Wilderness & Black Butte HSAs	River & Stream	642	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Aluminum	Natural Sources	2021
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, Middle Main HA	River & Stream	674	Miles	Temperature, water	Hydromodification	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel R HU, N Fork HA, Lower N Fork Eel River Watershed	River & Stream	209	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel R HU, N Fork HA, Upper N Fork Eel River Watershed	River & Stream	173	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel R HU, N Fork HA, Upper N Fork Eel River Watershed	River & Stream	173	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel R HU, N Fork HA, Upper N Fork Eel River Watershed	River & Stream	173	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel R HU, N Fork HA, Upper N Fork Eel River Watershed	River & Stream	173	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Aluminum	Natural Sources	2021
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, South Fork HA	River & Stream	943	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Eel River HU, Upper Main HA (Includes Tomki Creek)	River & Stream	1141	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Eel R HU, Upper Main HA, L Pillsbury HSA, L Pillsbury	Lake & Reservoir	1973	Acres	Mercury	Unspecified Nonpoint Source	2012
Eel R HU, Upper Main HA, L Pillsbury HSA, L Pillsbury	Lake & Reservoir	1973	Acres	Mercury	Resource Extraction	2012
Eel R HU, Upper Main HA, L Pillsbury HSA, L Pillsbury	Lake & Reservoir	1973	Acres	Mercury	Natural Sources	2012
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Eel River HU, Van Duzen River HA	River & Stream	585	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Natural Sources	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Habitat Modification	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Habitat Modification	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Hydromodification	2011
Eureka Plain HU, Elk River	River & Stream	88	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Hydromodification	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Natural Sources	2011

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Habitat Modification	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Habitat Modification	2011
Eureka Plain HU, Freshwater Creek	River & Stream	84	Miles	Sedimentation/Siltation	Silviculture	2011
Eureka Plain HU, Humboldt Bay	Bay & Harbor	16075	Acres	Dioxin Toxic Equivalents	Hazardous Waste Site/ Storage	2019
Eureka Plain HU, Humboldt Bay	Bay & Harbor	16075	Acres	Dioxin Toxic Equivalents	Industrial Wastewater	2019
Eureka Plain HU, Humboldt Bay	Bay & Harbor	16075	Acres	Dioxin Toxic Equivalents	Source Unknown	2019
Eureka Plain HU, Humboldt Bay	Bay & Harbor	16075	Acres	PCBs (Polychlorinated biphenyls)	Source Unknown	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Hydromodification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Construction/Land Development	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Sediment	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Hydromodification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Natural Sources	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Habitat Modification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Unspecified Nonpoint Source	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Hydromodification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Hydromodification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Habitat Modification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Construction/Land Development	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Habitat Modification	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Urban Runoff	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Construction/Land Development	2019
Eureka Plain HU, Jacoby Creek watershed	River & Stream	19	Miles	Sediment	Silviculture	2019
Hare Creek Beach	Coastal & Bay Shoreline	0	Miles	Indicator Bacteria	Source Unknown	2021
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Source Unknown	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Natural Sources	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Hydromodification	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2019
Iron Gate Reservoir	Lake & Reservoir	1073	Acres	Cyanobacteria hepatotoxic microcystins	Agriculture	2019
Klamath River HU, Butte Valley HA	River & Stream	253	Miles	Nutrients	Unspecified Nonpoint Source	2019
Klamath River HU, Butte Valley HA	River & Stream	253	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Unspecified Nonpoint Source	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Natural Sources	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Agriculture	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Hydromodification	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Hydromodification	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Agriculture	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Habitat Modification	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Agriculture	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Agriculture	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Agriculture	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Habitat Modification	USEPA-approved 2001
Klamath R HU, Lost R HA, Tule Lake & Mt Dome HSAs	River & Stream	612	Miles	Nutrients	Habitat Modification	USEPA-approved 2001
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Industrial Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Municipal Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Municipal Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Industrial Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Municipal Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Industrial Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Nutrients	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Miscellaneous	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Industrial Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Organic Enrichment/ Low Dissolved Oxygen	Municipal Wastewater	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Sedimentation/Siltation	Source Unknown	2019
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Habitat Modification	2010
Klamath River HU, Lower HA, Klamath Glen HSA	River & Stream	609	Miles	Temperature, water	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Source Unknown	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Natural Sources	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Agriculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Natural Sources	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Municipal Wastewater	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Waste Storage And Disposal	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Unspecified Nonpoint Source	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Miscellaneous	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Industrial Wastewater	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Nutrients	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Municipal Wastewater	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Municipal Wastewater	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Industrial Wastewater	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Waste Storage And Disposal	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Organic Enrichment/ Low Dissolved Oxygen	Miscellaneous	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Agriculture	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Source Unknown	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Natural Sources	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Habitat Modification	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Resource Extraction	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Hydromodification	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Other Runoff	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Hydromodification	2021

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Silviculture	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Unspecified Nonpoint Source	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Habitat Modification	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Sediment	Silviculture	2021
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Natural Sources	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Unspecified Nonpoint Source	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Silviculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Silviculture	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Habitat Modification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath R HU, Middle HA & Lower HA, Scott to Trinity R	River & Stream	1389	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Agriculture	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Source Unknown	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Natural Sources	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Nutrients	Miscellaneous	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Nutrients	Unspecified Nonpoint Source	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Nutrients	Unspecified Point Source	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Organic Enrichment/ Low Dissolved Oxygen	Miscellaneous	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Organic Enrichment/ Low Dissolved Oxygen	Unspecified Point Source	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Organic Enrichment/ Low Dissolved Oxygen	Unspecified Nonpoint Source	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Other Runoff	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Source Unknown	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Silviculture	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Agriculture	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Habitat Modification	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Silviculture	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Resource Extraction	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Hydromodification	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Natural Sources	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Sediment	Habitat Modification	2021
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Unspecified Nonpoint Source	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Habitat Modification	2010
Klamath River HU, Middle HA, Iron Gate Dam to Scott R	River & Stream	548	Miles	Temperature, water	Habitat Modification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Source Unknown	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Hydromodification	2010

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Natural Sources	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Cyanobacteria hepatotoxic microcystins	Habitat Modification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Natural Sources	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Unspecified Nonpoint Source	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Natural Sources	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Municipal Wastewater	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Nutrients	Industrial Wastewater	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Municipal Wastewater	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Miscellaneous	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Industrial Wastewater	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Temperature, water	Unspecified Nonpoint Source	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Temperature, water	Hydromodification	2010

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath River HU, Middle HA, Oregon to Iron Gate	River & Stream	129	Miles	Temperature, water	Hydromodification	2010
Klamath River HU, Salmon River HA	River & Stream	694	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Salmon River HA	River & Stream	694	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Salmon River HA	River & Stream	694	Miles	Temperature, water	Resource Extraction	USEPA-approved 2001
Klamath River HU, Salmon River HA	River & Stream	694	Miles	Temperature, water	Silviculture	USEPA-approved 2001
Klamath River HU, Salmon River HA	River & Stream	694	Miles	Temperature, water	Silviculture	USEPA-approved 2001
Klamath River HU, Salmon River HA, Wooley Creek HSA	River & Stream	184	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Salmon River HA, Wooley Creek HSA	River & Stream	184	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Source Unknown	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Silviculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Klamath River HU, Scott River HA	River & Stream	902	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Municipal Wastewater	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Habitat Modification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Hydromodification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Klamath River HU, Shasta River HA	River & Stream	630	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Klamath River HU, Tule & Lower Klamath Lakes NWR	Lake & Reservoir	26998	Acres	pH (high)	Unspecified Nonpoint Source	USEPA-approved 2001
Klamath River HU, Tule & Lower Klamath Lakes NWR	Lake & Reservoir	26998	Acres	pH (high)	Natural Sources	USEPA-approved 2001
Luffenholtz Beach	Coastal & Bay Shoreline	0	Miles	Indicator Bacteria	Source Unknown	2019
Mad River HU, Mad River	River & Stream	654	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Turbidity	Unspecified Nonpoint Source	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Turbidity	Resource Extraction	USEPA-approved 2001
Mad River HU, Mad River	River & Stream	654	Miles	Turbidity	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Albion River HA, Albion River	River & Stream	91	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Albion River HA, Albion River	River & Stream	91	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Albion River HA, Albion River	River & Stream	91	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Albion River HA, Albion River	River & Stream	91	Miles	Temperature, water	Source Unknown	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Hydromodification	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Big River HA, Big River	River & Stream	225	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Garcia River HA, Garcia River	River & Stream	154	Miles	Sediment	Source Unknown	USEPA-approved 2001
Mendocino Coast HU, Garcia River HA, Garcia River	River & Stream	154	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Garcia River HA, Garcia River	River & Stream	154	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Garcia River HA, Garcia River	River & Stream	154	Miles	Temperature, water	Unspecified Nonpoint Source	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Mendocino Coast HU, Garcia River HA, Garcia River	River & Stream	154	Miles	Temperature, water	Hydromodification	2019
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Aluminum	Natural Sources	2021
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Temperature, water	Hydromodification	2019
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Temperature, water	Hydromodification	2019
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Gualala River HA, Gualala River	River & Stream	455	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Hydromodification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Resource Extraction	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA	River & Stream	415	Miles	Temperature, water	Agriculture	USEPA-approved 2001
Mendocino Coast HU, Navarro River HA, Delta	Estuary	48	Acres	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Mendocino Coast HU, Noyo River HA, Noyo River	River & Stream	144	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Mendocino Coast HU, Noyo River HA, Noyo River	River & Stream	144	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Noyo River HA, Noyo River	River & Stream	144	Miles	Temperature, water	Source Unknown	2019
Mendocino Coast HU, Noyo River HA, Pudding Creek	River & Stream	24	Miles	Temperature, water	Silviculture	2019
Mendocino Coast HU, Noyo River HA, Pudding Creek	River & Stream	24	Miles	Temperature, water	Silviculture	2019
Mendocino Coast HU, Noyo River HA, Pudding Creek	River & Stream	24	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Temperature, water	Hydromodification	2019
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Temperature, water	Habitat Modification	2019
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Mendocino Coast HU, Rockport HA, Ten Mile River HSA	River & Stream	162	Miles	Temperature, water	Habitat Modification	2019
Moonstone County Park	Coastal & Bay Shoreline	0	Miles	Indicator Bacteria	Source Unknown	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Pudding Creek Beach	Coastal & Bay Shoreline	0	Miles	Indicator Bacteria	Source Unknown	2021
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Construction/Land Development	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Habitat Modification	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Natural Sources	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Agriculture	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Habitat Modification	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Hydromodification	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Silviculture	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Redwood Creek HU, Redwood Creek	River & Stream	332	Miles	Temperature, water	Silviculture	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Silviculture	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower RR HA, Austin Creek HSA	River & Stream	81	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Indicator Bacteria	Source Unknown	2012
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Construction/Land Development	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Silviculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Lower RR HA, Guerneville HSA	River & Stream	195	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Indicator Bacteria	Source Unknown	2012
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Habitat Modification	2021

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Source Unknown	2021
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Habitat Modification	2021
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Agriculture	2021
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Source Unknown	2021
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Habitat Modification	2021
Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	River & Stream	39	Miles	Oxygen, Dissolved	Natural Sources	2021
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Specific Conductivity	Source Unknown	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Temperature, water	Hydromodification	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Temperature, water	Habitat Modification	2019
Russian R HU, Middle RR HA, Big Sulphur Creek HSA	River & Stream	85	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Indicator Bacteria	Source Unknown	2012
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Natural Sources	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Urban Runoff	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Silviculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Sedimentation/Siltation	Resource Extraction	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Middle RR HA, Geyserville HSA	River & Stream	242	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Indicator Bacteria	Source Unknown	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Mercury	Source Unknown	2019
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Nitrogen	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Nitrogen	Unspecified Point Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Nitrogen	Natural Sources	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Oxygen, Dissolved	Natural Sources	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Oxygen, Dissolved	Unspecified Point Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Oxygen, Dissolved	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Phosphorus	Unspecified Nonpoint Source	2012

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Phosphorus	Unspecified Point Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Phosphorus	Natural Sources	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Other Runoff	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Other Runoff	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Sedimentation/Siltation	Other Runoff	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Temperature, water	Habitat Modification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Temperature, water	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Laguna de Santa Rosa	River & Stream	96	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Silviculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Silviculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Habitat Modification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Habitat Modification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Mark West Creek HSA	River & Stream	99	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Indicator Bacteria	Source Unknown	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Urban Runoff	2012

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Habitat Modification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Construction/Land Development	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Urban Runoff	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Agriculture	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Sedimentation/Siltation	Natural Sources	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Temperature, water	Habitat Modification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Temperature, water	Hydromodification	2012

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Temperature, water	Unspecified Nonpoint Source	2012
Russian River HU, Middle RR HA, Santa Rosa Creek	River & Stream	87	Miles	Temperature, water	Hydromodification	2012
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Sedimentation/Siltation	Source Unknown	2012
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Middle RR HA, Warm Springs HSA	River & Stream	255	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Middle Russian River HA, Warm Springs HSA, Lake Sonoma [Reservoir]	Lake & Reservoir	2377	Acres	Mercury	Unspecified Nonpoint Source	2012
Russian River HU, Middle Russian River HA, Warm Springs HSA, Lake Sonoma [Reservoir]	Lake & Reservoir	2377	Acres	Mercury	Resource Extraction	2012
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Silviculture	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Agriculture	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Sedimentation/Siltation	Hydromodification	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Upper RR HA, Coyote Valley HSA	River & Stream	171	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper Russian River HA, Coyote Valley HSA, Lake Mendocino [Reservoir]	Lake & Reservoir	1704	Acres	Mercury	Unspecified Nonpoint Source	2012
Russian River HU, Upper Russian River HA, Coyote Valley HSA, Lake Mendocino [Reservoir]	Lake & Reservoir	1704	Acres	Mercury	Resource Extraction	2012
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper RR HA, Forsythe Creek HSA	River & Stream	122	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Silviculture	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Construction/Land Development	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Natural Sources	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Hydromodification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Agriculture	2019

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Other Runoff	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Resource Extraction	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Sedimentation/Siltation	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Unspecified Nonpoint Source	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Hydromodification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Habitat Modification	2019
Russian River HU, Upper Russian River HA, Ukiah HSA	River & Stream	460	Miles	Temperature, water	Hydromodification	2019
Shastina, Lake	Lake & Reservoir	1414	Acres	Mercury	Atmospheric Deposition	2021
Shastina, Lake	Lake & Reservoir	1414	Acres	Mercury	Resource Extraction	2021
Shastina, Lake	Lake & Reservoir	1414	Acres	Mercury	Natural Sources	2021
Shastina, Lake	Lake & Reservoir	1414	Acres	Mercury	Source Unknown	2021
Trinidad State Beach	Coastal & Bay Shoreline	1	Miles	Indicator Bacteria	Source Unknown	2019
Trinity Lake (was Claire Engle Lake)	Lake & Reservoir	15985	Acres	Mercury	Atmospheric Deposition	2019
Trinity Lake (was Claire Engle Lake)	Lake & Reservoir	15985	Acres	Mercury	Resource Extraction	2019
Trinity Lake (was Claire Engle Lake)	Lake & Reservoir	15985	Acres	Mercury	Natural Sources	2019
Trinity Lake (was Claire Engle Lake)	Lake & Reservoir	15985	Acres	Mercury	Source Unknown	2019
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Lower Trinity HA	River & Stream	1256	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Middle HA	River & Stream	331	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Sedimentation/Siltation	Agriculture	USEPA-approved 2001
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Temperature, water	Hydromodification	2019
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Temperature, water	Habitat Modification	2019
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Temperature, water	Agriculture	2019
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Temperature, water	Habitat Modification	2019
Trinity River HU, South Fork HA	River & Stream	1161	Miles	Temperature, water	Hydromodification	2019
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA	River & Stream	570	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Mercury	Source Unknown	2019
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001

WATER BODY NAME	WATER BODY TYPE	EST. SIZE AFFECTED (UNIT)		POLLUTANT	SOURCE CATEGORY	EXPECTED TMDL COMPLETION DATE***
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Unspecified Nonpoint Source	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Resource Extraction	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Natural Sources	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Silviculture	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Hydromodification	USEPA-approved 2001
Trinity River HU, Upper HA, Trinity River, East Fork	River & Stream	92	Miles	Sedimentation/Siltation	Habitat Modification	USEPA-approved 2001

Source: US Environmental Protection Agency (2011)

TABLE 26 TMDL STATUS FOR IMPAIRED WATERS OF THE NORTH COAST REGION

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Albion River	Sediment	Complete	2001	High	412 tons/mi2/yr 1	Silviculture, Logging, Nonpoint Source
Americano Creek	Nutrient	Not Started	Unknown	Low	-	Intensive Animal Feeding Operations, Manure Lagoons, Dairies
Americano Creek	Sediment	Not Started	Unknown	Low	-	Pasture Grazing, Range Grazing
Big River	Sediment	Complete	2001	High	393 tons/mi2/yr 1	Silviculture, Logging, Road Construction/ Maintenance, Road Construction, Disturbed Sites (Land Develop.), Nonpoint Source, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Drainage/Filling Of Wetlands, Erosion/Siltation
Big River	Temperature	Not Started	Unknown	Low	-	Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Drainage/Filling of Wetlands, Erosion/Siltation, Nonpoint Source
Eel River (Delta)	Sediment	In progress	Dec-06	Medium	-	Range Grazing-Riparian and/or Upland, Siviculture, Nonpoint Source
Eel River (Delta)	Temperature	In progress	Dec-06	Medium	-	Removal of Riparian Vegetation
Eel River (North Fork)	Sediment	Complete	2002	Medium	1038 tons /mi2/yr 1	Silviculture, Logging, Erosion, Nonpoint Source
Eel River (North Fork)	Temperature	Complete	2002	Medium	409 langley(ly)/day	Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Nonpoint Source
Eel River (Middle Fork) Middle Fork Eel basin tributaries 2	Temperature	Complete	2003	Medium	109 ly/day	Removal of Riparian Vegetation, Nonpoint Source

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Eel River (Middle Fork) Upper Black Butte subarea	Temperature	Complete	2003	Medium	100 ly/day	Removal of Riparian Vegetation, Nonpoint Source
Eel River (Middle Fork) North Fork Middle Fork subarea	Temperature	Complete	2003	Medium	118 ly/day	Removal of Riparian Vegetation, Nonpoint Source
Eel River (Middle Fork) Upper Middle Fork Eel River and its tributaries	Sediment	Complete	2003	Medium	420 tons/mi2/yr	Erosion/Siltation
Eel River (Middle Fork) Black Butte subwatershed	Sediment	Complete	2003	Medium	740 tons/mi2/yr	Erosion/Siltation
Eel River (Middle Fork) Elk Creek subwatershed	Sediment	Complete	2003	Medium	1,112 tons/mi2/yr	Erosion/Siltation
Eel River (Middle Fork) Round Valley subwatershed	Sediment	Complete	2003	Medium	393 tons/mi2/yr	Erosion/Siltation
Eel River (Middle Fork) Williams/Thatcher subwatershed	Sediment	Complete	2003	Medium	438 tons/mi2/yr	Erosion/Siltation
Eel River (Middle Main)	Sediment	In progress	Dec-05	Medium	-	Range Grazing-Riparian, Range Grazing-Upland, Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/ Maintenance, Construction/Land Development, Land Development, Hydromodification, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Erosion/Siltation
Eel River (Middle Main)	Temperature	In progress	Dec-05	Medium	-	Upstream Impoundment, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Drainage/Filling Of Wetlands, Channel Erosion, Erosion/Siltation
Eel River (South Fork)	Sediment	Complete	1999	Medium	473 tons/km2/yr	Range Grazing-Riparian and/or Upland, Silviculture, Logging Road Construction/Maintenance, Resource Extraction, Hydromodification, Flow Regulation/Modification, Removal of Riparian Vegetation, Erosion/Siltation, Nonpoint Source
Eel River (South Fork)	Temperature	Complete	1999	Medium	Expressed as percent effective shade for individual stream segments 3	Hydromodification, Flow Regulation/ Modification, Removal of Riparian Vegetation, Erosion/Siltation, Nonpoint Source
Upper Main Eel River	Temperature	Complete	2004	Medium	289 ly/day 4	Channelization, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Drainage/ Filling Of Wetlands, Nonpoint Source
Upper Main Eel River	Sediment	Complete	2004	Medium	388 tons/mi2/yr	Agriculture-grazing, Silviculture, Harvesting, Restoration, Residue Management Logging Road Construction/Maintenance, Silvicultural Point Sources Construction/Land Development, Highway/Road/Bridge Construction, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Erosion/Siltation
Elk River Sediment	Sediment	In progress	Aug-06	High	-	Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/ Maintenance, Removal of Riparian Vegetation Streambank Modification/Destabilization, Erosion/ Siltation, Natural Sources, Nonpoint Source
Estero de San Antonio	Nutrient	Not Started	Unknown	Medium/ Low	-	Pasture Grazing-Riparian and/ or Upland, Manure Lagoons

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Estero de San Antonio	Sediment	Not Started	Unknown	Medium/ Low	-	Range Grazing-Riparian, Hydromodification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Erosion/Siltation, Nonpoint Source
Freshwater Creek	Sediment	In progress	Aug-06	High	-	Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/ Maintenance, Removal of Riparian Vegetation Streambank Modification/Destabilization, Erosion/ Siltation, Natural Sources, Nonpoint Source
Garcia River	Sediment	In implementation	1998	NA	Target for mean particle size diameter is ≥ 69 mm with a minimum of ≥ 37 mm	NA
Garcia River	Temperature	Not Started	Unknown	High	-	Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Nonpoint Source
Gualala River	Sediment	Complete	2001	High	475 tons/mi2/yr	Specialty Crop Production, Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/Maintenance, Highway/Road/Bridge Construction, Land Development, Disturbed Sites (Land Develop.), Erosion/Siltation, Nonpoint Source
Gualala River	Temperature	Not Started	Unknown	Low	-	Removal of Riparian Vegetation, Streambank Modification/Destabilization, Channel Erosion, Erosion/Siltation, Nonpoint Source
Humboldt Bay	PCBs	Not Started	Unknown	Low	-	Source Unknown
Jacoby Creek	Sediment	Not Started	Unknown	Low	-	Silviculture, Road Construction, Land Development, Disturbed Sites (Land Develop.), Urban Runoff/Storm Sewers, Hydromodification, Channelization, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Drainage/Filling Of Wetlands
Klamath River	Nutrient	In progress	Dec-05	Medium	-	Nonpoint Source, Hydromodification, Agriculture, Specialty Crop Production, Habitat Modification, Removal of Riparian Vegetation Drainage/Filling Of Wetlands, Industrial Point Sources, Municipal Point Sources, Irrigated Crop Production, Specialty Crop Production, Pasture Grazing-Riparian and/or Upland, Range Grazing-Riparian, Intensive Animal Feeding Operations, Out-of-state source Nonpoint/ Point Source, Industrial Point Sources, Municipal Point Sources, Specialty Crop Production, Internal Nutrient Cycling (primarily lakes), Natural Sources, Nonpoint Source, Wastewater — land disposal, Upstream Impoundment, Natural Sources, Nonpoint Source, Out-of-state source
Klamath River	Temperature	In progress	Dec-05	Medium	-	Nonpoint Source, Hydromodification, Dam Construction, Upstream Impoundment, Flow Regulation/Modification, Water Diversions, Channelization, Flow Regulation/Modification, Water Diversions, Habitat Modification, Removal of Riparian Vegetation, Drainage/Filling Of Wetlands, Nonpoint Source, Hydromodification, Dam Construction, Habitat Modification, Channel Erosion, Hydromodification, Upstream Impoundment, Dam Construction, Streambank Modification/Destabilization, Drainage/ Filling Of Wetlands, Natural Sources

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Klamath River	Low Dissolved Oxygen	In progress	Dec-05	Medium	-	Industrial Point Sources, Municipal Point Sources, Agriculture, Irrigated Crop Production, Specialty Crop Production, Range Grazing-Riparian, Agriculture-storm runoff, Agriculture-subsurface drainage, Agriculture-irrigation tailwater, Agriculture-animal, Upstream Impoundment Flow, Regulation/Modification, Out-of-state source, Out-of-state source, Nonpoint/Point Source, Industrial Point Sources, Municipal Point Sources, Combined Sewer Overflow, Upstream Impoundment, Flow Regulation/ Modification, Out-of-state source
Laguna de Santa Rosa	Nutrient	Not Started	Unknown	Low	-	Internal Nutrient Cycling (primarily lakes), Nonpoint Source, Point Source
Laguna de Santa Rosa	Temperature	Not Started	Unknown	Low	-	Hydromodification, Upstream Impoundment Removal of Riparian Vegetation, Streambank Modification/Destabilization Nonpoint Source
Laguna de Santa Rosa	Low Dissolved Oxygen	Not Started	Unknown	Low	-	Internal Nutrient Cycling (primarily lakes), Nonpoint Source, Point Source
Lake Mendocino	Mercury	Not Started	Unknown	Low	-	Resource Extraction, Nonpoint Source
Lake Pillsbury	Mercury	Not Started	Unknown	Low	-	Natural Sources
Lake Sonoma	Mercury	Not Started	Unknown	Low	-	Resource Extraction, Nonpoint Source
Upper Lost River	Nutrient	Proposed for delisting	Anticipated Dec-04	NA	-	NA
Upper Lost River	Temperature	Proposed for delisting	Anticipated Dec-04	NA	-	NA
Lower Lost River	Nutrient	In progress	Jun-05	NA	-	NA
Lower Lost River	Temperature	In progress	Jun-05	NA	-	NA
Mad River	Sediment	In progress	Dec-07	Low	-	Silviculture, Resource Extraction, Nonpoint Source
Mad River	Temperature	Not Started	Unknown	Low	-	Upstream Impoundment, Flow Regulation/ Modification, Habitat Modification, Removal of Riparian Vegetation, Nonpoint Source, Unknown Nonpoint Source
Mad River	Turbidity	In progress	Unknown	Low	-	Silviculture, Resource Extraction, Nonpoint Source
Mattole River	Sediment	Complete	2003	High	3600 tons/mi2/yr	Specialty Crop Production, Range Grazing-Riparian and/or Upland, Range Grazing-Riparian, Silviculture, Road Construction, Hydromodification, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Erosion/Siltation
Mattole River	Temperature	Complete	2003	High	See note 5	Range Grazing-Riparian and/or Upland, Silviculture, Road Construction, Habitat Modification, Removal of Riparian Vegetation, Natural Sources, Nonpoint Source
Navarro River	Temperature	Complete	1998	High	See note 6	Agriculture, Agricultural Return Flows Resource Extraction, Flow Regulation/Modification, Water Diversions, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Drainage/ Filling Of Wetlands, Nonpoint Source

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Navarro River	Sediment	Complete	1998	High	1463 tons/mi2/ yr for sediment	Agriculture, Nonirrigated Crop Production, Irrigated Crop Production, Specialty Crop Production, Range Grazing-Riparian and/or Upland, Range Grazing-Riparian, Range Grazing-Upland, Agriculture-grazing Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/ Maintenance, Silvicultural Point Sources, Construction/Land Development, Highway/Road/ Bridge Construction, Land Development, Disturbed Sites (Land Develop.), Resource Extraction, Flow Regulation/Modification, Water Diversions, Habitat Modification, Removal of Riparian Vegetation, Streambank, Modification/Destabilization, Drainage/Filling Of Wetlands, Channel Erosion, Erosion/Siltation, Nonpoint Source
Noyo River	Sediment	Complete	1999	High	470 tons/mi2/yr 7	Silviculture, Nonpoint Source
Redwood Creek	Sediment	Complete	1998	Medium	1900 tons/mi2/yr 8	Range Grazing-Riparian, Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/Maintenance, Construction/ Land Development, Disturbed Sites (Land Develop.), Removal of Riparian Vegetation, Streambank Modification/Destabilization, Erosion/Siltation, Natural Sources
Redwood Creek	Temperature	Not Started	Unknown	Low	-	Logging Road Construction/Maintenance, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Erosion/ Siltation, Natural Sources, Nonpoint Source
Russian River	Sediment	Not Started	Unknown	Medium	-	Silviculture, Agriculture, Agriculture-grazing, Agriculture-storm runoff, Bridge Construction, Channel Erosion, Channelization, Construction/ Land Development, Dam Construction, Drainage/Filling Of Wetlands, Erosion/Siltation, Flow Regulation/Modification, Geothermal Development, Habitat Modification, Harvesting, Restoration, Residue Management, Highway Maintenance and Runoff, Hydromodification, Intensive Animal Feeding Operations, Irrigated Crop Production, Logging Road Construction/ Maintenance, Natural Sources, Nonirrigated Crop Production, Nonpoint Source, Other Urban Runoff, Range Grazing-Riparian and/ or Upland, Removal of Riparian Vegetation, Resource Extraction, Specialty Crop Production, Streambank Modification/Destabilization, Surface Runoff, Upstream Impoundment
Russian River	Temperature	Not Started	Unknown	Low	-	Flow Regulation/Modification, Habitat Modification, Hydromodification, Nonpoint Source, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Upstream Impoundment
Russian River (Monte Rio and Healdsburg Memorial Beach)	Pathogens	Not Started	Unknown	Low	-	Nonpoint/Point Source
Salmon River	Nutrient	In progress	Jun-04	NA	-	NA
Salmon River	Temperature	In progress	Jun-04	NA	-	NA
Santa Rosa Creek	Pathogens	Not Started	Unknown	Low	-	Nonpoint Source, Point Source
Scott River	Sediment	In progress	Sep-04	Medium	-	Irrigated Crop Production, Pasture Grazing-Riparian and/or Upland, Silviculture, Resource Extraction, Mill TailingsNatural Sources, Nonpoint Source

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Scott River	Temperature	In progress	Sep-04	Medium	-	Irrigated Crop Production, Pasture Grazing-Riparian and/or Upland, Agricultural Return Flows, Silviculture, Flow Regulation/Modification, Water Diversions, Habitat Modification Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Drainage/Filling Of Wetlands
Shasta River	Low Dissolved Oxygen	In progress	Dec-04	Medium	-	Minor Municipal Point Source-dry and/or wet weather discharge, Agriculture-storm runoff, Agriculture-irrigation tailwater, Dairies, Hydromodification, Dam Construction, Flow Regulation/Modification, Habitat Modification
Shasta River	Temperature	In progress	Dec-04	Medium	-	Agriculture-irrigation tailwater, Flow Regulation/ Modification, Habitat Modification, Removal of Riparian Vegetation, Drainage/Filling Of Wetlands
Stemple Creek	Sediment	Complete	1997	Low	Target for sediment is 12,760 tons per year by the year 2004	Agriculture, Grazing-Related Sources, Land Development, Erosion/Siltation, Nonpoint Source
Stemple Creek	Nutrients	Complete	1997	Medium	The target for un-ionized ammonia is 0.025 mg/L as NH3 9	Agriculture, Irrigated Crop Production, Pasture Grazing-Riparian and/or Upland, Range Grazing-Riparian, Concentrated Animal Feeding Operations (permitted, point source), Land Development, Hydromodification, Channelization, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Drainage/Filling Of Wetlands, Channel Erosion, Natural Sources
Ten Mile River	Sediment	Complete	2005	High	390 tons/mi2/yr 10	Silviculture, Harvesting, Restoration, Residue Management, Logging Road Construction/Maintenance
Ten Mile River	Temperature	Not Started	Unknown	Low	-	Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/ Destabilization, Nonpoint Source
Trinity River Upper area reference subwatersheds	Sediment	Complete	2001	Medium	1406 tons/mi2/yr	Channel Erosion, Dam Construction, Drainage/ Filling Of Wetlands, Erosion/Siltation, Flow Regulation/Modification, Habitat Modification, Harvesting, Restoration, Residue Management, Hydromodification, Logging Road Construction/ Maintenance, Mine Tailings, Natural Sources, Nonpoint Source, Placer Mining, Removal of Riparian Vegetation, Resource Extraction, Silvicultural Point Sources, Silviculture, Streambank Modification/Destabilization, Surface Mining, Upstream Impoundment
Trinity River Westside Tributaries subwatershed	Sediment	Complete	2001	Medium	526 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Upper Trinity subwatershed	Sediment	Complete	2001	Medium	3449 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River East Fork Tributaries subwatershed	Sediment	Complete	2001	Medium	323 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River East Side Tributaries subwatershed	Sediment	Complete	2001	Medium	301 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Weaver and Rush Creeks subwatershed	Sediment	Complete	2001	Medium	844 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Deadwood Creek, Hoadley Gulch and Poker Bar Area subwatershed	Sediment	Complete	2001	Medium	341 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Lewiston Lake Area subwatershed	Sediment	Complete	2001	Medium	244 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed

WATERBODY	TMDL	STATUS	DATE COMPLETE	PRIORITY	TMDL/ TARGET	POTENTIAL SOURCES
Trinity River Grass Valley Creek subwatershed	Sediment	Complete	2001	Medium	219 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Indian Creek subwatershed	Sediment	Complete	2001	Medium	405 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Reading and Browns Creek subwatershed	Sediment	Complete	2001	Medium	329 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Lower Middle area subwatershed	Sediment	Complete	2001	Medium	1592 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Canyon Creek subwatershed	Sediment	Complete	2001	Medium	1628 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Upper tributaries of lower middle area subwatershed	Sediment	Complete	2001	Medium	335 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Middle tributaries of lower middle area subwatershed	Sediment	Complete	2001	Medium	263 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Lower tributaries of lower middle area subwatershed	Sediment	Complete	2001	Medium	276 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Lower area reference subwatershed	Sediment	Complete	2001	Medium	2638 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Mill Creek and Tish Tang subwatershed	Sediment	Complete	2001	Medium	1049 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Willow Creek subwatershed	Sediment	Complete	2001	Medium	468 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Campbell Creek and Supply Creek subwatershed	Sediment	Complete	2001	Medium	9806 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River Lower mainstem area and coon creek subwatershed	Sediment	Complete	2001	Medium	315 tons/mi2/yr	Same as Trinity River Upper area reference subwatershed
Trinity River (South Fork)	Sediment	Complete	1998	Medium	737 tons/mi2/yr	Range Grazing-Riparian, Silviculture, Nonpoint Source
Trinity River (South Fork)	Temperature	Not Started	Unknown	Low	-	Range Grazing-Riparian, Water Diversions, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization
Van Duzen River	Sediment	Complete	1999	Medium	1358 yds3/ mi2/yr 11	Range Grazing-Riparian, Range Grazing-Upland, Silviculture, Harvesting, Restoration, Residue Management, Logging, Road Construction/ Maintenance, Silvicultural Point Sources, Construction/Land Development, Habitat Modification, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Channel Erosion, Erosion/Siltation, Natural Sources

Source: US Environmental Protection Agency (2011)

TABLE 27 THREATENED & ENDANGERED SPECIES OF THE NORTH COAST REGION

LATIN BINOMIAL	COMMON NAME	LISTED STATUS
Martes pennanti (pacifica)	Pacific fisher	Candidate for Federal listing
Ambystoma californiense	California tiger salamander	Federally listed as Threatened
Falco peregrinus anatum	American peregrine falcon	Delisted — previously listed
Eucyclogobius newberryi	tidewater goby	Federally listed as Endangered
Fritillaria gentneri	Gentner's fritillary	Federally listed as Endangered
Lasthenia conjugens	Contra Costa goldfields	Federally listed as Endangered

LATIN BINOMIAL	COMMON NAME	LISTED STATUS
Howellia aquatilis	water howellia	Federally listed as Threatened
Acipenser medirostris	green sturgeon	Federally listed as Threatened
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	Federally listed as Endangered
Aplodontia rufa nigra	Point Arena mountain beaver	Federally listed as Endangered
Charadrius alexandrinus nivosus	western snowy plover	Federally listed as Threatened
Branta hutchinsii leucopareia	cackling (=Aleutian Canada) goose	Delisted — previously listed
Rana draytonii	California red-legged frog	Federally listed as Threatened
Rana pretiosa	Oregon spotted frog	Candidate for Federal listing
Polites mardon	mardon skipper	Candidate for Federal listing
Thlaspi californicum	Kneeland Prairie pennycress	Federally listed as Endangered
Trifolium amoenum	showy rancheria clover	Federally listed as Endangered
Speyeria zerene myrtleae	Myrtle's silverspot	Federally listed as Endangered
Speyeria zerene Hippolyta	Hippolyta frittilary	Federally listed as Threatened
Speyeria zerene behrensii	Behren's silverspot butterfly	Federally listed as Endangered
Plebejus idas lotis	lotis blue butterfly	Federally listed as Endangered
Oncorhynchus mykiss irideus	steelhead — central California coast ESU	Federally listed as Threatened
Oncorhynchus mykiss irideus	steelhead — northern California ESU	Federally listed as Threatened
Oncorhynchus tshawytscha	chinook salmon — California coastal ESU	Federally listed as Threatened
Lupinus tidestromii	Tidestrom's lupine	State listed as Endangered Federally listed as Endangered
Cirsium ciliolatum	Ashland thistle	State listed as Endangered
Trifolium trichocalyx	Monterey clover	State listed as Endangered Federally listed as Endangered
Arctostaphylos densiflora	Vine Hill manzanita	State listed as Endangered
Gratiola heterosepala	Boggs Lake hedge-hyssop	State listed as Endangered
Chasmistes brevirostris	shortnose sucker	State listed as Endangered Federally listed as Endangered
Empidonax traillii brewsteri	little willow flycatcher	State listed as Endangered
Clarkia imbricate	Vine Hill clarkia	State listed as Endangered Federally listed as Endangered
Eryngium constancei	Loch Lomond button-celery	State listed as Endangered Federally listed as Endangered
Arabis macdonaldiana	Mcdonald's rock-cress	State listed as Endangered Federally listed as Endangered
Chorizanthe valida	Sonoma spineflower	State listed as Endangered Federally listed as Endangered
Deltistes luxatus	Lost River sucker	State listed as Endangered Federally listed as Endangered
Limnanthes vinculans	Sebastopol meadowfoam	State listed as Endangered Federally listed as Endangered
Empidonax traillii	willow flycatcher	State listed as Endangered
Fritillaria roderickii	Roderick's fritillary	State listed as Endangered
Delphinium bakeri	Baker's larkspur	State listed as Endangered Federally listed as Endangered
Layia carnosa	beach layia	State listed as Endangered Federally listed as Endangered
Coccyzus americanus occidentalis	western yellow-billed cuckoo	State listed as Endangered Candidate for Federal listing
Syncaris pacifica	California freshwater shrimp	State listed as Endangered Federally listed as Endangered
Astragalus agnicidus	Humboldt milk-vetch	State listed as Endangered
Blennosperma bakeri	Sonoma sunshine	State listed as Endangered Federally listed as Endangered
Sidalcea oregana ssp. valida	Kenwood Marsh checkerbloom	State listed as Endangered Federally listed as Endangered
Silene campanulata ssp. Campanulata	Red Mountain catchfly	State listed as Endangered
Eriogonum alpinum	Trinity buckwheat	State listed as Endangered
Dichanthelium lanuginosum var. thermal	Geysers dichanthelium	State listed as Endangered
Navarretia leucocephala ssp. Plieantha	many-flowered navarretia	State listed as Endangered Federally listed as Endangered
Eriogonum kelloggii	Kellogg's buckwheat	State listed as Endangered Candidate for Federal listing
Rallus longirostris obsoletus	California clapper rail	State listed as Endangered Federally listed as Endangered
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	State listed as Endangered Federally listed as Endangered
Phlox hirsute	Yreka phlox	State listed as Endangered Federally listed as Endangered

LATIN BINOMIAL	COMMON NAME	LISTED STATUS
Oncorhynchus kisutch	coho salmon — central California coast ESU	State listed as Endangered Federally listed as Endangered
Castilleja uliginosa	Pitkin Marsh Indian paintbrush	State listed as Endangered
Strix nebulosa	great gray owl	State listed as Endangered
Carex albida	white sedge	State listed as Endangered Federally listed as Endangered
Haliaeetus leucocephalus	bald eagle	State listed as Endangered Federally Delisted
Orcuttia tenuis	slender Orcutt grass	State listed as Endangered Federally listed as Threatened
Lilium occidentale	western lily	State listed as Endangered Federally listed as Endangered
Lasthenia burkei	Burke's goldfields	State listed as Endangered Federally listed as Endangered
Cordylanthus tenuis ssp. capillaris	Pennell's bird's-beak	State listed as Rare Federally listed as Endangered
Limnanthes bakeri	Baker's meadowfoam	State listed as Rare
Delphinium luteum	golden larkspur	State listed as Rare Federally listed as Endangered
Blennosperma nanum var. robustum	Point Reyes blennosperma	State listed as Rare
Bensoniella oregona	Bensoniella	State listed as Rare
Calamagrostis foliosa	leafy reed grass	State listed as Rare
Arctostaphylos bakeri ssp. bakeri	Baker's manzanita	State listed as Rare
Eriastrum tracyi	Tracy's eriastrum	State listed as Rare
Calochortus persistens	Siskiyou mariposa-lily	State listed as Rare Candidate for Federal listing
Arctostaphylos bakeri ssp. Sublaevis	The Cedars manzanita	State listed as Rare
Chorizanthe howellii	Howell's spineflower	State listed as Threatened
Spirinchus thaleichthys	longfin smelt	State listed as Threatened
Monadenia infumata setosa	Trinity bristle snail	State listed as Threatened
Pleuropogon hooverianus	North Coast semaphore grass	State listed as Threatened
Plethodon stormi	Siskiyou Mountains salamander	State listed as Threatened
Plethodon asupak	Scott Bar salamander	State listed as Threatened
Oncorhynchus kisutch	coho salmon — southern Oregon / northern California ESU	State listed as Threatened Federally listed as Threatened
Riparia riparia	bank swallow	State listed as Threatened
Vulpes vulpes necator	Sierra Nevada red fox	State listed as Threatened
Lupinus milo-bakeri	Milo Baker's lupine	State listed as Threatened
Buteo swainsoni	Swainson's hawk	State listed as Threatened
Gulo gulo	California wolverine	State listed as Threatened
Grus canadensis tabida	greater sandhill crane	State listed as Threatened
Astragalus claranus	Clara Hunt's milk-vetch	State listed as Threatened Federally listed as Endangered

Source: National Oceanic Atmospheric Administration and US Fish & Wildlife Service

TABLE 28 CRITICAL HABITATS OF THE NORTH COAST REGION (NON-SALMONID)

COMMON SPECIES NAME	CLASSIFICATION	UNIT NAME	SPECIES NAME
Baker's larkspur	Endangered	Coleman Valley	*Delphinium bakeri*
Black Abalone	Endangered	North Coast Region — Coast of Sonoma County and south	*Haliotis cracherodii*
California Red-legged Frog	Threatened	MRN-1	*Rana draytonii*
California Red-legged Frog	Threatened	MRN-2	*Rana draytonii*
California Red-legged Frog	Threatened	SON-1	*Rana draytonii*
California Red-legged Frog	Threatened	SON-2	*Rana draytonii*
California Tiger Salamander	Endangered	Santa Rosa Plain	*Ambystoma californiense*
Contra costa goldfields	Endangered	Manchester Beach	*Lasthenia conjugens*
Pacific Eulachon/Smelt	Threatened	Klamath River	*Thaleichthys pacificus*
Pacific Eulachon/Smelt	Threatened	Mad River	*Thaleichthys pacificus*
Pacific Eulachon/Smelt	Threatened	Redwood Creek	*Thaleichthys pacificus*

COMMON SPECIES NAME	CLASSIFICATION	UNIT NAME	SPECIES NAME
Green Sturgeon	Species of Concern	Elk River	*Acipenser medirostris*
Green Sturgeon	Species of Concern	Freshwater Creek	*Acipenser medirostris*
Green Sturgeon	Species of Concern	Humboldt Bay	*Acipenser medirostris*
Green Sturgeon	Species of Concern	Jacoby Creek	*Acipenser medirostris*
Green Sturgeon	Species of Concern	North Coast Region Coastal Waters	*Acipenser medirostris*
Kneeland penny-cress	Endangered	Mad River Basin	*Noccaea fendleri ssp. californicum*
Leatherback	Endangered	North Coast Region South of point Arena	*Dermochelys coriacea*
Lost River Sucker	Endangered	Lost River Basin	*Deltistes luxatus*
Marbled murrelet	Threatened	North Coast region	*Brachyramphus marmoratus*
Northern Spotted Owl	Threatened	East Cascades South	*Strix occidentalis caurina*
Northern Spotted Owl	Threatened	Interior California Coast	*Strix occidentalis caurina*
Northern Spotted Owl	Threatened	Klamath East	*Strix occidentalis caurina*
Northern Spotted Owl	Threatened	Klamath West	*Strix occidentalis caurina*
Northern Spotted Owl	Threatened	Redwood Coast	*Strix occidentalis caurina*
Stellar Sea Lion	Endangered	Sugarloaf Island	*Eumetopias jubatus*
Tidewater Goby	Endangered	Big Lagoon	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Davis Lake/Manchester State Park Ponds	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Eel River	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Estero Americano	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Estero De San Antonio	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Humboldt Bay	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Lake Earl/Talawa	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Pudding Creek	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Salmon Creek	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Stone Lagoon	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Tenmile River	*Eucyclogobius newberryi*
Tidewater Goby	Endangered	Virgin Creek	*Eucyclogobius newberryi*
Western snowy plover	Threatened	Clam Beach/Little River	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Eel River Gravel Bars	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Eel River North Spit/Beach	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Eel River South Spit/Beach	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Gold Bluffs Beach	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Humboldt Bay South Spit	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Humboldt Lagoons	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Lake Earl	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	MacKerricher Beach	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Mad River	*Charadrius alexandrinus nivosus*
Western snowy plover	Threatened	Manchester Beach	*Charadrius alexandrinus nivosus*
Yellow larkspur	Endangered	Bodega Bay	*Delphinium luteum*
Yellow larkspur	Endangered	Estero Americano	*Delphinium luteum*
Yellow larkspur	Endangered	Estero de San Antonio	*Delphinium luteum*

Source: US Environmental Protection Agency and CDFW

TABLE 29 CRITICAL HABITAT FOR MARBLED MURRELET IN NORTH COAST COUNTIES

COUNTY	ACREAGE
Del Norte	116,859
Humboldt	410,249
Mendocino	99,929

Siskiyou	48,495
Sonoma	11,505
Total	**687,023**

Source: National Oceanic Atmospheric Administration and United States Fish & Wildlife Service

TABLE 30 CRITICAL HABITATS OF SALMONIDS IN THE NORTH COAST REGION

BASIN	STREAM NAME
COHO CRITICAL HABITAt	
Not Yet Available (NOAA)	Tbd
CHINOOK CRITICAL HABITAT	
Albion River	Albion River Estuary, Albion and North Fork Albion
Bear River	Bear River mainstem, South Fork Bear River, Bear River estuary, Bear River mainstem
Big River	Big River Estuary, Big River
Eel River	Anderson Creek, Atwell Creek, Baechtel Creek, Bear Creek, Bear Creek, Bear Pen Creek, Bear Wallow Creek, Bell Springs Creek, Berry Creek, Bloody Run, Bond Creek, Bridge Creek, Broaddus Creek, Brock Creek, Bull Creek, Burger Creek, Burger Creek, Butler Creek, Cahto Creek, Canoe Creek, Carson Creek, Cave Creek, Chadd Creek, Chamise Creek, China Creek- trib to Redwood Creed, Connick Creek, Corner Creek, Cow Creek-Trib of Bull Creek, Cox Creek, Cummings Creek, Cuneo Creek- Trib of Bull Creek, Davis Creek, Dean Creek, Dutch Charlie Creek, Dutch Henry Creek, East Branch South Fork, Eel River Estuary, Eel River, Elk Creek, Fiedler (Fielder) Creek, Fish Creek, Foster Creek, Grapewine Creek, Grub Creek, Haehl Creek, Harper Creek- Trib of Bull Creek, Hartsook Creek, Hely Creek, Hollow Tree Creek, Hoover Creek, Howe Creek, Huckleberry Creek, Indian Creek, Jack of Hearts Creek, Jewett Creek, Jones Creek, Jordan Creek, Kekawaka Creek, Kenny Creek, Larabee Creek, Lawrence Creek, Leggett Ck, Little Sproul Creel, Long Branch Creek, Long Valley Creek, Low Gap Creek, Mainstem Dobbyn Creek, mainstem Eel River, McCoy Creek, Michael's Creek, Middle Fork Eel River, Middle Fork Yager Creek, Mill Creek, Mill Creek-Trib of Bull Creek, Miller Creek-trib to Redwood Creek, Monument Creek, Moody Creek, Mud Creek, Murphy Creek, North Fork Dobbyn Creek, North Fork Eel mainstem, North Fork Yager Creek, Outlet Creek, Piercy Creek, Pollock Creek — trib to Redwood Ck, Poor Mans Creek, Price Creek, Rattlesnake Creek, Redwood Creek, Rock Creek, Rocktree Creek, Ryan Creek, Salmon Creek, Scott Creek, Seely Creek, Shaw Creek, Short Creek, Somerville Creek-tributary to Redwood Creek, South Fork Dobbyn Creek, South Fork Eel River, South Fork Redwood Creek, South Fork Salmon River, Spoul Creek, Squaw Creek, Standley Creek, Streeter Creek, String Creek, Strongs Creek, Ten Mile Creek, Tom Long Creek, Tomki Creek, Tostin Creek, Turner Creek, Twin Rocks Creek, unnamed trib to Eel near McCann, Upp Creek, Upper Van Duzen Mainstem, Van Duzen mainstem lower 2 miles, Warden Creek, West Fork Sproul Creek, Wheelbarrow Creek, Wildcat Creek, Williams Creek, Willits Creek, Wilson Creek, Woodman Creek, Yager Creek
Elk River	Bridge Creek, Dunlap Gulch, Elk River, North Branch of the North Fork, North Fork Elk River, South Branch of the North Fork, South Fork
Freshwater Creek	Little Freshwater, Lower Freshwater Creek, Ryan Creek, South Fork Freshwater Creek, Upper Freshwater Creek,
Garcia River	Garcia River, Garcia River Estuary
Jacoby Creek	Gannon Slough, Lower Jacoby Creek, Middle and Upper Jacoby Creek
Little River	Carson Creek aka South Fork Little River, Little River, Lower South Fork Little River, Railroad Creek, Upper South Fork Little River
Mad River	Black Creek, Black Dog Creek, Cannon Creek (aka Canon Creek), Dry Creek, Lindsay Creek, Mad River, Maple Creek, Mill Creek, North Fork Mad River, North Fork Mad River, Squaw Creek, Sullivan Gulch, Unt, Warren Creek
Maple Creek	Maple Creek, North Fork of Maple Creek
Mattole River	Bear Creek, Blue Slide Creek, Bridge Creek, Conklin Creek, Dry Creek, East Fork Honeydew Creek, East Fork of the North Fork, Estuary, Eubanks Creek, Eubanks Creek, Gilham Creek, Grindstone Creek, Honeydew Creek, Mattole Canyon, Mattole Canyon, Mattole River mainstem, McGinnis Creek, McKee Creek, Mill Creek, North Fork Bear Creek, North Fork Bear Creek, North Fork, Oil Creek, Rattlesnake Creek, South Fork Bear Creek, Squaw Creek, Thompson Creek, Thompson Creek, Unnamed tributary to North Fork Bear Creek, Upper Mattole River, Upper Mattole River, Upper North Fork, Westlund Creek, Woods creek, Yew Creek
Noyo River	North Fork Noyo River, Noyo River Estuary, Noyo River, South Fork Noyo River
Redwood Creek (Humboldt)	Boyes Creek, Bridge Creek, Brown Creek, Emerald (Harry Weir), Godwood, Lacks Creek, Larry Dam Creek, Little Lost Man Creek, Lost Man Creek, Lower Redwood Creek, May Creek, McArthur Creek, Minor Creek, North Fork Lost Man Creek, Prairie Creek, Redwood Creek, Tom McDonald
Russian River	Austin Creek, Canyon Reach of Mainstem, Dry Creek, Feliz Creek, Forsythe Creek, Lower Mainstem, Mainstem at Mirabel, Mainstem in Alexander Valley, Mainstem in Ukiah Valley, Mark West Creek, Middle Reach of Mainstem, West Branch of Mainstem
Salmon Creek (Humboldt)	Salmon Creek (Humboldt)
Ten Mile River	Middle Fork Ten Mile River, North Fork Ten Mile River, South Fork Ten Mile River, Ten Mile River and North Fork Ten Mile River, Ten Mile River Estuary
Wages Creek	Wages Creek
STEELHEAD CRITICAL HABITAT	
Ash Creek	Ash Creek

BASIN	STREAM NAME
Austin Creek	Austin Creek at Cazadero, Austin Creek mainstem, Bear Pen Creek, Conshea Creek, Devil Creek, Kidd Creek, Lower Black Rock Creek, Lower East Austin Creek, Lower Gilliam Creek, Lower Gray Creek, Lower Mainstem, Lower Thompson Creek, Lower Ward Creek, Mainstem between Ward and Bear Pen, Red Slide Creek, Saint Elmo Creek, Schoolhouse Creek, Sulphur Creek, Upper Austin Creek, Upper East Austin Creek, Upper Gilliam Creek, Upper Gray Creek, Upper Ward Creek, Ward Creek
Big Sulphur	Alder Creek, Anna Belcher, Big Sulphur Creek, Frasier, Humming Bird Creek, Little Sulphur Creek, Lovers Gulch, Squaw Creek, North Branch Little Sulphur Creek, Upper Little Sulphur Creek
Crocker Creek	Crocker Creek
Dry Creek	Angel Creek, Crane Creek, Dry Creek, Dutcher Creek, Felta, Foss Creek, Grape Creek, Mill Creek, North Slough Creek, Palmer Creek, Pena, Redwood Log, Salt Creek, Upper Pena Creek, Wallace, Wine Creek, Woods Creek
Dutch Bill Creek	Baumert Springs, Dutch Bill Creek, Duvoul Creek, Grub Creek, Lancel Creek, North Fork Lancel Creek
Edwards	Edwards
Estero Americano	Ebabias Creek, Estero Americano
Fife Creek	Fife Creek
Forsythe Creek	Bakers Creek, Eldridge, Forsythe Creek, Jack Smith Creek, Mill Creek, Seward
Freezeout Creek	Freezeout Creek, Unnamed Tributary
Gill	Gill, South Fork Gill
Gird	Gird,
Green Valley Creek	Atascadero Creek, Green Valley Creek, Mainstem Green Valley, Purrington Creek, unnamed trib to Atascadero Creek
Hobson Creek	Hobson Creek,
Hulbert Creek	Hulbert Creek,
Jenner Gulch	Jenner Gulch,
Laguna de Santa Rosa	Laguna De Santa Rosa,
Maacama	Bear, Bidwell, Bluegum, Briggs, Coon Creek, Franz, Ingalls, Kellog Creek, Little Briggs, Maacama, Maacama, McDonnell Creek, Mill Stream, Redwood, Redwood, Yellowjacket
Mariposa	Mariposa
Mark West Creek	Humbug Creek, Lower Pruit Creek, Mark West Creek, Middle reach of Windsor Creek, Pool Creek, Upper Mark West Creek, Upper Pool Creek, Upper Pruit Creek, Windsor Creek
Miller Creek	Miller Creek, Unnamed tributary
Oat Valley Creek	Oat Valley Creek
Pieta Creek	Pieta Creek
Pocket Canyon	Mays Canyon, Pocket Canyon
Porter Creek	Porter Creek,
Russian River	Canyon Reach of Mainstem, Lower Mainstem, Mainstem Alexander Valley, Mainstem at Dry Creek, Mainstem in Ukiah Valley, Mainstem near Healdsburg, Russian River, West Branch Russian River
Salmon Creek	Coleman Valley Creek, Faye Creek, Finley Creek, Salmon Creek, Tannery Creek
Salt Hollow	Salt Hollow Creek
Sausal	Sausal
Sheep House Creek	Sheep House Creek
Smith Creek	Smith Creek
Ward Creek	Big Oat Creek, Blue Jay Creek, Pole Mountain Creek, Spring Creek
Willow Creek	Willow Creek

Source: National Oceanic Atmospheric Administration and United States Fish & Wildlife Service

TABLE 31 CRITICAL HABITATS THAT INTERSECT WITH NORTH COAST IMPAIRED STREAMS

IMPAIRED STREAM NAME	CRITICAL HABITAT
Willow Creek	Baker's larkspur
Garcia River	California Red-Legged Frog
Garcia River	Contra Costa Goldfields
Big River	Marbled murrelet
Elk River	Green Sturgeon

IMPAIRED STREAM NAME	CRITICAL HABITAT
Gualala River	Leatherback
Bluff Creek	Marbled murrelet
Boulder Creek	Marbled murrelet
Camp Creek	Marbled murrelet
Cedar Creek	Marbled murrelet
Chamise Creek	Marbled murrelet
Dillon Creek	Marbled murrelet
East Austin Creek	Marbled murrelet
East Branch South Fork Eel River	Marbled murrelet
Eel River	Marbled murrelet
Fife Creek	Marbled murrelet
Indian Creek	Marbled murrelet
Lawrence Creek	Marbled murrelet
Little South Fork Elk River	Marbled murrelet
Mattole River	Marbled murrelet
Mill Creek	Marbled murrelet
Navarro River	Marbled murrelet
North Fork Big River	Marbled murrelet
North Fork Elk River	Marbled murrelet
North Fork of South Fork Noyo River	Marbled murrelet
South Fork Big River	Marbled murrelet
South Fork Eel River	Marbled murrelet
South Fork Elk River	Marbled murrelet
South Fork Noyo River	Marbled murrelet
Tom Long Creek	Marbled murrelet
Anderson Creek	Northern Spotted Owl
Big River	Northern Spotted Owl
Black Butte River	Northern Spotted Owl
Bluff Creek	Northern Spotted Owl
Bogus Creek	Northern Spotted Owl
Boulder Creek	Northern Spotted Owl
Browns Creek	Northern Spotted Owl
Camp Creek	Northern Spotted Owl
Canyon Creek	Northern Spotted Owl
Chamise Creek	Northern Spotted Owl
Cold Creek	Northern Spotted Owl
Deadwood Creek	Northern Spotted Owl
Dillon Creek	Northern Spotted Owl
East Branch South Fork Eel River	Northern Spotted Owl
East Fork North Fork Eel River	Northern Spotted Owl
East Fork South Fork Salmon River	Northern Spotted Owl
East Fork South Fork Trinity River	Northern Spotted Owl
East Fork Trinity River	Northern Spotted Owl
Eel River	Northern Spotted Owl
Estell Creek	Northern Spotted Owl
Grider Creek	Northern Spotted Owl
Hayfork Creek	Northern Spotted Owl
Indian Creek	Northern Spotted Owl

IMPAIRED STREAM NAME	CRITICAL HABITAT
Klamath River	Northern Spotted Owl
Little North Fork Salmon River	Northern Spotted Owl
Little Shasts River	Northern Spotted Owl
Little Van Duzen River	Northern Spotted Owl
Lower North Fork Mad River	Northern Spotted Owl
Mad River	Northern Spotted Owl
Mattole River	Northern Spotted Owl
Mill Creek	Northern Spotted Owl
New River	Northern Spotted Owl
North Fork Big River	Northern Spotted Owl
North Fork Eel River	Northern Spotted Owl
North Fork of South Fork Noyo River	Northern Spotted Owl
North Fork Salmon River	Northern Spotted Owl
Parks Creek	Northern Spotted Owl
Pilot Creek	Northern Spotted Owl
Rattlesnake Creek	Northern Spotted Owl
Reading Creek	Northern Spotted Owl
Red Cup Creek	Northern Spotted Owl
Salmon River	Northern Spotted Owl
Scott River	Northern Spotted Owl
Seiad Creek	Northern Spotted Owl
Shackleford Creek	Northern Spotted Owl
Shovel Creek	Northern Spotted Owl
South Fork Big River	Northern Spotted Owl
South Fork Eel River	Northern Spotted Owl
South Fork Mad River	Northern Spotted Owl
South Fork Noyo River	Northern Spotted Owl
South Fork Salmon River	Northern Spotted Owl
South Fork Trinity River	Northern Spotted Owl
Spanish Creek	Northern Spotted Owl
Stuart Fork	Northern Spotted Owl
Summit Lake	Northern Spotted Owl
Thompson Creek	Northern Spotted Owl
Tish Tang A Tang Creek	Northern Spotted Owl
Tom Long Creek	Northern Spotted Owl
Trinity River	Northern Spotted Owl
West Fork North Fork Eel River	Northern Spotted Owl
West Fork Van Duzen River	Northern Spotted Owl
Willow Creek	Northern Spotted Owl
Wooley Creek	Northern Spotted Owl
Elk River	Tidewater Goby
Ten Mile River	Tidewater Goby
Centerville Slough	Western snowy plover
Cutoff Slough	Western snowy plover
Eel River	Western snowy plover
Garcia River	Western snowy plover
Little Palmer Creek	Western snowy plover
Mad Riveriver	Western snowy plover

IMPAIRED STREAM NAME	CRITICAL HABITAT
Mather Creek	Western snowy plover
Mill Creek	Western snowy plover
Rohnert Creek	Western snowy plover
Salt Riveriver	Western snowy plover
Strongs Creek	Western snowy plover
Ten Mile River	Western snowy plover
Van Duzen River	Western snowy plover
Estero Americano	Yellow larkspur
Estero De San Antonio	Yellow larkspur

Source: US Environmental Protection Agency and US Fish & Wildlife Service

TABLE 32 HABITAT ATTRIBUTES FOR NORTH COAST SALMONIDS

CENTRAL CALIFORNIA COAST COHO POPULATION CONDITIONS BY HABITAT ATTRIBUTE			LOST COAST										NAVARRO — GUALALA			COAST	
Target	Attribute	Indicator	Usal	Coltaneva	Wages	Ten Mile	Pudding	Noyo	Casper	Big	Albion	Big Salmon	Navarro	Garcia	Gualala	Russian	Salmon
Smolts	Estuary/Lagoon	Quality & Extent	F	G	F	G	F	F	F	F	F	V	F	F	F	F	F
Summer Rearing Juveniles	Estuary/Lagoon	Quality & Extent	F	G	F	G	F	F	F	F	F	V	F	F	F	P	P
Adults	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 m)	P	P	P	F	P	P	V	P	P	G	F	G	G	P	P
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 m)	P	P	P	F	P	P	V	F	P	G	P	G	G	P	P
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 0-10 m)	P	P	P	F	P	P	V	F	P	G	P	G	G	P	P
Summer Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 m)	P	P	F	P	F	P	G	P	F	F	P	P	G	P	P
Winter Rearing Juveniles	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 m)	P	P	F	P	F	P	G	P	F	F	P	P	G	P	P
Adults	Habitat Complexity	Large Wood Frequency (Bankfull Width 10-100 m)	P	V	F	P	F	P	G	P	F	F	P	P	G	P	P
Summer Rearing Juveniles	Habitat Complexity	Percent Primary Pools	P	F	P	P	P	P	P	P	P	P	P	G	P	P	G
Adults	Habitat Complexity	Pool/Riffle/Flatwater Ratio	F	F	F	V	G	F	V	P	F	F	F	G	P	P	F
Summer Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	F	F	F	V	G	F	G	P	P	F	P	G	P	P	F
Winter Rearing Juveniles	Habitat Complexity	Pool/Riffle/Flatwater Ratio	G	F	F	V	G	F	G	P	P	F	P	G	P	P	F
Adults	Habitat Complexity	Shelter Rating	P	P	F	P	P	P	P	P	P	F	P	P	P	P	P
Smolts	Habitat Complexity	Shelter Rating	P	P	F	P	P	P	P	P	P	F	F	P	P	P	P
Summer Rearing Juveniles	Habitat Complexity	Shelter Rating	P	P	F	P	P	P	P	P	P	F	P	P	P	P	P
Winter Rearing Juveniles	Habitat Complexity	Shelter Rating	P	P	F	P	P	P	P	P	P	F	P	P	P	P	P
Summer Rearing Juveniles	Hydrology	Flow Conditions (Baseflow)	G	G	G	G	F	F	G	F	F	G	F	F	P	P	F
Eggs	Hydrology	Flow Conditions (Instantaneous Condition)	V	G	G	G	G	G	V	G	F	V	F	G	F	F	G
Summer Rearing Juveniles	Hydrology	Flow Conditions (Instantaneous Condition)	G	V	G	G	V	G	V	G	F	G	F	G	F	P	G
Watershed Processes	Hydrology	Impervious Surfaces	V	V	V	V	V	V	V	V	V	V	V	V	V	G	V
Smolts	Hydrology	Number, Condition and/or Magnitude of Diversions	V	V	F	G	G	G	V	G	F	G	F	F	G	F	F
Summer Rearing Juveniles	Hydrology	Number, Condition and/or Magnitude of Diversions	V	V	F	G	G	G	V	G	F	G	F	G	G	F	F
Adults	Hydrology	Passage Flows	V	V	G	G	G	G	V	G	G	V	F	G	F	F	F

CENTRAL CALIFORNIA COAST COHO POPULATION CONDITIONS BY HABITAT ATTRIBUTE			LOST COAST										NAVARRO — GUALALA			COAST	
Target	**Attribute**	**Indicator**	**Usal**	**Coltaneva**	**Wages**	**Ten Mile**	**Pudding**	**Noyo**	**Casper**	**Big**	**Albion**	**Big Salmon**	**Navarro**	**Garcia**	**Gualala**	**Russian**	**Salmon**
Smolts	Hydrology	Passage Flows	V	V	G	G	G	G	V	G	G	V	F	G	F	P	G
Eggs	Hydrology	Redd Scour	F	V	G	G	G	F	V	F	F	G	F	F	F	P	F
Watershed Processes	Landscape Patterns	Agriculture	V	V	V	V	V	V	V	V	V	V	V	V	V	G	V
Watershed Processes	Landscape Patterns	Timber Harvest	G	F	F	P	F	F	V	F	P	G	G	G	F	V	G
Watershed Processes	Landscape Patterns	Urbanization	V	V	V	V	P	V	V	V	G	P	G	V	V	F	P
Adults	Passage/Migration	Passage at Mouth or Confluence	F	V	V	V	G	V	V	V	G	V	G	F	G	F	G
Smolts	Passage/Migration	Passage at Mouth or Confluence	F	V	V	V	G	V	V	G	G	V	G	F	F	F	F
Summer Rearing Juveniles	Passage/Migration	Passage at Mouth or Confluence	G	V	V	V	G	G	V	G	G	G	F	F	F	F	G
Adults	Passage/Migration	Physical Barriers	V	V	V	V	V	V	V	V	V	V	G	V	V	V	V
Summer Rearing Juveniles	Passage/Migration	Physical Barriers	V	V	V	V	V	V	V	V	G	V	F	V	V	V	G
Winter Rearing Juveniles	Passage/Migration	Physical Barriers	V	V	V	V	G	G	V	V	G	V	F	V	V	V	V
Summer Rearing Juveniles	Riparian Vegetation	Canopy Covers	V	V	V	V	G	G	V	P	G	P	F	G	F	F	F
Watershed Processes	Riparian Vegetation	Species Composition	V	V	V	G	V	G	G	F	V	V	P	V	G	F	F
Adults	Riparian Vegetation	Tree Diameter (North of SF Bay)	F	G	P	P	P	F	G	F	F	P	P	F	F	P	P
Summer Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	F	G	P	P	P	F	G	F	F	P	P	F	F	P	P
Winter Rearing Juveniles	Riparian Vegetation	Tree Diameter (North of SF Bay)	F	G	P	P	P	G	G	F	F	P	P	F	F	P	P
Eggs	Sediment	Gravel Quality (Bulk)	P	F	P	F	P	F	F	F	N	P	F	F	G	G	N
Eggs	Sediment	Gravel Quality (Embeddedness)	F	V	P	P	F	F	V	P	P	F	F	V	F	F	G
Adults	Sediment	Quantity & Distribution of Spawning Gravels	V	G	G	G	G	G	V	G	F	F	G	F	V	F	G
Summer Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	F	V	P	P	F	F	V	P	F	F	F	V	F	F	G
Winter Rearing Juveniles	Sediment (Food Productivity)	Gravel Quality (Embeddedness)	F	V	P	P	F	F	V	P	F	F	F	V	F	F	G
Watershed Processes	Sediment Transport	Road Density	P	P	P	P	P	P	P	P	P	P	P	P	P	P	F
Watershed Processes	Sediment Transport	Streamside Road Density (100 m)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Smolts	Smoltification	Temperature	V	G	V	V	V	G	V	G	G	G	F	G	F	F	F
Adults	Velocity Refuge	Floodplain Connectivity	G	G	G	F	G	F	F	F	F	F	G	G	F	P	F
Winter Rearing Juveniles	Velocity Refuge	Floodplain Connectivity	G	G	G	F	F	F	P	P	F	F	F	G	F	P	F
Smolts	Viability	Abundance	P	P	P	P	F	P	P	P	F	F	P	P	F	P	P
Adults	Viability	Density	P	F	P	P	F	F	F	P	F	F	P	P	P	P	P
Summer Rearing Juveniles	Viability	Density	P	F	P	P	F	F	F	F	P	P	P	P	P	P	P
Summer Rearing Juveniles	Viability	Spatial Structure	P	G	G	F	G	V	G	G	G	V	P	G	G	F	G
Summer Rearing Juveniles	Water Quality	Temperature (MWMT)	G	G	V	F	G	P	F	P	F	G	P	F	F	P	F
Adults	Water Quality	Toxicity	V	G	G	G	G	G	G	G	G	G	F	G	F	F	G
Smolts	Water Quality	Toxicity	V	G	G	G	G	G	G	G	G	G	F	G	F	F	G
Summer Rearing Juveniles	Water Quality	Toxicity	V	G	G	G	G	G	G	G	G	G	F	G	F	F	G
Winter Rearing Juveniles	Water Quality	Toxicity	V	G	G	G	G	G	G	G	G	G	F	G	F	F	G
Adults	Water Quality	Turbidity	F	F	G	F	P	G	F	F	F	P	G	G	G	F	P
Smolts	Water Quality	Turbidity	F	F	G	F	P	F	P	F	G	F	F	G	F	F	F
Summer Rearing Juveniles	Water Quality	Turbidity	G	F	G	G	P	G	G	V	V	F	F	G	G	F	G
Winter Rearing Juveniles	Water Quality	Turbidity	F	F	G	F	P	F	P	F	G	P	G	G	F	F	P

V Very Good
G Good

F Fair
P Poor
N No Data

Table 32 is reproduced from National Marine Fisheries Service. 2012. Final Recovery Plan for Central California Coast Coho Salmon Evolutionarily Significant Unit. National Marine Fisheries Service, Southwest Region, Santa Rosa, California at http://www.nmfs.noaa.gov/pr/recovery/plans.htm

TABLE 33 LAND USE TYPES OF THE NORTH COAST REGION

LAND USE	ACRES NORTH COAST REGION	PERCENT NORTH COAST REGION
Barren	106,265.78	0.86
Bays and Estuaries	24.463169	0.0002
Commercial and Services	1,262.74	0.01
Conifer Forest	7,488,345.60	60.28
Cropland and Pasture	443,562.85	3.57
Hardwood Forest	1,860,305.72	14.97
Herbaceous Rangeland	901443.10	7.26
Lakes	134,826.53	1.09
Nonforested Wetland	60,035.73	0.48
Other Urban or Built-up Land	468.80	0.0038
Residential	12,844.50	0.1
Rural Development	88,387.65	0.71
Shrub and Brush Rangeland	1,309,724.06	10.54
Streams and Canals	7,950.75	0.06
Transportation, Communications, and Utilities	4,641.78	0.04
Water	2,666.71	0.02

Source: California Department of Forestry and Fire Protection (CALFIRE)

TABLE 34 WATER RESOURCES & WATER USE FOR NORTH COAST REGION BASINS

Adapted from NCRWQCB 2011

HYDROLOGIC UNIT (HU) OR AREA (HA)	WATER RESOURCE USES	WATER SUPPLY SOURCES	SURFACE WATER INFRASTRUCTURE DEVELOPMENT	GROUNDWATER AREAS (DWR DEFINED)	GROUNDWATER INFRASTRUCTURE DEVELOPMENT
KLAMATH BASIN					
Klamath River HU	-	-	-	-	-
Butte Valley HA	Domestic?, irrigation, water table balance	Irrigation of 28,000 acres; excess pumped to Meiss Lake into Klamath River	No significant development/	(3) Bray Town, Butte Valley, Red Rock Valley	Groundwater pumping — irrigation?
Lost River Valley HA	Domestic (ground), irrigation, managed wildlife habitat (surface)	Surface water diversions including via Klamath River (OR) and Lost River	Klamath Project (Bureau of Reclamation) irrigates 233,625 acres in CA/OR via Clear Lake Reservoir, Tule Lake, Lower Klamath Lake Sump; excess pumped to OR (Tule Lake Irrigation Dist. Area) for use in CA/OR	(4) Fairchild Swamp, Klamath River Valley, Modoc Plateau Pleistocene Area, Modoc Plateau Recent Volcanic Area	Groundwater pumping (domestic)
HA-Lower Klamath HA	Domestic, agricultural	Surface water diversions, groundwater	No significant development	(1) ?	Groundwater pumping (domestic, agricultural)
Middle Klamath HA	Domestic, agricultural, power generation	Surface water diversions, groundwater, springs	Four Pacific Power & Light Co. hydroelectric reservoirs in Upper and Middle Klamath: John Boyle Dam (OR), Copco #1, #2, and Iron Gate; further major development prohibited (Wild & Scenic Rivers Act)	(2) Happy Camp Town Area, Seiad Valley	Groundwater pumping

HYDROLOGIC UNIT (HU) OR AREA (HA)	WATER RESOURCE USES	WATER SUPPLY SOURCES	SURFACE WATER INFRASTRUCTURE DEVELOPMENT	GROUNDWATER AREAS (DWR DEFINED)	GROUNDWATER INFRASTRUCTURE DEVELOPMENT
Salmon River HA	Domestic (surface)	Surface water diversions, springs	No significant development	None	No significant development
Scott River HA	Domestic, agricultural (33,000 acres irrigated)	Surface water diversions, groundwater, springs	No significant development	(1) ?	Groundwater pumping (increases for irrigation have prompted adjudication)
Shasta Valley HA	Domestic, agricultural (primarily surface)	Surface water diversions, springs	48,000 acres irrigated by Montague Water Conservation District (14,000) and other irrigation districts	(1) ? unclear	Groundwater pumping, increasingly for domestic and agricultural
Rogue River HA	Domestic, agricultural, industrial	??	No significant development	None identified by DWR	No significant development
Smith River HA	Domestic, agricultural, industrial from surface and ground	Surface water diversions	No significant development	(1) Smith River Plain	Groundwater pumping
Trinity River HA	Domestic, agricultural, industrial, power generation, intraregional water export	Surface water diversions incl. via CVP, groundwater, springs	Trinity River Division of Central Valley Project (largest in Klamath Basin): Trinity Dam, Clair Engle Lake, Lewiston Reservoir; some to Sacramento Valley; further major development prohibited (Wild & Scenic Rivers Act)	(3) Hayfork Valley, Hoopa Valley, Hyampton Valley	Groundwater pumping
Winchuck River HA	Domestic, agricultural, industrial	??	No significant development	None identified by DWR	No significant development
NORTH COASTAL BASIN					
Bodega HA	??	??	No significant development	(1) ?	No significant development
Cape Mendocino HA	Domestic	Groundwater	No significant development	(2) Honeydew Town Area, Mattole River Valley	Groundwater pumping (domestic)
Eel River HA	Municipal, power generation, interregional export	Surface water diversions, groundwater; considered "water surplus" unit	80,700 acre-ft. Lake Pillsbury, Scott Dam, Van Arsdale Dam, Potter Valley Tunnel provide power and water to Russian River unit; Willits' water from James River via reservoirs	(15) Valley/ Town Areas: Dinsmore, Eden Eel River, Garberville, Gravelly, Hettenshaw, Larabee, Laytonville, Little Lk, Lower Laytonville, Pepperwood, Round, Sherwood, Weott, Williams	Groundwater pumping
Eureka Plain HA	Municipal, industrial, surface storage	Surface water diversion, groundwater; "sufficient to meet current projections"	48,030 acre-ft. Ruth Reservoir on Mad River exports water to Eureka Plain subbasin	Eel River/ Salmon Creek Area, Jacoby Creek/ Freshwater Creek Areas	Groundwater pumping
Mad River HA	Municipal, industrial, surface storage	Surface water diversion, groundwater; "sufficient to meet current projections"	48,030 acre-ft. Ruth Reservoir on Mad River exports water to Eureka Plain subbasin	Eel River/ Salmon Creek Area, Jacoby Creek/ Freshwater Creek Areas	Groundwater pumping
Redwood Creek HA	Domestic, agricultural	Surface water diversion, groundwater	No significant development	(3) Big Lagoon, Prairie Creek Area, Redwood Creek Valley	Groundwater pumping
Mendocino Coast HA	Domestic (ground), agricultural (surface, ground)	Surface water diversion, groundwater; "reaching existing capacity"	No significant development	(11) Town Area/ Valley: Annapolis Ohlson Ranch Formation Highlands Big River, Branscomb, Gualala River, Little, Fort Bragg Terrace, Ten Mile River,	Groundwater pumping (domestic)

HYDROLOGIC UNIT (HU) OR AREA (HA)	WATER RESOURCE USES	WATER SUPPLY SOURCES	SURFACE WATER INFRASTRUCTURE DEVELOPMENT	GROUNDWATER AREAS (DWR DEFINED)	GROUNDWATER INFRASTRUCTURE DEVELOPMENT
Russian River	Domestic/ municipal (ground: Rhonert Park, Santa Rosa, Sebastopol, Ukiah, Windsor), agricultural, industrial, E-generation, local export	70,000 af from Lake Mendocino and 212,000 af from Lake Sonoma; power generated at both dams; "sufficient to meet currently projected demands for the foreseeable future"	Lake Mendocino (122,500 af) stores Eel River and East Fork Russian River water via Coyote Dam, and Lake Sonoma (381,000 af) stores Dry Creek water via Warm Springs Dam; water also exported to Marin Co.	Numerous, incl: Potter, Ukiah, Sanel, MacDowell, Cloverdale, Alexander Valley & Area, Healdsburg, Santa Rosa Plain & Valley, Kenwood/ Rincon, Lower RR, Sebastopol Merced Highlands	Groundwater pumping (domestic/ municipal)
Trinidad HU	Domestic, agricultural	Surface water diversion, groundwater; "sufficient to meet currently projected demands for the foreseeable future"	No significant development	(3) Big Lagoon, Prairie Creek Area, Redwood Creek Valley	Groundwater pumping

Source: North Coast Regional Water Quality Board (NCRWQCB) 2011 — North Coast "Basin Plan"

TABLE 35 DAC WATER & WASTEWATER SERVICE PROVIDERS OF THE NORTH COAST REGION

WATER SUPPLY AND/ OR WASTEWATER SERVICE PROVIDER	LOCATION
Bertsch-Oceanview C.S.D.	Del Norte County
Crescent City Water District	Del Norte County
Gasquet C.S.D.	Del Norte County
Klamath C.S.D.	Del Norte County
Smith River C.S.D.	Del Norte County
Yurok Tribe	Del Norte/ Humboldt County
Alderpoint C.W.D.	Humboldt County
Big Lagoon C.S.D.	Humboldt County
Big Lagoon Sphere	Humboldt County
Briceland C.S.D.	Humboldt County
Carlotta C.S.D.	Humboldt County
City Of Arcata	Humboldt County
City Of Blue Lake W.S.A.	Humboldt County
City Of Eureka W.S.A.	Humboldt County
City Of Ferndale	Humboldt County
City Of Fortuna W.S.A.	Humboldt County
City Of Rio Dell	Humboldt County
City Of Trinidad	Humboldt County
Fieldbrook C.S.D.	Humboldt County
Garberville Sanitary District	Humboldt County
Garberville Sd Sphere	Humboldt County
Garberville Water Company	Humboldt County
H.C.S.D. Proposed Sphere	Humboldt County
H.C.S.D. Sphere	Humboldt County
Hoopa Valley Tribe	Humboldt County
Humboldt Bay M.W.D.	Humboldt County
Humboldt C.S.D.	Humboldt County
Hydesville C.W.D.	Humboldt County
Hydesville C.W.D. Sphere	Humboldt County
Hydesville County W.D.	Humboldt County
Jacoby Creek C.W.D.	Humboldt County

WATER SUPPLY AND/ OR WASTEWATER SERVICE PROVIDER	LOCATION
Loleta C.S.D.	Humboldt County
Loleta C.S.D. Sphere	Humboldt County
Manila C.S.D.	Humboldt County
McKinleyville C.S.D.	Humboldt County
Miranda C.S.D.	Humboldt County
Orick C.S.D.	Humboldt County
Orick C.S.D. Sphere	Humboldt County
Orleans C.S.D.	Humboldt County
Palmer Creek C.S.D.	Humboldt County
Palmer Creek C.S.D. Sphere	Humboldt County
Phillipsville C.S.D.	Humboldt County
Redway C.S.D.	Humboldt County
Redway C.S.D. Sphere	Humboldt County
Redway Community Service Dist.	Humboldt County
Redway/Garberville Spheres	Humboldt County
Resort Impr Dist #1 Boundary	Humboldt County
Resort Impr Dist #1 Sphere	Humboldt County
Resort Impr Dist #1	Humboldt County
Riverside C.S.D.	Humboldt County
Weott C.S.D	Humboldt County
Westhaven C.S.D.	Humboldt County
Willow Creek C.S.D.	Humboldt County
Brundage Fickle Hill Water System	Humboldt County (Arcata)
Marilann Court Water System	Humboldt County (Arcata)
Seascape Lane Water Co #1	Humboldt County (Arcata)
Seascape Lane Water Co #2	Humboldt County (Arcata)
Fielder Creek Water System	Humboldt County (Carlotta)
Dinsmore Lodge Water System	Humboldt County (Dinsmore)
Central Water System	Humboldt County (Loleta)
Thunder Mnt Water Association	Humboldt County (Orleans)
R Place	Humboldt County (Petrolia)
Ruby Valley Water System	Humboldt County (Redway)
Baker Ranch Water System	Humboldt County (Trinidad)
Riley Creek Water System	Humboldt County (Trinidad)
Savage Creek Water Assocn Water	Humboldt County (Trinidad)
Yurok Tribe	Humboldt/ Del Norte County
Caspar South Water District	Mendocino
Brooktrails Township C.S.D.	Mendocino County
Calpella County Water District	Mendocino County
City Of Fort Bragg W.S.A.	Mendocino County
Laytonville Water District	Mendocino County
North Gualala Water Company	Mendocino County
Potter Valley Irrigation Dist.	Mendocino County
Redwood Valley County W.D.	Mendocino County
Round Valley Indian Tribes	Mendocino County
Russian River Flood Control & Water Conservation & Improvement District	Mendocino County

WATER SUPPLY AND/ OR WASTEWATER SERVICE PROVIDER	LOCATION
Ukiah Valley Sanitation District	Mendocino County
Ukiah Water District	Mendocino County
Willow County Water District	Mendocino County
Calpella Out Of District Service Area	Mendocino County (Calpella)
Covelo C.S.D.	Mendocino County (Covelo)
Round Valley County Water District	Mendocino County (Covelo)
City Of Fort Bragg	Mendocino County (Fort Bragg)
Laytonville County Water District	Mendocino County (Laytonville)
Irish Beach Water District	Mendocino County (Manchester)
Point Arena Water Works Inc	Mendocino County (Point Arena)
Rogina Water Company	Mendocino County (Talmage)
City Of Ukiah	Mendocino County (Ukiah)
Millview County Water District	Mendocino County (Ukiah)
River Estates Mutual Water Corp	Mendocino County (Ukiah)
Westport County Water District	Mendocino County (Westport)
Brooktrails C.S.D.	Mendocino County (Willits)
City Of Willits	Mendocino County (Willits)
Tulelake Irrigation District	Modoc/ Siskiyou County
Redwood Valley Water District	Redwood Valley
Big Springs Irrig. District	Siskiyou County
Butte Valley I.D.	Siskiyou County
City Of Dorris	Siskiyou County
Colonial Realty I.D.	Siskiyou County
Grenada I.D.	Siskiyou County
Happy Camp C.S.D.	Siskiyou County
Hornbrook C.S.D.	Siskiyou County
Lake Shastina Mutual Water Co.	Siskiyou County
Montague Water Conserv. Dist.	Siskiyou County
P Canal	Siskiyou County
Scott Valley I.D.	Siskiyou County
Tulelake Irrigation District	Siskiyou/ Modoc County
Camp Meeker	Sonoma County
City Of Cloverdale W.S.A.	Sonoma County
City Of Cotati	Sonoma County
City Of Healdsburg W.S.A.	Sonoma County
City Of Rohnert Park	Sonoma County
City Of Rohnert Park W.S.A.	Sonoma County
City Of Santa Rosa	Sonoma County
City Of Sebastopol W.S.A.	Sonoma County
Town Of Windsor	Sonoma County
Town Of Windsor W.S.A	Sonoma County
Trinity Co. W.W. Dist.#1	Trinity County
Weaverville C.S.D.	Trinity County
TOTAL NUMBER DAC PROVIDERS	**120**

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX I
NCIRWMP PROJECT INFORMATION

APPENDIX I
NCIRWMP PROJECT INFORMATION

I.1 PROJECT REVIEW & SELECTION GUIDELINES

Section 7 of the NCIRWMP describes the process steps and guidelines developed by the NCRP Policy Review Panel (PRP) and ad hoc committee, and utilized by the PRP and Technical Peer Review Committee (TPRC) to identify, rank, and select priority projects to implement the NCIRWMP. The current (Spring 2014) NCRP Project Review and Selection Process Guidelines (NCRP Guidelines[1]) standardize the process and are subject to continual review and refinement per recommendations of the PRP, TPRC, NCRP staff, and the DWR's IRWM Grant Program Guidelines.

I.2 PROJECT LISTS

The NCRP process has identified through multiple rounds of proposal solicitation numerous projects from throughout the North Coast Region that address state, regional, and local objectives and priorities for water management. Proposed projects that are aligned with NCIRWMP Goals & Objectives may qualify for formal NCRP endorsement and subsequent inclusion in the NCIRWMP. The project proponents then can work with NCRP members and staff to develop project-funding applications to appropriate sources.

The NCRP priority projects comprise a NCIRWMP project portfolio consisting predominantly of the highest scoring projects recommended to the PRP by the TPRC for inclusion in the Plan and related funding applications. The PRP has the discretion to select additional projects to supplement high-scoring proposed projects so as to achieve regional equity, address integrated coastal watershed management, and respond to urgent public health problems (Map 39 "Project Locations in the North Coast Region").

IRWM Proposition 50 Funded Projects

Projects and their benefits are summarized in Appendix I.3. These projects represent the specific actions, projects, and studies by which the first phase of the NCIRWMP was implemented. Monitoring measures are identified and will be used to provide feedback to the NCRP, which will continue to modify the NCIRWMP and project implementation and prioritization as new information and technology becomes available.

TABLE 36 IRWM PROPOSITION 50 FUNDED PROJECTS

PROJECT SPONSOR	PROJECT
Proposition 50 — Round 1	
California Land Stewardship Institute	Fish Friendly Farming Environmental Certification Program
California State Parks — North Coast Redwoods District	Head Hunter/Smoke House Non-point Sediment Reduction Project
City of Crescent City	Crescent City Wastewater Treatment Plant Renovation
City of Etna	City of Etna Water Supply
City of Eureka	Martin Slough Interceptor Project
City of Santa Rosa	Sonoma County Water Recycling and Habitat Preservation Project
Covelo Community Services District	Covelo Wastewater Facilities Improvement Project
Graton Community Service District	Graton Wastewater Treatment Upgrade and Reclamation Project
Gualala River Watershed Council	Sediment Solutions for the Gualala: Phase III
Humboldt County Resource Conservation District	Salt River Restoration Project
Humboldt County Resource Conservation District	Mid Van Duzen River Ranch Road Sediment Reduction Program
Mattole Restoration Council	Mattole Integrated Water Management Program
Mendocino County Resource Conservation District	Navarro Watershed Road Sediment Reduction Project
Modoc County	Newell Water System Renovation
Pacific Coast Fish, Wildlife & Wetlands Restoration Association	Redwood Creek Erosion Control

1 The 2014 NCRP Project Review & Selection Process Guidelines http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf

PROJECT SPONSOR	PROJECT
Shasta Valley Resource Conservation District	Shasta Water Association Dam Restoration
Shasta Valley Resource Conservation District	Araujo Dam Restoration
Trinity County Waterworks District #1	Raw & Recovered Water for Irrigating Public Agencies
Weaverville Sanitary District	Weaverville Sanitary District Water Reclamation Project
Westport County Water District	Water Supply Reliability Project
Proposition 50 — Round 2 and Supplemental	
Gold Ridge Resource Conservation District	Salmon Creek Sediment Reduction and Water Conservation Program
Mattole Restoration Council	Mattole Integrated Coastal Watershed Management Program
Mendocino Land Trust	Big River Lower Mainstem Restoration Project
Mendocino Resource Conservation District	Forsythe Creek Upslope Road Sediment Reduction Project

IRWM Proposition 84 Funded Projects

Projects and their benefits are summarized in Appendix I.3. These projects represent the specific actions, projects, and studies by which Phase III of the NCIRWMP will be implemented. Monitoring measures are identified and will be used to provide feedback to the NCRP, which will continue to modify the NCIRWMP and project implementation and prioritization as new information and technology becomes available.

TABLE 37 IRWM PROPOSITION 84 — ROUND 1 FUNDED PROJECTS

PROJECT SPONSOR	PROJECT
Proposition 84 — Round 1	
City of Fort Bragg	Waterfall Gulch Transmission Main
Del Norte Resource Conservation District	Del Norte Agricultural Enhancement Program
Gold Ridge Resource Conservation District	Bodega Bay HU Water Resources Management Project
Gualala River Watershed Council	Gualala River Sediment Reduction Program
Happy Camp Community Services District	Happy Camp Water Treatment System Upgrade
Happy Camp Sanitary District	Indian Creek Sewer Pipeline Crossing
Hopland Band of Pomo Indians	Nissa-kah Creek Fish Passage at Hwy 175
Humboldt Bay Municipal Water District	HBMWD-Blue Lake Fieldbrook Pipeline Support Retrofit
Karuk Tribe	Camp Creek Habitat Protection-Road Decommissioning Implementation Project
Mattole Restoration Council	Mattole Integrated Watershed Management Initiative
Mendocino County Resource Conservation District	Mendocino Headwaters Integrated Water Quality Enhancement Project
Mendocino County Resource Conservation District	Mendocino Jumpstart Integrated Water Plan
Pinoleville Pomo Nation	Ackerman Creek Habitat Restoration
Redwood Forest Foundation Inc.	Sustainable Forests, Clean Water & Carbon Sequestration Demonstration Project
Sonoma County Water Agency	The Copeland Creek Watershed Detention/Recharge, Habitat Restoration, and Steelhead Refugia Project
Sonoma Resource Conservation District	Russian River Arundo donax Removal and Riparian Enhancement Program
Sonoma Resource Conservation District	Lower Russian River Water Quality Improvement Project
Willow Creek Community Services District	Hwy 96 Stormceptor

TABLE 38 IRWM PROPOSITION 84 — ROUND 2 FUNDED PROJECTS

PROJECT SPONSOR	PROJECT
Proposition 84 — Round 2	
Big Rock Community Services District	Big Rock CSD Stabilize Water Storage Tank
California Land Stewardship Institute	Fish Friendly Farming and Fish Friendly Ranching Environmental Certification in the Russian, Navarro, and Gualala River Watersheds
California Land Stewardship Institute	Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program
Gold Ridge Resource Conservation District	Gold Ridge Coastal Watersheds Enhancement Project
Gualala River Watershed Council	Gualala River Sediment Reduction Program

PROJECT SPONSOR	PROJECT
Humboldt Bay Municipal Water District	Ranney Collectors 1 & 1A Lateral Replacement
Karuk Tribe	Lower Mid-Klamath Habitat Protection-Road Decommissioning Implementation Project
Mendocino County Resource Conservation District	Mendocino County Working Landscapes Riparian Demonstration Project
Salyer Mutual Water Company	Larger Capacity Storage Tanks, Dedicated Main Line, Meters/Master Meter Project
Siskiyou County	Siskiyou County Septage Pond Closure
Trinity County Resource Conservation District	West Weaver Creek — Channel and Floodplain Rehabilitation
Westhaven Community Services District	Westhaven CSD Water Tank
Yurok Tribe — Yurok Tribal Fisheries Program	Restoration of Lower Klamath River Habitats

NCIRWMP Projects

As of April 2014, the NCRP process has identified 243 projects from throughout the North Coast Region with a total project cost of $781,714,198 and a combined funding request of $435,665,565. The current (Spring 2014) NCRP Project Review and Selection Process Guidelines (NCRP Guidelines[2]) standardize the process for on-going project inclusion into the NCIRWM Plan.

TABLE 39 NCIRWMP IRWM PROJECTS — ALL

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 50		
City of Crescent City	Crescent City Wastewater Treatment Plant Renovation	Del Norte
California State Parks — North Coast Redwoods District	Head Hunter/Smoke House Non-point Sediment Reduction Project	Humboldt
City of Arcata Environmental Services Department	Arcata Storm Water Master Plan Elements	Humboldt
City of Arcata Environmental Services Department	Arcata Watershed Enhancement through I & I Reduction	Humboldt
City of Arcata Environmental Services Department	Jolly Giant Dam Retrofit	Humboldt
City of Blue Lake	Blue Lake Wastewater Treatment Plant	Humboldt
City of Eureka	Eureka Inflow and Infiltration Reduction Project	Humboldt
City of Eureka	Mad River Pipeline Improvements	Humboldt
City of Eureka	Martin Slough Interceptor Project	Humboldt
City of Ferndale	Ferndale Drainage Improvements	Humboldt
City of Ferndale	Ferndale Infiltration & Inflow Reduction	Humboldt
City of Ferndale	Ferndale Wastewater Treatment Plant Improvements	Humboldt
City of Rio Dell	Sludge Disposal and Handling Improvement Project	Humboldt
City of Rio Dell	Stormwater Master Plan	Humboldt
City of Rio Dell	Valve and Fire Hydrant Replacement Project	Humboldt
City of Rio Dell	Wastewater Disposal Project	Humboldt
City of Rio Dell	Wastewater Master Plan and Inflow and Infiltration Study	Humboldt
City of Rio Dell	Water Treatment System Improvements	Humboldt
City of Trinidad	Water Storage improvement Project	Humboldt
Fieldbrook Community Services District	Water Storage improvement Project	Humboldt
Garberville Sanitary District (Garberville Water Company)	Garbervillle Water Supply Reliability Project	Humboldt
Garberville Sanitary District (Garberville Water Company)	Wastewater Treatment Plant Improvements	Humboldt
Gasquet Community Services District	Gasquet Community Services District Water System Upgrade	Humboldt
Hoopa Valley Tribal Protection Agency	Klamath-Trinity Water Quality and Water Supply Database and	Hoopa Valley Tribe
Humboldt Bay Municipal Water District	Ranney Collectors Rehabilitation/Upgrade	Humboldt
Humboldt Bay Municipal Water District	Samoa Peninsula Pipeline Replacements	Humboldt
Humboldt Bay Municipal Water District	Water Supply Interties	Humboldt
Humboldt Community Services District	CR Transmission Main	Humboldt

2 The 2014 NCRP Project Review & Selection Process Guidelines http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 50		
Humboldt Community Services District	Steel Water Main Replacement	Humboldt
Humboldt County Department of Agriculture	BMP for Control of Invasive Plants in Northcoast Watersheds	Humboldt
Humboldt County Resource Conservation District	Eel River Cooperative Sediment Reduction Program	Humboldt
Humboldt County Resource Conservation District	Mid Van Duzen River Ranch Road Sediment Reduction Program	Humboldt
Humboldt County Resource Conservation District	Salt River Restoration Project	Humboldt
Hydesville County Water District	Infrastructure Upgrade	Humboldt
Loleta Community Services District	Loleta I&I	Humboldt
Loleta Community Services District	Water Supply	Humboldt
McKinleyville Community Services District	Sewer Main Construction	Humboldt
Orick Community Services District	Orick Community Services District Wastewater Treatment Sys.	Humboldt
Pacific Coast Fish, Wildlife and Wetlands Restoration Association	Redwood Creek Erosion Control	Humboldt
Redwood Community Action Agency	Humboldt Bay Water Quality Improvement Program	Humboldt
Redwood Community Action Agency	Humboldt Bay Watershed Plan Implementation	Humboldt
Redwood Community Action Agency	KRIS Humboldt Bay	Humboldt
Redwood Community Action Agency	KRIS Mad River	Humboldt
Redwood Community Action Agency	Luffenholtz Creek Barrier Modification Designs and Sediment	Humboldt
Westhaven Community Services District	Water Storage Improvement Project	Humboldt
Willow Creek Community Services District	Hwy 96 Stormceptor	Humboldt
Willow Creek Community Services District	Water Filtration Plant	Humboldt
North Coast Regional Land Trust	Six Rivers to the Sea	Humboldt County
Mattole Restoration Council	Mattole Integrated Water Management Program	Humboldt, Mendocino
Mendocino National Forest	Soda Creek Riparian Improvement	Lake
The Conservation Fund	Big River/Salmon Creek Watershed Restoration Project	Marin
Bioengineering Institute	Ten Mile Creek Watershed Outreach and Organizing Project	Mendocino
Bioengineering Institute	Walker Creek Restoration Project	Mendocino
California State Parks Mendocino District	Big River Focused Landform and Habitat Restorations	Mendocino
City of Ukiah	Inflow and Infiltration Reduction Project	Mendocino
City of Ukiah	Reclaimed Water System	Mendocino
City of Ukiah	Wastewater Secondary Treatment Upgrade	Mendocino
City of Ukiah	Water Treatment Plant Improvement Project	Mendocino
City of Willits	Willits Wastewater Treatment/ Water Reclamation Project	Mendocino
Covelo CSD (Community Services District)	Covelo Wastewater Facilities Improvement Project	Mendocino
E Center, Mendocino Fisheries Program	Hollow Tree Road Improvement Project	Mendocino
Mendocino County RCD	Navarro Watershed Road Sediment Reduction Project	Mendocino
Mendocino County Resource Conservation District	Navarro Watershed Upslope Road Inventory Project	Mendocino
Mendocino County Resource Conservation District	Upper Rancheria Creek Riparian Enhancement Project	Mendocino
Mendocino County Water Agency	Eel River Basin KRIS database	Mendocino
Mendocino County Water Agency	Mendocino County Water Quality/Supply Database (KRIS)	Mendocino
Mendocino County Water Agency	Russian River Basin KRIS Database	Mendocino
Mendocino County Water Agency	U. S. Army Corps Coyote Valley Dam Feasibility Study	Mendocino
Mendocino County	Development of Mendocino County Grading Ordinance	Mendocino
Russian River Unlimited	2005 River Clean-up and River Education in Schools	Mendocino
Westport County Water District	Wages Creek Source Water Protection	Mendocino
Westport County Water District	Water Supply Reliability Project	Mendocino
Mendocino County RCD	Garcia Effectiveness Monitoring	Mendocino
Mendocino County RCD	Sinkyone Road Restoration Project	Mendocino

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 50		
Mendocino County Resource Conservation District	BMPs for Invasive Plant Control in Coastal Watersheds	Mendocino County
Mendocino County Resource Conservation District	Robinson Creek Restoration Demonstration Project	Mendocino County
Modoc County	Newell Water System Renovation	Modoc
Siskiyou County	Siskiyou Co. Integrated Water Mgt/Coho Recovery Project	Siskiyou
California Department of Forestry	California Forest Improvement Program	Sonoma
California Department of Forestry	Sensitive Watershed Monitoring and Mapping Resource	Sonoma
California Land Stewardship Institue	Fish Friendly Farming Environmental Certification Program	Sonoma
California Land Stewardship Institue	Sediment Reduction and Habitat Improvements — 4 RRiver tribs	Sonoma
City of Cotati	Low Water Use Demonstration Program	Sonoma
City of Rohnert Park	Rohnert Park/Cotati Urban Recycled Water System Expansion	Sonoma
City of Santa Rosa	Citywide Creek Master Plan	Sonoma
City of Santa Rosa	Colgan Creek Restoration	Sonoma
City of Santa Rosa	Development of Standby Water Supply Wells	Sonoma
City of Santa Rosa	Prince Memorial Greenway Pierson Reach Restoration	Sonoma
City of Santa Rosa	Santa Rosa Creek B Street Outfall Retrofit Project	Sonoma
City of Santa Rosa	Sonoma County Water Recycling and Habitat Preservation Proj	Sonoma
City of Sebastopol	Sebastopol MWS Groundwater Management Program	Sonoma
Community Clean Water Institute	Humboldt Bay Regional Water Quality Monitoring Project	Sonoma
Community Clean Water Institute	Middle Reach Russian River Citizen Monitoring Project	Sonoma
Gold Ridge Resource Conservation District	Dutch Bill Creek Coho Habitat Enhancement	Sonoma
Gold Ridge Resource Conservation District	Laguna de Santa Rosa Restoration Program	Sonoma
Gold Ridge Resource Conservation District	Salmon Creek Watershed Assessment and Implementation	Sonoma
Graton Community Service District	Graton Wastewater Treatment Upgrade and Reclamation Project	Sonoma
Gualala River Watershed Council	Lower Fuller Creek Sediment Source Implementation Plan	Sonoma
Institute for Fisheries Resources	Networked Watershed Library for the North Coast Region	Sonoma
Laguna de Santa Rosa Foundation	Laguna de Santa Rosa Cotati Reach Restoration	Sonoma
Laguna de Santa Rosa Foundation	Laguna de Santa Rosa Riparian and Wetland Restoration	Sonoma
LandPaths	Dam Failure Prevention & Sediment Reduction Santa Rosa Creek	Sonoma
Occidental Arts and Ecology Center's WATER Institute	Dutch Bill Watershed Literacy Project: No Coho Left Behind	Sonoma
Occidental County Sanitation District	Camp Meeker-Occidental Joint Wastewater Reclamation Project	Sonoma
Sebastopol Water Information Group (SWiG)	Groundwater Studies in the Sebastopol Area	Sonoma
Sonoma County Regional Parks	Cloverdale River Park, Russian River Bank Restoration	Sonoma
Sonoma County Regional Parks	Shiloh Ranch & Foothill Regional Parks Erosion Prevention	Sonoma
Sonoma County Regional Parks	Storm Water System and Natural Resource Inventory	Sonoma
Sonoma County Water Agency	Cook Creek Restoration Project	Sonoma
Sonoma County	Monte Rio Community Wastewater Project	Sonoma
Sotoyome Resource Conservation District	Russian River Arundo Removal and Habitat Restoration Project	Sonoma
Town of Windsor	Sonoma County Airport Area Recycled Water Irrigation-Phase 1	Sonoma
Sonoma County	Implementing an Effective Storm Water Management Program	Sonoma
Gualala River Watershed Council	Sediment Solutions for the Gualala: Phase III	Sonoma and Mendocino
North Coast Resource Conservation & Development Council	Rural Municipal Service Provider Techincal Assistance Progrm	Sonoma /Marin /Mendocino /Lake
The Watershed Research and Training Center	Hayfork Forest Health Phase II	Trinity
Trinity County Resource Conservation District	East Branch Irrigation Ditch Piping Project	Trinity
Trinity County Waterworks District #1	Raw & Recovered Water for Irrigating Public Agencies	Trinity
Trinity County	Trinity Drinking Water Source Sediment Reduction Project	Trinity
Weaverville Community Services District	East Weaver Creek Booster Pump Station	Trinity
Weaverville Sanitary District	Weaverville Sanitary District Water Reclamation Project	Trinity

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 50		
Trinity County Resource Conservation District	Reading Creek Water Conservation Project	Trinity

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 84 ROUND 1		
California Land Stewardship Institute	Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program	Mendocino and Sonoma
California Land Stewardship Institute	Fish Friendly Farming Environmental Certification Program, Mendocino and Sonoma Counties	Mendocino and Sonoma
City of Blue Lake	Powers Creek Fish Passage Enhancement Project	Humboldt
City of Fort Bragg	Waterfall Gulch Transmission Main	Mendocino
City of Fortuna	Rohner Creek Flood Control and Salmonid Habitat Improvement Project	Humboldt
City of Montague	Lift Station Upgrade	Siskiyou
City of Rio Dell	Rio Dell Stormwater Control Flood Reduction Project	Humboldt
City of Rohnert Park	Rohnert Park Creek Master Plan	Sonoma
City of Rohnert Park	Rohnert Park Urban Reuse Expansion Project	Sonoma
City of Santa Rosa	Trash Exclusion	Sonoma
City of Santa Rosa	North Coast Regional Indoor Water Efficiency Program	Potentially all in region
City of Santa Rosa	Russian River Regional Cash for Grass Program	Mendocino and Sonoma
City of Santa Rosa — Utilities Department	Santa Rosa Plain Subbasin Salt and Nutrient Management Plan	Sonoma
City of Santa Rosa — Utilities Department	Sonoma County Water Recycling and Habitat Preservation Project	Sonoma
City of Trinidad	Trinidad Westhaven Coastal Water Quality Restoration Program / OWTS Emphasis	Humboldt
City of Tulelake	Tulelake Wastewater Project	Siskiyou
City of Ukiah	City of Ukiah Recycled Water Plan	Mendocino
Colgan Creek Restoration Project	City of Santa Rosa	Sonoma
Del Norte Resource Conservation District	Real-Time Weather Data for Irrigation Water Management	Del Norte
Del Norte Resource Conservation District	Del Norte Agricultural Enhancement Program	Del Norte
Freshwater Conservation Trust	Instream Water Dedications	Potentially all in region
Gold Ridge RCD	Bodega Bay HU Water Resources Management Project	Sonoma
Gualala River Watershed Council	Gualala River Sediment Reduction Program	Mendocino and Sonoma
Gualala River Watershed Council	Gualala River Wood In the Stream Program	Mendocino and Sonoma
Happy Camp Community Services District (CSD)	Water Treatment System Upgrade	Siskiyou
Happy Camp Sanitary District	Indian Creek Sewer Pipeline Crossing	Siskiyou
Hopland Band of Pomo Indians	Nissa-kah Creek Fish Passage at Nokomis Road	Mendocino Tribal
Hopland Band of Pomo Indians	Nissa-kah Creek Fish Passage at Hwy 175	Mendocino Tribal
Hopland Band of Pomo Indians	Russian River Tribal Watershed Group — Non-profit organization	Mendocino, Sonoma and Lake
Humboldt Bay Municipal Water District	Ranney Collector 3 Lateral Replacement	Humboldt
Humboldt Bay Municipal Water District	Ranney Collectors 1, 2, & 4 Lateral Replacement	Humboldt
Humboldt Bay Municipal Water District	15-inch Somoa Peninsula Pipeline Replacement	Humboldt
Humboldt Bay Municipal Water District	HBMWD-Blue Lake Fieldbrook Pipeline Support Retrofit	Humboldt
Humboldt Bay Municipal Water District	Ruth Hydro Plant Generator & Turbine Replacement	Trinity
Karuk Tribe	Camp Creek Habitat Protection-Road Decommissioning Implementation Project	Humboldt, Siskiyou Tribal
Mattole Restoration Council	Mattole Integrated Watershed Management Initiative	Humboldt, Mendocino
McKinleyville Community Services District	Murray Road Water Supply Tank and Piping	Humboldt
McKinleyville Community Services District	Water Meter Replacement and Upgrade	Humboldt
McKinleyville Community Services District	Critical Emergency Drinking Water Supply Wells and Piping	Humboldt
McKinleyville Community Services District	Waste Water Management Facility Treatment System Improvements	Humboldt
McKinleyville Community Services District	Solar Pilot Project	Humboldt
McKinleyville Community Services District	Regional Intertie for Emergency Drinking Water Supply and Water Reliability	Humboldt

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 84 ROUND 1		
Mendocino County RCD	Mendocino Headwaters Integrated Water Quality Enhancement Project	Mendocino
Mendocino County Water Agency	Mendocino County Stormwater Retrofit, Water Conservation and Rainwater Capture Project	Mendocino
Mendocino County Water Agency	Mendocino Jumpstart Integrated Water Plan	Mendocino
Occidental County Sanitation District	Wastewater Reclamation and Storage Project	Sonoma
Pinoleville Pomo Nation	Ackerman Creek Habitat Restoration	Mendocino Tribal
Redwood Community Action Agency, Natural Resources Services Division	The North Coast Stormwater Coalition's Non-Point Source Pollution Prevention Program	Humboldt, Mendocino
Redwood Forest Foundation Inc. (RFFI)	Sustainable Forests, Clean Water & Carbon Sequestration Demonstration Project, Redwood Forest Foundation Inc.	Mendocino
Russian River Watershed Association (RRWA)	Russian River Friendly Landscapes (RRFL) and Low Impact Development (LID) Demonstration Project	Mendocino and Sonoma
School of Performing Arts and Cultural Education (SPACE)	SPACE Theater Water Efficiency Project	Mendocino
Siskiyou County	Septage Receiving Pond Closure	Siskiyou
Siskiyou County	Siskiyou County Septage Receiving Facility	Siskiyou
Smith River Community Services District	Smith River Community Services District Infrastructure Improvement Plan — Phase 1 Back-up Power System	Del Norte
Sonoma County Water Agency	The Copeland Creek Watershed Detention/Recharge, Habitat Restoration, and Steelhead Refugia Project	Sonoma
Sotoyome Resource Conservation District	Russian River Arundo donax Removal and Riparian Enhancement Program	Sonoma
Sotoyome Resource Conservation District	Lower Russian River Water Quality Improvement Project	Sonoma
Town of Windsor	Windsor Groundwater Exploration Project	Sonoma
Town of Windsor	Esposti Park Well Connection Project	Sonoma
Willow Creek Community Services District	Hwy 96 Stormceptor	Humboldt

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 84 ROUND 2		
Big Rock Community Services District	Big Rock CSD Stabilize Water Storage Tank	Del Norte
County of Del Norte	Waste Water Lift Station Replacement	Del Norte
Smith River Community Services District	Smith River Community Services District Infrastructure Improvement Project	Del Norte
California State Parks	Benbow Dam Removal	Humboldt
California Trout	Elk River Recovery Assessment and Pilot Implementation Projects	Humboldt
Humboldt Bay Municipal Water District	Ranney Collectors 1 & 1A Lateral Replacement	Humboldt
Humboldt County Resource Conservation District	Humboldt Bay Nutrient Management Program	Humboldt
Mattole Restoration Council	Mattole Watershed Integrated Climate Adaptation Initiative	Humboldt
McKinleyville Community Services District	Mad River Estuary Enhancement	Humboldt
McKinleyville Community Services District	McKinleyville CSD Radio-Read Water Meter Upgrade	Humboldt
McKinleyville Community Services District	McKinleyville CSD Water Reliability Development	Humboldt
Redwood Community Action Agency	Martin Slough Enhancement Project	Humboldt
Resort Improvement District #1	Teleraph Creek Barrier Removal and Channel Restoration	Humboldt
City of Trinidad	Trinidad-Westhaven Coastal Water Quality Restoration Program	Humboldt
Westhaven Community Services District	Westhaven CSD Water Tank	Humboldt
California Land Stewardship Institute	Fish Friendly Farming and Fish Friendly Ranching Environmental Certification in the Russian, Navarro, and Gualala River Watersheds	Mendocino/ Sonoma
California Land Stewardship Institute	Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program	Mendocino/ Sonoma
Gualala River Watershed Council	Gualala River Watershed Management and Enhancement	Mendocino/ Sonoma
Jug Handle Creek Farm and Nature Center	Jug Handle Creek Farm and Nature Center Ecological Enhancement Project	Mendocino
Mendocino County Resource Conservation District	Mendocino County Working Landscapes Riparian Demonstration Project	Mendocino

PROJECT SPONSOR	PROJECT NAME	COUNTY /TRIBE
IRWMP PROPOSITION 84 ROUND 2		
Siskiyou County	Siskiyou County Septage Pond Closure	Siskiyou
Gualala River Watershed Council	Gualala River Sediment Reduction Program	Mendocino/ Sonoma
Gold Ridge Resource Conservation District	Gold Ridge Coastal Watersheds Enhancement Project	Sonoma
Laguna de Santa Rosa Foundation	Restoring Sebastopol Railroad Forest	Sonoma
Occidental County Sanitation District/ SCWA	Occidental Recycled Water and Restoration Project	Sonoma
Russian River Watershed Association	Russian River Watershed Urban Creek Care Program	Sonoma
City of Santa Rosa	Santa Rosa Plain Groundwater Monitoring Well Installation and Data Analysis	Sonoma
City of Santa Rosa	Santa Rosa's Russian River Friendly Landscapes and Low Impact Development Project	Sonoma
City of Sebastopol Public Works	Arsenic Removal Pilot Project for Well 6	Sonoma
City of Sebastopol Public Works	Arsenic Treatment Implementation for Well 6	Sonoma
Sonoma County Water Agency	Regional Water Use Efficiency Program	Sonoma
Sotoyome Resource Conservation District	Austin Creek Watershed Restoration Program	Sonoma
Sotoyome Resource Conservation District	LandSmart Laguna: Achieving TMDL Compliance and Ag Water Quality Improvements in the Laguna de Santa Rosa Watershed	Sonoma
Town of Windsor	Windsor Groundwater Banking Pilot Demonstration Project	Sonoma
Salyer Mutual Water Company	Larger capacity storage tanks, dedicated main line, meters/master meter	Trinity
Trinity County Resource Conservation District	West Weaver Creek — Channel and Floodplain Rehabilitation	Trinity
Weaverville Community Services District	East Weaver Treatment Plant Improvement Project	Trinity
Weaverville Sanitary District	Weaverville Sanitary District Water Reclamation Project	Trinity
Karuk Tribe	Lower Mid-Klamath Habitat Protection-Road Decommissioning Implementation Project	Karuk Tribe
Yurok Tribe — Yurok Tribal Fisheries Program (YTFP)	Restoration of Lower Klamath River Habitats	Yurok Tribe
Rural Community Assistance Corporation	DAC/ Tribal DAC Implementation Circuit Rider	North Coast region

California Energy Commission Funded Projects — 2010

In 2010 the NCIRWM partnership was funded a California Energy Commission Energy Efficiency & Conservation Block Grant to address other challenges facing the region, including energy independence, greenhouse gas emissions reduction, and job creation. Projects and their benefits are summarized in Appendix I.3.

TABLE 40 CALIFORNIA ENERGY COMMISSION FUNDED PROJECTS — 2010

PROJECT SPONSOR	COUNTY	PROJECT
County of Humboldt	Humboldt	Agricultural Farm Bureau — Lighting Fixtures
County of Humboldt	Humboldt	Agricultural Farm Bureau — Forced Air Furnace
County of Humboldt	Humboldt	Airport Lighting
County of Humboldt	Humboldt	Animal Shelter Lighting
County of Humboldt	Humboldt	Arcata Veterans Building — Forced Air Furnace
County of Humboldt	Humboldt	Clark Complex Lighting Project
County of Humboldt	Humboldt	Courthouse Lighting
County of Humboldt	Humboldt	Courthouse Parking Exhaust Fan
County of Humboldt	Humboldt	Courthouse —Replace CV with VAV
County of Humboldt	Humboldt	Courthouse — Efficient Motor Replacement
County of Humboldt	Humboldt	Environmental Health Lighting
County of Humboldt	Humboldt	Eureka Veterans Hall Lighting
County of Humboldt	Humboldt	Fortuna Veterans Hall — Furnace
County of Humboldt	Humboldt	Repair Garage Lighting
County of Humboldt	Humboldt	Garberville Veterans Building -Forced Air Furnace
County of Humboldt	Humboldt	IT Building Lighting

PROJECT SPONSOR	COUNTY	PROJECT
County of Humboldt	Humboldt	Jail Lighting
County of Humboldt	Humboldt	Jail Ozone Laundry
County of Humboldt	Humboldt	Jail — Replace Inlet Guide Vanes with Variable Frequency Drives
County of Humboldt	Humboldt	Jail — Efficient Motor Replacement
County of Humboldt	Humboldt	Library Lighting
County of Humboldt	Humboldt	Motor Pool Lighting
County of Humboldt	Humboldt	Public Health Lighting
County of Humboldt	Humboldt	Public Health Outside Air Damper Repair
County of Humboldt	Humboldt	Public Works Building — Forced Air Furnaces
County of Humboldt	Humboldt	Public Works Building — Lighting
County of Humboldt	Humboldt	Soils Lab Lighting
County of Trinity	Trinity	Jail Furnace
County of Trinity	Trinity	Library HVAC
County of Trinity	Trinity	Murray Building — Furnace Replacement
City of Arcata	Humboldt	Alliance Pump Station Lighting
City of Arcata	Humboldt	City Hall Air Conditioning
City of Arcata	Humboldt	Corp Yard Lighting Retrofits
City of Arcata	Humboldt	D Street HVAC
City of Arcata	Humboldt	Foodworks Lighting
City of Arcata	Humboldt	Foodworks Refrigeration
City of Arcata	Humboldt	LED Streetlights
City of Arcata	Humboldt	Wastewater Treatment Plant Automatic Aeration
City of Blue Lake	Humboldt	Booster Pumps Replacement
City of Crescent City	Del Norte	Variable Frequency Drive Pumps
City of Etna	Siskiyou	Replace Furnace w/Heat Pump
City of Eureka	Humboldt	Adorni Building — Replace Electric Water Heaters with Heat Pumps
City of Eureka	Humboldt	Adorni Building — Lighting Retrofits
City of Eureka	Humboldt	City Hall Solar PV
City of Eureka	Humboldt	Service Garage Lighting
City of Eureka	Humboldt	City of Ferndale Projects
City of Eureka	Humboldt	Ferndale Elementary School Lighting
City of Eureka	Humboldt	Ferndale High School Lighting
City of Fortuna	Humboldt	LED Street Lighting
City of Point Arena	Mendocino	Replace Wastewater Treatment Pumps
City of Rio Dell	Humboldt	Air Conditioner & Furnace Replacement
City of Trinidad	Humboldt	City Hall Insulation & Furnace Replacement

I.3 PROJECT SUMMARIES

Following are project summaries for the priority NCIRWMP implementation projects that are funded through the IWRM program per Propositions 50 and 84 *(through April 2014; the NCRP website may contain more up-to-date project information*[3]*).* The process whereby projects were solicited, scored, and selected is described in detail in Section 7 and in the formal "NCRP Project Review & Selection Process Guidelines" [4](2014).

I.3.1 PROPOSITION 50 PROJECT Summaries

3 For a current listing of projects in the NCIRWMP portfolio, see the NCIRWMP Implementation Projects page http://www.northcoastirwmp.net/proj2012/rpf.php
4 The 2014 NCRP Project Review & Selection Process Guidelines http://www.northcoastirwmp.net/docManager/1000009634/NCRP_Project%20Review_Guidelines_2014.pdf

Waterfall Gulch Transmission Main

CITY OF FORT BRAGG

STATEMENT OF THE PROBLEM

Fort Bragg's water supply infrastructure is over half a century old and in need of repair. It is leaking treated water with increasing frequency and severity through cracks and leaks in the water main line at an initial rate of about 15,000 gallons per day.

PROJECT GOALS

1. Improve system reliability
2. Maintain critical water supply for the Disadvantaged Community of Fort Bragg
3. Improve system operation and maintenance

THE SOLUTION

This project replaces the Waterfall Gulch Raw Water Transmission Main. There is limited access to the existing main line and replacement will incorporate solutions for better access to the line in case of emergency and be guaranteed to have a service life of at least 75 years.

PROJECT IMPLEMENTATION

The project will replace the existing 8" water main between State Route 20 and Brush Creek Road with 5400 lineal feet of new 10" PVC C900 Class 235 pipe from Highway 20 along the existing pipeline easement to a point where the line crosses Thomas Lane just south of Scholars Bog then on a new alignment along the easterly side of Thomas Lane to Brush Creek Road, then east along Brush Creek Road to a point that intersects the existing raw water transmission line and tie into that point. The remainder of the main line will be replaced form Brush Creek Road to a proposed new reservoir approximately 1500' to the northeast of the intersect location during a later phase of the project. The project may be phased so that the portion between Thomas Lane and Brush Creek Road be considered Phase I, and the section of the project between State Highway 20 and Thomas Lane be considered Phase II.

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 238,305*
Leveraged funds:	*$ 550,000*
TOTAL	**$ 788,305**

BENEFITS

Economic

- Approximately $1,260 per year provided by increased instream flows for environmental purposes
- Approximately $4,200 per year in avoided water supply operations costs
- Approximately $3,900 per year in reduced electricity costs associated with pumping
- Approximately $3,000 per year in avoided costs associated with emergency repairs

Water Supply

- An increase in instream flows in the Noyo River of about 16.8 acre-feet per year

Water Quality

- Water quality will improve because the Waterfall Gulch source will replace some of the water currently provided by the Noyo source. The Waterfall Gulch water is of higher quality with less taste and odor issues
- Water quality will also improve because silt will no longer be able to enter the system through breaks and cracks in the pipeline

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » To the extent that the project increases instream flows, it is likely to enhance salmonid habitat and create conditions favorable to increased salmonid populations

Cultural

- Increased salmonid populations provide an intrinsic value outside of the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- About $788,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Avoided costs associated with reduction in sediment from the intake

NEXT STEPS & RECOMMENDATIONS

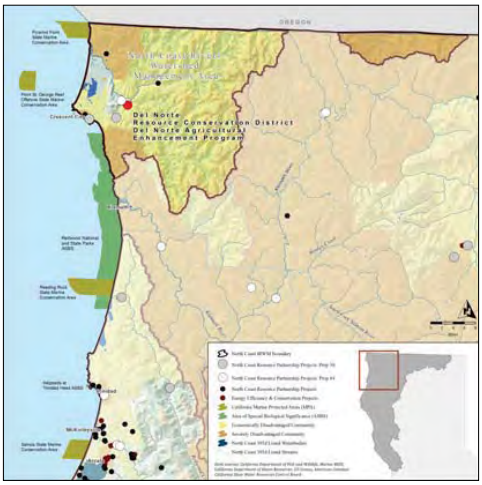
The City of Fort Bragg will continue to seek funding to implement projects to improve aging infrastructure and water supply reliability for the disadvantaged community of Fort Bragg.

CONTACT
Crystal Prairie
City of Fort Bragg
Fort Bragg, CA 95437
707.961.2824

NORTH COAST RESOURCE PARTNERSHIP

Del Norte Agricultural Enhancement Program

DEL NORTE RESOURCE CONSERVATION DISTRICT



STATEMENT OF THE PROBLEM

Agricultural waste is recognized as a contributor to reduced water quality. Although the water of the Smith River Watershed is not impaired, agricultural activities impact coastal water resources as well as estuarine and wetland habitat.

PROJECT GOALS

Improve resource management by assisting local farmers improve nutrient management and waste distribution systems to meet standards for waste discharge requirements and avoid enforcement fines.

THE SOLUTION

This project will implement key components and practices of dairy waste management systems. Practices will include development of waste distribution/nutrient management systems, as well as heavy use area protection, roof runoff management, and construction of waste storage structures. These practices can significantly reduce nutrients and pathogens running off or leaching from dairy crop fields.

PROJECT IMPLEMENTATION

Project implementation consists of the following tasks.

1. Environmental documentation and permitting
2. Site specific design plans and specifications
3. Project component construction according to NRCS standards
4. Final construction evaluation and project closeout
5. Development of a plan to measure, evaluate and report the effectiveness of practices installed through the program, including a methodology for verifying pollutant load reduction estimates

COMPLETION DATE

Start Date November 1st 2013

PROJECT BUDGET

IRWM funds:	*$ 255,000*
Leveraged funds:	*$ 145,000*
TOTAL	**$ 400,000**

BENEFITS

Economic

- Estimated benefit of $81,130 for avoided costs of noncompliance penalties for violating waste-management regulations

Water Quality

- Reduction in pathogens, excessive nutrients, and other harmful pollutants that enter waterways from dairy runoff

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improvements in water quality provided by this project will improve function of spawning and rearing habitat, potentially leading to increases in juvenile salmonid survival and increased salmonid populations
- Reduction in pollutants will improve the quality of recreation for people who fish, swim, boat and otherwise enjoy the river

Cultural and Social

- Improvements to salmonid habitat and increased salmonid populations provide traditional cultural benefits for Native Americans and others who recognize the importance of salmon outside the cultural framework and economic terms often imposed by western society
- By assisting dairy operators to comply with environmental regulations, this project is helping to preserve the watershed's agricultural heritage

Jobs and Local Economy

- Over $340,000 will spent locally/regionally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 4 jobs created/maintained
- Other local economic benefits

NEXT STEPS & RECOMMENDATIONS

The Del Norte RCD will continue to assist agricultural operations in the Smith River watershed attain and maintain compliance with environmental regulations in order to sustain the community's agricultural heritage and protect its natural resources.

CONTACT
Andrea Souther
Del Norte Resource Conservation District
241B West First Street
Smith River, CA 95567
707.487.7630

ACKNOWLEDGEMENTS
Del Norte Resource Conservation District

NORTH COAST RESOURCE PARTNERSHIP

Bodega Bay HU Water Resources Management Project

GOLD RIDGE RESOURCE CONSERVATION DISTRICT (GRRCD)

STATEMENT OF THE PROBLEM

The towns of Bodega and Valley Ford are considered economically disadvantaged communities and both have failing water storage systems. Their water supplies primarily come from shallow, near-channel wells that are documented by DWR as drawing from the water table, with no appropriative rights for this water, thus both town's water security are in jeopardy. Additionally, agricultural and rural residential practices throughout the Bodega Bay HU have resulted in altered stream channels and reduced riparian zones, resulting in a loss of habitat. The removal of riparian vegetation has caused increases in water temperature, fine sediment, as well as reduced instream complexity due to less LWD.

PROJECT GOALS

1. Increased instream flow during critical dry periods
2. Fine sediment delivery reduction to rearing
3. Instream habitat enhancement
4. Riparian vegetation enhancement for shade, habitat diversity, bank stability, and instream wood recruitment

THE SOLUTION

The GRRCD will work throughout the Estero Americano and Salmon Creek Watersheds within the Bodega Bay HU to facilitate planning, project implementation and monitoring efforts to restore and enhance water resources. This program combines a suite of approaches to restore a resilient, sustainable riparian corridor and in-stream habitat for endangered CCC coho and threatened steelhead trout.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

This project consists of several components, listed below.

1. Riparian enhancement through native riparian planting to reestablish a wide diverse riparian buffer
2. Instream habitat improvement through installation of large wood structures to provide cover and habitat complexity
3. Streamflow augmentation during critical dry periods through installation of rainwater catchment systems to replace creek withdrawals
4. Sediment reduction through the restoration of five actively eroding gullies
5. Infrastructure upgrades for Bodega and Valley Ford Water Companies to eliminate leaks and increase storage
6. Outreach, education and signage to increase public awareness locally and nationally

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 700,000*
Leveraged funds:	*$ 255,205*
TOTAL	**$ 955,205**

BENEFITS

Economic

- Approximately $391,037 from reduced water treatment costs
- Approximately $207 from increased instream flow for environmental beneficial uses
- Approximately $202,149 from avoided water supply purchases
- Approximately $30,000 per year from avoided water-supply operations costs
- Approximately $2,304 per year from restored riparian habitat and improved biodiversity
- Approximately $15,486 in avoided costs of carbon dioxide emissions
- Approximately $6,610 per year from sediment reduction

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased salmonid populations due to improved spawning and juvenile rearing habitat
- Enhanced human and social capital from the project's educational activities including workshops and field visits, increasing local technical knowledge and thereby improving land management practices in the Salmon Creek watershed

Jobs and Local Economic Benefit

- Over $950,000 is being spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Approximately 6.7 jobs created/maintained through Prop 84 NCIRWMP funds

NEXT STEPS & RECOMMENDATIONS

GRRCD continues to implement and seek funding for projects that improve salmonid habitat, water supply reliability, and agricultural sustainability in the Salmon Creek watershed.

CONTACT
Brittany Heck
Gold Ridge Resource Conservation District
Sebastopol, CA 95472, 707.823.5244

ACKNOWLEDGEMENTS
State Water Resources Control Board
USDA's Natural Resources Conservation Service
CA Department of Fish and Wildlife
Landowners

NORTH COAST RESOURCE PARTNERSHIP

Gualala River Sediment Reduction Program

GUALALA RIVER WATERSHED COUNCIL (GRWC)

STATEMENT OF THE PROBLEM

The Gualala River is 303(d) listed for sediment which increases turbidity, impacts spawning and rearing habitat, and reduces available thermal refugia. The Gualala River TMDL Technical Support Document (TSD) concluded that 85% of anthropogenic sediment delivery is road related.

PROJECT GOALS

1. Improve water quality and work towards attainment of TMDL targets for sediment
2. Improved instream habitat
3. Provide project effectiveness monitoring
4. Increase stakeholder and community education

THE SOLUTION

This proposal incorporates five high priority NPS reduction projects to complete sediment source reduction at the CalWater planning watershed scale. High priority projects for road related sediment source completion are based on a high road density, percent of erosion total from road sources, planning watershed disturbance index and refugia potential for coho and/or steelhead. Through these priority projects multiple landowners have partnered with the GRWC to treat sediment sources on 116 miles of high and medium priority road networks that will prevent 288,700 cubic yards of sediment from entering the watercourses in the Gualala River Watershed. Basin-wide TMDL attainment road based sediment reduction will increase from 17% to 24% by the implementation of these projects.

PROJECT IMPLEMENTATION

Approximately 1.6 miles of road will be abandoned, 0.08 miles of road will be decommissioned and 10.32 miles of road will be storm-proofed. All road segments will be outsloped, rolling dips installed, and berms and side-cast fill removed. Site- specific treatments include:

Abandoned and decommissioned roads:

- Culvert removal
- Stream crossings excavated to grade
- Cobble placement in channel where necessary
- Rocked ford installation with large rip-rap buttresses

Storm-proofed roads:

- Culverts upgraded
- Fill removed and culvert installation
- Rock placement at crossings for energy dissipation
- Critical dip installation

In conjunction with sediment source reduction, this proposal will also implement the sixth phase of the Large Wood in the Stream Program placing over 100 in-stream logs and structures within 10 tributaries of the Gualala River.

COMPLETION DATE

December 2015

PROJECT BUDGET

IRWM funds:	*$ 600,000*
Leveraged funds:	*$ 308,280*
TOTAL	**$ 908,280**

BENEFITS

Economic

- An estimated $214,866 from avoided costs of road maintenance
- An estimated $185,419 from avoided costs of sediment deposition
- An estimated $11,591,308 in the passive-use value associated with increases in salmonid populations (estimated at $2,000 per additional fish generated by the project)[1]

Water Quality

- 80% reduction in anthropogenic sediment in project watersheds

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flow — both hyporheic and surface — has been shown to occur in the watershed following similar restoration projects, benefitting salmonids and other wildlife
  - » Increased pool formation and channel diversity creating habitat and refuge for adult and juvenile salmonids
  - » Increased connectivity of the ecological systems within the Gualala River watershed.

Cultural and Social

- Cultural value of improved salmonid populations and their habitat apart from the cultural framework and economic terms often imposed by western society
- Increased levels of technical knowledge of land owners and land managers will improve land management techniques, further improving water and habitat quality
- The collaboration between landowners and agencies increases the social capital in the watershed, paving the way for future collaborative efforts and allowing the community to more efficiently and effectively solve mutual challenges

Jobs and Local Economic Benefit

- Over $900,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Assist in maintaining and creating 10 to 20 jobs within the community.
- The project will help remediate impacts of declines in salmonid populations and help restore the beneficial functions of the watershed.

NEXT STEPS & RECOMMENDATIONS

The basis for the GRWC was formed in the 1980s due to precipitous declines in salmonid populations and we have been working to improve watershed conditions since then. This project builds on previous restoration and remediation work and we will continue to implement sediment reduction and habitat restoration projects within the Gualala River watershed until TMDL goals are met and the ecosystems that support salmonid habitat are functioning naturally.

CONTACT
Kathleen Morgan
Gualala River Watershed Council
Gualala, CA 95445, 707.884.9166

NORTH COAST RESOURCE PARTNERSHIP

Happy Camp Water Treatment System Upgrade

HAPPY CAMP COMMUNITY SERVICES DISTRICT (CSD)

STATEMENT OF THE PROBLEM

The California Department of Public Health (CDPH) has indicated that the existing water treatment system is missing a flocculation step and does not meet State requirements to qualify as direct filtration. Without an approved filtration system, the CDPH is concerned that there is the potential that under certain conditions, small particles, including organisms such as Giardia or Cryptosporidium that cause disease, could get through the filters and into the public drinking water system. Additionally, Happy Camp's water system would be out of compliance with federal and state drinking water regulations when the state adopts EPA's new Long-Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), and vulnerable to failure in the event of a flood.

PROJECT GOALS

1. Protect and enhance drinking water quality
2. Protect public health
3. Maintain system operation in the event of a flood

THE SOLUTION

This project will upgrade the existing water filtration plant to protect and enhance water quality and public health for an economically disadvantaged community.

PROJECT IMPLEMENTATION

The project constructs a new roughing filter upstream of the two existing pressure filters and provides additional upgrades including:

- Upgrade of the existing wetwell pumps and electrical equipment to handle the additional hydraulic and electrical load
- Relocation of existing wetwell electrical equipment to place it a safe distance outside the 100-year floodplain
- Improvements to the existing backwash disposal pond to handle additional filter backwashing cycles
- Improvements of Supervisory Control and Data Acquisition (SCADA) for the existing water treatment plant and existing water storage tank for better control of water storage tank levels and wetwell pump operation.

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 253,000*
Leveraged funds:	*$ 251,000*
TOTAL	**$ 504,000**

BENEFITS

Economic

- An estimated $1,960 yearly for avoided costs of service disruption
- An estimated $200 per year for avoided costs of non-compliance with drinking water regulations

Water Quality

- Improved drinking water quality

Social Benefits

- Protection and enhancement of drinking water quality for an economically disadvantaged community
- Protection of water treatment operators from potential electrical shock due to damaged and/or flooded equipment

Jobs and Local Economy

- Over $ 500,000 was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Avoided costs associated with emergency repairs if a ten-year flood occurs

NEXT STEPS & RECOMMENDATIONS

The Happy Camp CSD will continue to monitor drinking water quality and project performance to ensure that the disadvantaged community of Happy Camp will be provided with high quality drinking water at reasonable rates while also ensuring operator safety.

CONTACT
Gary Hahn
Happy Camp Community Services District
Happy Camp, CA 96039
530.493.5106

NORTH COAST RESOURCE PARTNERSHIP

Indian Creek Sewer Pipeline Crossing

HAPPY CAMP SANITARY DISTRICT (HCSD)

STATEMENT OF THE PROBLEM

The existing sewer pipeline is exposed in the bed of Indian Creek; there is a high likelihood that the pipeline will fail within 50 years, causing untreated sewage to leak into Indian Creek, which flows into the Klamath River, threatening fish populations, recreation, and other ecosystem services provided by the water bodies. Pipeline damage will also interrupt wastewater collection services for customers within the Happy Camp Sanitary District.

PROJECT GOALS

1. Protect public health
2. Protect native salmonids, other wildlife, and their habitats

THE SOLUTION

The Indian Creek Sewer Pipeline Crossing will decommission the existing sewer pipeline and replace it with a new pipe crossing and infrastructure.

PROJECT IMPLEMENTATION

This project will be implemented as follows:

1. Temporary use of bridge scaffolding, placement and removal of a temporary sewer bypass, pump, and appurtenances
2. Replace and relocate the existing crossing
   - » New sewer bridge pipeline crossing
   - » New sewer lift station structure and equipment
   - » New sewer lift station electrical equipment and controls
   - » New sewer lift station emergency generator
   - » New underground sewer main
   - » New sewer connections to existing system
3. Abandon existing sewer siphon and sewer main crossing
4. New fencing and gates
5. Erosion and sediment control
6. Final inspection and project closeout

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 542,000*
Leveraged funds:	*$ 375,065*
TOTAL	**$ 917,065**

BENEFITS

Economic

- Approximately $1,010,300 in avoided costs associated with emergency repair
- Up to $150,000 in avoided costs associated with administrative civil liability action fines for unauthorized discharge of sewage into Indian Creek

Water Quality

- Avoided impacts to water quality from sewage discharge into Indian Creek

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Avoided harm to salmonid and other wildlife from pipeline failure

Cultural

- Cultural value of salmonid populations that are protected from pipeline failure outside of the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- Over $ 917,000 was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Avoided costs of a service disruption when the pipeline fails
- Avoided disruption of recreation activities at the Indian Creek-Klamath River confluence, which is a popular whitewater rafting location

NEXT STEPS & RECOMMENDATIONS

The Happy Camp Sanitary District will continue to maintain and monitor the new pipeline and associated infrastructure to ensure public health in this economically disadvantaged community and protect vital salmonid and other wildlife habitat.

CONTACT
Gary Hahn
Happy Camp Sanitary District
Happy Camp, CA 96039
530.493.5293

NORTH COAST RESOURCE PARTNERSHIP

Nissa-kah Creek Fish Passage

HOPLAND BAND OF POMO INDIANS

STATEMENT OF THE PROBLEM

The Hopland Reservation contains two headwater streams which are tributary to the Russian River watershed. These creeks historically supported a vibrant salmonid population of steelhead trout, which is important to the spirituality, nourishment and cultural preservation of the Hopland Tribe. Recent observations indicate a decline in salmonid populations of the North Coast, including the Hopland Reservation. Viable salmonid populations are known indicators of a healthy watershed and are at the risk of extinction along the North Coast.

PROJECT GOALS

Restore viable populations of steelhead trout on the Hopland Reservation.

THE SOLUTION

This project consists of building fish passage improvement for two culverts on Nissakah Creek that have been identified as a major impediment to steelhead migration.

PROJECT IMPLEMENTATION

1. Environmental documentation and permitting
2. Final project design plans
3. Remove and replace existing culverts to enable upstream and downstream fish passage
4. Post installation revegetation
5. Final inspection and project closeout
6. Photomonitoring

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 803,000*
Leveraged funds:	*$ 252,474*
TOTAL	**$ 1,055,474**

BENEFITS

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Culvert removal will allow steelhead migration past former barriers, increasing the amount of high-quality spawning and rearing habitat available by two miles, creating conditions that will support an increased steelhead population

Cultural and Social

- An increase in steelhead populations has a cultural value apart from the cultural framework and economic value often imposed by western society
- Increasing steelhead populations on the Hopland reservation helps to preserve the cultural heritage of the Pomo Tribe

Jobs and Local Economy

- Local labor and supplies will be used when possible, thus contributing to State goals for environmental justice and social equity
- An increase in steelhead in Nissa-kah Creek will improve the overall Russian River watershed steelhead fishery, contributing to the recreational fishing industry

NEXT STEPS & RECOMMENDATIONS

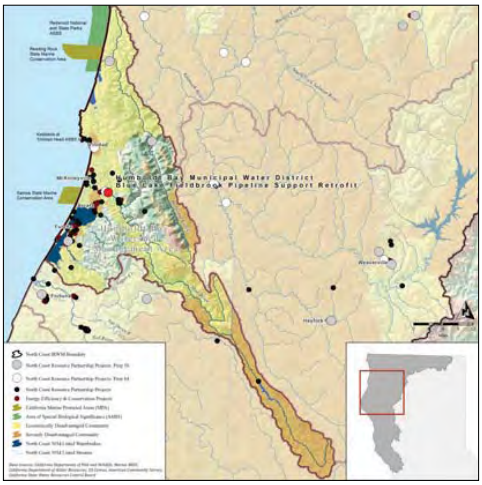
The Hopland Tribe is working to restore their culture, lands and waters. In 2005 they identified restoration of steelhead as a high priority in their Environmental Master Plan. They will continue to seek funding for and implement projects that advance this goal.

CONTACT
Meyo Marrufo
Hopland Band of Pomo Indians
Hopland, CA 95449
707.472.2100

NORTH COAST RESOURCE PARTNERSHIP

Blue Lake Fieldbrook Pipeline Support Retrofit

HUMBOLDT BAY MUNICIPAL WATER DISTRICT



STATEMENT OF THE PROBLEM

Humboldt Bay Municipal Water District (HBMWD) currently supplies domestic water to the City of Blue Lake and the Fieldbrook Glendale Community Services District (FGCSD). The Blue Lake/FGCSD pipeline crosses the Mad River via a 14-inch ductile iron pipeline attached to a North Coast Railroad Authority (NCRA) bridge. The bridge has not been used or maintained for many years, and if it fails or collapses, it will damage the District's pipeline and interrupt the sole domestic water service to these communities.

PROJECT GOALS

Improve local and regional water supply reliability

THE SOLUTION

The proposed project addresses the potential loss of water service to two communities that serve approximately 2,880 residents. By constructing a new crossing, the receiving communities will likely continue to receive potable water during flood conditions or after an earthquake. Currently, their water source is vulnerable to both these natural disasters. This region of California is very seismically active and receives large storm events several times a year; it is not a matter of if these disasters will happen, but when they will happen. Therefore, constructing a new crossing will address the vulnerability problems of the existing crossing's infrastructure.

PROJECT IMPLEMENTATION

This project will replace the current pipeline with an aerial crossing for a new 14-inch diameter pipe, which will meet modern seismic codes and be located outside of the 100-year floodplain by implementing the steps below.

1. Environmental permitting and preliminary engineering
2. Planning and design specifications
3. Construction of spanning support structures, pipeline, valves, other appurtenances, and connection to the existing system.
4. System testing and project closeout

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 700,000*
Leveraged funds:	*$ 903,580*
TOTAL	**$1,603,580**

BENEFITS

Economic

- Approximately $1,492,438 benefit from avoided costs of service disruption and emergency repair
- An annual benefit of approximately $95,922 from avoided fire damage

Water Supply

- This project ensures a reliable water supply to support planned growth for Fieldbrook, Glendale, and the City of Blue Lake, which are Disadvantaged Communities

Jobs and Local Economic Benefit

- Over $1.6 million will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Improved emergency preparedness and response during natural disasters and other emergencies

NEXT STEPS & RECOMMENDATIONS

HBMWD will continue to proactively repair and replace aging, outdated infrastructure to improve environmental quality and maintain water supply reliability in the area.

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NORTH COAST RESOURCE PARTNERSHIP

Camp Creek Habitat Protection-Road Decommissioning Implementation Project

KARUK TRIBE

STATEMENT OF THE PROBLEM

Unmaintained and improperly designed road networks have negative impacts on North Coast fisheries. In addition to the chronic sediment transport from these roads, the high number of stream crossings has a high potential for failure during a significant storm event. Stream crossing failures result in debris torrents that scour stream channels of riparian vegetation which is critical in maintaining lower water temperatures. Depending on slope position and channel gradient these debris torrents can trigger successive debris torrents as they move downstream. Debris torrents fills in pools, which are used by salmonids as rearing areas and as refugia.

PROJECT GOALS

Protection and enhancement of the habitat of Tribal trust species such as Spring Chinook, Coho Salmon and Summer Steelhead populations.

THE SOLUTION

The Camp Creek Habitat Protection—Road Decommissioning Project involves approximately 16.02 miles of road slated for decommissioning that is within the ecologically sensitive 26,994 acre Camp Creek Watershed. Specific management strategies suggest for the Camp Creek watershed are to minimize hydrologic and erosion concerns in this critical watershed by addressing the high road density (2.3 miles/square mile) and implementing restoration activities including decommissioning. Recovery and maintaining the high quality of water can be promoted primarily through road decommissioning.

PROJECT IMPLEMENTATION

Road decommissioning in the Camp Creek watershed involves the following tasks:

1. Environmental documentation and site-specific project design
2. Road decommissioning using proven decommissioning methods to remove and stabilize unstable fill at road/stream crossings, swales and springs, and reestablish the natural hillslope drainage pattern along the entire road using heavy equipment and hand labor.
3. Post-project erosion and sediment control measures and revegetation will include sowing of native grass seed and fertilizer followed by the spreading native mulch material.
4. Final construction evaluation and project closeout

COMPLETION DATE

Project is ongoing despite the lack of any funding from IRWM Proposition 84 Award.

PROJECT BUDGET

IRWM funds:	*$ 300,000*
Leveraged funds:	*$ 75,000*
TOTAL	**$ 375,000**

BENEFITS

Economic

- Approximately $299 per year in benefit from increases to forest biodiversity
- Approximately $14,506 per year associated with avoided costs of sediment deposition

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Reduction in sediment deposition will improve spawning and rearing habitat for salmonids, allowing for increased populations
  - » Decommissioning the roads will reduce risk of spreading Port Orford Root Rot fungus (Phytophthora lateralis)
  - » Restoration of 2.5 acres of upland habitat and 2 stream miles of riparian habitat will encourage the reestablishment of other native plants and wildlife

Cultural benefits

- Increased salmonid populations, which are traditionally and culturally significant to the Karuk people, will provide for continued and improved ceremonial and sustenance uses
- Improved riparian habitat will result in increased presence of culturally significant resources for the Karuk Tribe

Jobs and Local Economic Benefit

- About $375,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 6 jobs created/maintained

NEXT STEPS & RECOMMENDATIONS

The Karuk Tribe is committed to improving habitat conditions in the Camp Creek watershed and will continue to seek funding for an implement projects that accomplish this goal throughout the Ancestral Territory.

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ACKNOWLEDGEMENTS
Karuk Tribal Council
U.S.F.S. Six Rivers National Forest
U.S. EPA Non-Point Source Program

NORTH COAST RESOURCE PARTNERSHIP

Mattole Integrated Watershed Management Initiative

MATTOLE RESTORATION COUNCIL (MRC)

STATEMENT OF THE PROBLEM

The Mattole River watershed is home to a variety of threatened and endangered species, most notably steelhead trout (federally threatened with extinction), coho salmon (federally threatened and state threatened), and Chinook salmon (federally threatened). The Mattole River is Section 303(d)-listed for excessive sediment and high summer water temperatures, which are recognized as limiting factors in the survival of salmonid species.

PROJECT GOALS

1. Increase instream summer water flows and increase water supply reliability
2. Improve salmonid habitat
3. Increase urban and agricultural water use efficiency measures

THE SOLUTION

The Mattole Integrated Watershed Management Initiative provides a comprehensive approach to watershed restoration in the Mattole through instream habitat enhancement, enhanced streamflow and groundwater recharge, water quality monitoring, riparian ecosystem restoration, and removal of invasive plants in riparian and critical habitat areas. The work proposed is included in the Mattole Integrated Coastal Watershed Management Plan (2009) and North Coast Integrated Coastal Watershed Management Plan (2007).

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

This project involves three components:

1. Instream flow — installation of four large water storage systems will be accompanied by forbearance agreements with three private landowners to prevent summer diversions
2. Riparian and instream habitat restoration and enhancement – installation of instream willow fences, riparian revegetation, and removal of invasive non-native riparian plants
3. Turbidity monitoring and instream flow monitoring to gauge project effectiveness.

COMPLETION DATE

Ongoing — estimated completion date: March 2017

PROJECT BUDGET

IRWM funds:	*$ 300,000*
Leveraged funds:	*$ 343,776*
TOTAL	**$ 643,776**

BENEFITS

Economic

- Approximately $5,400 per year in avoided costs of water supply purchases
- Approximately $150 per year benefit from increased instream flow for environmental purposes
- Approximately $200,000 per year benefit from an additional 100 adult salmon due to improved riparian habitat and increased flows
- Approximately $1,500 per year benefit from the passive-use value associated with increases in forest biodiversity associated with improved riparian habitat
- Approximately $42,358 over 50 years from the avoided cost of carbon emissions due to riparian forest restoration

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved riparian function and increased stream flow will improve salmonid habitat, creating conditions for increased juvenile survival and increased populations

Cultural benefits

- Increased salmon populations yield a cultural benefit that is outside of the cultural framework and economic value often imposed by western society
- Increased forest biodiversity yields a cultural benefit that is outside of the cultural framework and economic value often imposed by western society

Jobs and Local Economic Benefit

- Over $650,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Number of temporary/seasonal jobs created per year over the 3 year project period: approximately 30; Number of staff positions in Mattole Watershed Restoration Groups maintained during the life of the contract: approximately 12
- Avoided costs of regulatory enforcement such as a TMDL implementation program
- Increased water-based recreation due to increased summer flows

NEXT STEPS & RECOMMENDATIONS

MRC will continue to seek funding and implement projects to increase salmonid populations, improve salmonid habitat and ensure water supply reliability in the Mattole River watershed.

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ACKNOWLEDGEMENTS
California Department of Water Resources and County of Humboldt
Bureau of Land Management
Mattole River and Range Partners- the Mattole Salmon Group and Sanctuary Forest
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The Nature Conservancy
US Fish and Wildlife Service
All community members and landowners who participated in this work

NORTH COAST RESOURCE PARTNERSHIP

Mendocino Headwaters Integrated Water Quality Enhancement Project

MENDOCINO RESOURCE CONSERVATION DISTRICT

STATEMENT OF THE PROBLEM

The Little North Fork Big River, Upper Rancheria Creek, and Upper Mainstem of the Russian River are impacted by legacy effects of timber harvest, agricultural practices, and other human activities. The waterways are 303(d) listed for sediment, which is known to impact salmonid spawning and rearing habitat. Invasive non-native plant species are spreading in the riparian zone of the upper Russian River and rural road stream crossings impede fish passage and contribute to sediment delivery. Each watershed has a management plan and TMDL document calling for reducing sediment delivery to streams from unimproved rural roads.

PROJECT GOALS

1. Improve water quality by implementing TMDL sediment control strategies in Mendocino County's upper watersheds
2. Improve water quality by implementing TMDL water temperature reduction strategies in Mendocino County's upper watersheds
3. Monitor project benefits to measure project effectiveness

THE SOLUTION

The proposed projects were developed with a diverse group of regional stakeholders, including university, state forest, tribal, industrial timber, and watershed group partners. By addressing NPS pollution, these projects will:

1. Reduce road related sediment to enhance endangered salmonid habitat and improve water quality for downstream beneficial uses including domestic and municipal watersystems;
2. Improve riparian connectivity by controlling invasive plants and installing native plant demonstration projects;
3. Increase access to best management practices and educational opportunities through workshops and tours.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

1. Little North Fork Big River Road Decommissioning: 3 miles of road will be decommissioned (completed in 2013)
2. Rancheria Creek Fish Passage and Road Restoration: 2 bridge crossings and 3 culverts will be replaced with appropriate structures to provide crossing capacity for 100-year recurrence storm flow. Approximately 8 to 10 miles of roads will be upgraded/decommissioned to prevent sediment delivery to streams
3. Yokayo Rancheria Riparian Restoration: restoration of approximately 2 acres of riparian habitat
4. Effectiveness monitoring

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$462,670*
Leveraged funds:	*$228,064*
TOTAL	**$690,734**

BENEFITS

Economic

- Approximately $240 per year for passive use value associated with increased forest biodiversity due to riparian restoration
- Approximately $7,263 per year in avoided costs of sediment deposition
- Tribal basket makers will save travel dollars through their ability to harvest locally sourced plant material

Water Quality

- Water quality will be improved, thus contributing to watershed-wide TMDL efforts

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved fish passage will provide access to to 1.26 miles of available habitat to support migratory salmonid populations
- Planting riparian trees and plants will help to sequester carbon, provide shade and increase riparian functions
- Sediment savings will help improve spawning and summer rearing habitat by controlling potential sediment delivery to streams

Cultural benefits

- Cultural value of increased salmon populations and increased forest biodiversity outside of the cultural framework and economic terms often imposed by western society
- Riparian restoration includes culturally important plants for Native Americans, enabling tribal members to pursue and pass down traditional activities such as basket making
- Renewed appreciation of the value and uniqueness of the preserved riparian forest habitat in the midst of predominant, surrounding vineyard land use.

Jobs and Local Economic Benefit

- Over $600,000 will be spent locally using local labor and supplies, contributing to State goals for environmental justice and social equity
- 10 to 12 jobs created/maintained
- Reduced operation costs by up to 50% for maintenance and monitoring as a result of the project's prevention of sediment delivery to streams

NEXT STEPS & RECOMMENDATIONS

This project is one of many the MCRCD has implemented to improve watershed conditions and salmonid habitat and support Mendocino County's resource-based heritage. MRCD will continue to seek funding for implementation projects that assist landowners with natural resources management.

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NORTH COAST RESOURCE PARTNERSHIP

Mendocino Jumpstart Integrated Water Plan (IWP)

MENDOCINO COUNTY RESOURCE CONSERVATION DISTRICT

STATEMENT OF THE PROBLEM

Mendocino County is mainly a rural community, making outreach challenging. It currently faces a host of natural resources issues including commercial and industrial irrigation using potable water, irrigation-intensive landscapes andineffective stormwater management. It also lacks a core curriculum at Mendocino College addressing Low Impact Development (LID) and sustainable natural resource management.

PROJECT GOALS

1. Provide an ongoing and inclusive framework for education relating to LID techniques and LID project implementation
2. Provide an effective and integrated plan for outreach, education, and construction
3. Improve salmonid habitat
4. Improve watershed processes and ecosystem function
5. Conserve water
6. Adapt to climate change
7. Reach out to disadvantaged communities
8. Improve water quality
9. Promote the rapid adoption of efficient water, energy and ecosystem technologies
10. Monitoring and research

THE SOLUTION

The IWP consists of demonstration projects to improve water quality, conserve potable water, and improve the stormwater infrastructure on the Mendocino College campus. The outreach component includes at least eight classes at the college covering topics associated with LID and water conservation.

PROJECT IMPLEMENTATION

The project will initiate LID classes at Mendocino College, treat stormwater with LID techniques, and install two rainwater catchment and xeric landscapes. In addition, the IWP will perform a water audit of the sports fields to provide recommendations for scheduling improvements and component upgrades to increase water use efficiency. The IWP will also demonstrate water conservation measures at the College Agriculture Department's orchards and gardens with irrigation improvements which will be included in various class curricula.

The LID stormwater techniques will include construction of a bioswale wetlands and a vernal pool located near the main college entrance. Rainwater catchment will include installation of two systems, each with a 500 gallon tank that will be used to irrigate native plant landscapes.

COMPLETION DATE

March 2017

PROJECT BUDGET

IRWM funds:	*$ 337,330*
Leveraged funds:	*$ 54,114*
TOTAL	**$391,444**

BENEFITS

Economic

- Approximately $60 per year from the passive use value associated with increased biodiversity provided by the vernal pool and bioswale/wetland
- Approximately $1,400 per year from increased recreation availability for walking and wildlife viewing provided by the vernal pool, and bioswale/wetland
- Approximately $6,009 over the life of the project from increased instream flows for environmental purposes

Water Quality

- Prevention of sediment and pollutant mobilization from rooftops, parking lots, sports fields, and gardenswill improve water quality of storm water entering Hensley Creek

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved water quality and increased instream flow in Hensley Creek and the Russian River will improve salmonid habitat, creating the conditions for increased juvenile salmon survival and increased populations.

Cultural and Social

- Cultural benefits from increased salmon populations and increased biodiversity outside the cultural framework and economic terms often imposed by western society
- Educational opportunities at Mendocino College will promote learning and skill development with LID and other sustainable techniques which are likely to have a long term influence on water conservation and water quality in the County
- The vernal pool will be constructed in a high-profile area for continuing education and research

Jobs and Local Economic Benefit

- Over $390,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Avoided costs associated with treating contaminants in water prior to consumption

Avoided costs associated with compliance with water quality standards

NEXT STEPS & RECOMMENDATIONS

Mendocino College's ability to incorporate LID components into existing curricula, and to develop new classes will need support from entities such as the MCRCD, Mendocino County Departments, and community groups to continue the forward progress of water conservation and water quality protection.

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ACKNOWLEDGEMENTS
Anna Birkas has been the foundation of this project since its beginning, and her participation will be important in this project and to our community.

NORTH COAST RESOURCE PARTNERSHIP

Ackerman Creek Habitat Restoration

PINOLEVILLE POMO NATION

STATEMENT OF THE PROBLEM

Salmonid habitat in Ackerman Creek has been impacted by historic land use practices and invasive species.

PROJECT GOALS

1. Habitat restoration to improve salmonid habitat and re-establish native, culturally used riparian plants
2. Increased youth understanding of and involvement in habitat restoration

THE SOLUTION

Enhance existing habitat restoration efforts through continued removal of *Arundo donax* and Himalayan blackberry and restoration of native riparian forest to increase availability of native plants for cultural uses and create better habitat for salmonids and other wildlife. The project will engage tribal youth to educate them regarding cultural values and activities and ensure long-term interest in and maintenance of the project.

PROJECT IMPLEMENTATION

1. Creek restoration plan design
2. Development of youth training plan
3. Invasive species removal using heavy equipment and disposal through composting
4. Riparian revegetation with native species using drip irrigation
5. Classroom and field classes for youth conducted with project partners
6. Continued monitoring and management for invasive species suppression and riparian revegetation success

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 46,950*
Leveraged funds:	*$ 180,000*
TOTAL	**$ 226,950**

BENEFITS

Economic

- An estimated $2,500 every other year in avoided costs of sediment removal projects
- An estimated $480 per year benefit associated with increased forest biodiversity
- An estimated $3,531 benefit over the life of the project from avoided costs of carbon dioxide emissions due to riparian revegetation
- An estimated $1,582 benefit in increased instream flow due to removal of *Arundo* and replacement with native riparian species

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved water quality and aquatic habitat suitable for sustaining salmonid populations
  - » Improved riparian function through removal of invasive non-natives and revegetation with native tree and shrub species

Cultural benefits

Increased access to culturally significant plants in the revegetated riparian area

- Increased recreational days
- Enhanced human and social capital through involving youth in the restoration of culturally and traditionally important plants and habitats

Jobs and Local Economic Benefit

- The project will use local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

The Pinoleville Pomo Nation will continue riparian restoration and maintenance on streams, creeks and upland habitat within the reservation to support traditional cultural uses, improve water quality, and enhance salmonid and wildlife habitat. Education of Tribal youth will continue to provide a stable cultural foundation and potential career training in natural resources management.

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NORTH COAST RESOURCE PARTNERSHIP

Sustainable Forest, Clean Water, and Carbon Sequestration Demonstration Project

REDWOOD FOREST FOUNDATION INC. (RFFI)

STATEMENT OF THE PROBLEM

Woody biomass is a low value by-product of timber harvesting, bottom up thinning and other similar processes. Biomass is one of the few renewable resources that actually create problems when it is not used. Over population of small diameter trees negatively impact forest health and create fuel that feeds catastrophic forest fires. The Usal Redwood Forest (URF), which contains working timberland, was logged for redwoods multiple times and is now dominated by second-growth Douglas fir and tan oak.

PROJECT GOALS

1. Improve forest health
2. Create an acorn harvesting orchard
3. Convert excess biomass into a usable value added product that has environmental and social benefits
4. Offset the cost of biomass removal
5. Outreach activities to promote regional replication of project

THE SOLUTION

The RFFI is examining how utilizing woody biomass leads to healthier forest, living wage jobs, reducing the risk of catastrophic fires while maintaining our visual landscape, preserving our air quality and regenerating our forests. This project is intended to serve as a demonstration project to determine the environmental, economic and social factors that comprise a successful woody biomass enterprise. This information will be used as an educational tool to build community support for more biomass facilities in the region.

PROJECT IMPLEMENTATION

The Sustainable Forest, Clean Water, and Carbon Sequestration Demonstration project will demonstrate how a biochar facility can help restore timberland ecosystems in the region. The project consists of the following elements:

1. Locate a small biochar facility on or adjacent to the URF.
2. Work with stakeholders including local Native American Tribes to choose demonstration stands for biomass removal. One stand will be chosen for creation of an acorn harvesting area.
3. Thin selected stands and convert waste biomass into biochar.
4. Package biochar; deliver to local markets and sell as soil amendment
5. Work with school gardens and UC Extension to demonstrate benefits of biochar as a soil amendment.
6. Use proceeds of sales to finance continued operation of facility.
7. Scientifically document the project in collaboration with state and local universities and colleges.

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 250,000*
Leveraged funds:	*$ 78,040*
TOTAL	**$ 328,040**

BENEFITS

Economic

- Approximately $1,947 benefit from increased instream flows for environmental purposes
- Approximately $31,422 in benefit from avoided costs of carbon dioxide emissions
- Approximately $577,125 benefit from improved soil nutrients and water holding capacity due to biochar amendment

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flow and decreased likelihood of a catastrophic fire will enhance salmonid habitat
- Decreased likelihood of catastrophic forest fire due to thinning of dense understory

Cultural and Social

- The presence of an acorn harvesting forest will benefit Native American groups who formerly had ceremonial and cultural practices associated with acorn harvest
- This project will educate children and adults about forest fuel management and uses of biochar

Jobs and Local Economic

- The project will use local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

Redwood Forest Foundation Inc. will continue to promote and explore the potential for using woody biomass for energy production and economically viable value-added products by developing strategies for biomass projects that are consistent with community needs and values, that promote environmental health, and that strengthen our local and regional economy.

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NORTH COAST RESOURCE PARTNERSHIP

Copeland Creek Watershed Detention/Recharge, Habitat Restoration, and Steelhead Refugia Project

SONOMA COUNTY WATER AGENCY (WATER AGENCY)

STATEMENT OF THE PROBLEM

The Copeland Creek watershed can be characterized by three zones: 1) upper headwaters — dominated by steep cobble and boulders, 2) alluvial fan — moderately steep, and 3) Rohnert Park urban area — entrenched flood control channel. The lower elevation channels in urban area are linear, trapezoidal, and regularly maintained for in-stream vegetation growth and sediment deposition. In the non-urban area, the creek is unconfined and forms a series of braided channels with little associated riparian vegetation. The headwater area provides the source areas for flood waters, runoff, groundwater recharge, and sediment yields transported downstream.

The regional and local impacts of a 100-year flood have been determined to affect at least one quarter of the downstream City of Rohnert Park including Sonoma State University, Rancho Cotate High School, businesses, residences, and adjoining City arterial roadways. A stormwater detention system sited in the headwaters to reduce peak flow in Copeland Creek would reduce downstream impacts of future 100-year floods.

PROJECT GOALS

1. Stormwater flow management and improved flood protection
2. Increased aquifer recharge
3. Riparian and salmonid habitat enhancement
4. Acquisition, protection, and restoration of suitable lands for conservation and open space purposes.

THE SOLUTION

The Sonoma County Water Agency and its local partners propose to implement a regionally integrated project in the Copeland Creek Watershed in Rohnert Park between Highway 101 and east to Crane Creek Regional Park. This public-private partnership intends to implement the project in three phases and accomplish the following:

- Enhance and restore riparian and salmonid habitat
- Sediment removal and control
- Storm water detention of up to 200 acre-feet
- Increase groundwater recharge
- Increase of 75 to 90 acres of permanent preserved open space
- Construction of more than 6,000 linear feet of public trails

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Phase I of the project includes:

1. Habitat Enhancement and Restoration along 4,700 linear feet including invasive species removal and riparian revegetation (currently underway)
2. Sediment removal in accordance with Stream Maintenance Plan (completed)
3. Design of a detention/recharge system (currently underway)

COMPLETION DATE

Phase 1 is scheduled for completion in June 2016. The remaining phases will be completed as funding is obtained.

PROJECT BUDGET

IRWM funds (state):	*$ 1,000,000*
Leveraged funds (local public and private):	*$ 678,913*
TOTAL	**$ 1,678,913**

BENEFITS

Economic

- Approximate $2,520 annual benefit from the passive-use value associated with increases in forest biodiversity
- Approximate $20,000 annual benefit from avoided maintenance costs
- Approximately $17,789 benefit in avoided costs of carbon dioxide emissions
- Approximately $100,000 would be realized from reduction in the Water Agency's sediment removal cost

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Invasive non-native species removal and riparian revegetation will improve instream habitat, leading to increases in juvenile salmonid survival and salmonid populations
  - » In-stream sediment basins will increase water quality and focus routine sediment removal activities to confined areas, reducing impacts to habitat.
- Reduced flood risk
  - » In-stream sediment basins will facilitate efficient sediment removal, resulting in reduced flood risk
  - » Detention/recharge system design will result in flood protection and groundwater recharge

Cultural & Educational

- Enhanced human and social capital through stakeholders actively collaborating to implement improvements in the Copeland Creek watershed
- Enhanced recreational opportunities and more awareness of the creek and habitat
- Integrative Water Management approach implemented to study watershed, climate

Public Access and Health

- New public trails will connect urban area of Rohnert Park to park and open space lands traversing the three elevation zones of the watershed, providing an urban-to-headwaters corridor within the Laguna and Russian River watersheds.
- Alternative to vehicle access of Regional Park: provision of foot and bike access trail network to nearby recreation opportunities at Crane Creek Regional Park for variety of recreational purposes, affording views, observing and appreciating nature, picnicking, and more.
- New trail network in this area will offer additional opportunities for exercise and connect community to passive and active recreational opportunities contributing to public health and well-being.

Jobs and Local Economy

- Over $400,000 was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Habitat restoration work was largely performed by local at-risk youth and young adults participating in job training and education while working in the community doing conservation projects.
- Eleven (11) habitat restoration jobs were created
- Approximately 14,500 native plants were installed and were locally sourced when possible

Next Steps & Recommendations

The Water Agency and its partners will seek funding for future phases of this project, including construction of the detention/recharge system; trail development; acquisition of preserved open space; collaboration with SSU for educational benefits and study opportunities; and continued habitat enhancement in the Copeland Creek watershed Through its partnership with SSU's *Waters Collaborative Program*, the Water Agency and its partners engage university students in "watershed academics to enhance regional sustainability." The Copeland Creek Project continues to offer opportunities for study, field work, and public engagement, demonstrating the integration of water management practices into the broader community.

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ACKNOWLEDGEMENTS

Sonoma County Agricultural Preserve & Open Space District
Sonoma County Regional Parks
City of Rohnert Park
Sonoma State University
North Bay Conservation Corps
Sonoma Youth Ecology Corps
Sonoma Resource Conservation District (formerly Sotoyome RCD)
University District, LLC

NORTH COAST RESOURCE PARTNERSHIP

Russian River *Arundo donax* Removal and Riparian Enhancement

SONOMA RESOURCE CONSERVATION DISTRICT

STATEMENT OF THE PROBLEM

The invasion of the Russian River watershed by *Arundo donax* is a major factor in the decline of riparian habitat, water quality and ecological function. *Arundo* uses up to three times more water than native vegetation, crowds out native plant species that provide food and shelter for wildlife, and contributes to elevated instream temperatures by preventing establishment of shade tree seedlings. Riparian areas infested with *Arundo* frequently experience bank failures that contribute excess sediment in Russian River streams.

PROJECT GOALS

1. Improve riparian habitat conditions in the Russian River watershed
2. Reduce dense *Arundo* stands
3. Eradicate outlier populations of *Arundo*
4. Educate landowners about impacts of invasive species and opportunities to participate in the *Arundo* removal program

THE SOLUTION

This program will treat and control approximately 150 acres of *Arundo* in the Alexander Valley reach of the Russian River. Through either native plant restoration or succession the removal areas will be revegetated with riparian plants that provide shade, contribute large woody debris, and integrate insect and other food sources for salmonids. In addition to providing habitat for wildlife, native riparian vegetation stabilizes soil and stream banks, decreasing sediment inputs into the river and increasing water quality.

Since the start of the program in 2001, the Sonoma RCD and its partners have made great strides in controlling *Arundo* in the Russian River Watershed:

- 1,500 infested streamside acres of Arundo have been removed from the Russian River and its tributaries with the participation of over 100 landowners
- Over 5000 native riparian plants have been installed
- Over $1.5 Million in competitively-sought grant funds has been spent on the program

PROJECT IMPLEMENTATION

This project is guided by the Sonoma RCD's Strategic Plan for the Russian River *Arundo donax* Removal and Riparian Restoration Program. Methods include mechanical mowing with hand labor used where equipment access is not feasible or sensitive resources are present. Following removal, re-growth is controlled using herbicides approved for aquatic use or tarp covers to block out sun. Where appropriate, removal areas are replanted with locally propagated native riparian species and plantings are irrigated and maintained as required. Monitoring consists of periodic assessments for evidence of reinfestation.

COMPLETION DATE

Ongoing until June 2017

PROJECT BUDGET

IRWM funds:	*$ 225,000*
Leveraged funds:	*$ 70,000*
TOTAL	**$ 295,000**

BENEFITS

Economic

- Approximately $18,000 per year for increased instream flows
- Approximately $24,000 per year in passive use value associated with increased forest biodiversity
- Approximately $32,781 over the next 45 years in avoided costs of carbon dioxide emissions

Water Quality

- Native riparian vegetation will contribute to cooler instream temperatures by providing shade
- *Arundo* has been found to exacerbate bank erosion; removal and replacement with natives will reduce sedimentation

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flow and improved riparian habitat will improve salmonid habitat, creating conditions favorable to increased salmonid populations

Cultural

- Increased salmonid populations have an intrinsic benefit outside the cultural framework and economic terms often imposed by western society
- Increased forest biodiversity has an intrinsic benefit outside the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- About $295,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 12 jobs created and/or maintained for the life of the 4-year project
- Removal of *Arundo* will decrease fire risk, as the presence of *Arundo* typically shifts a plant community from native riparian forest to a fire-adapted *Arundo* monoculture

NEXT STEPS & RECOMMENDATIONS

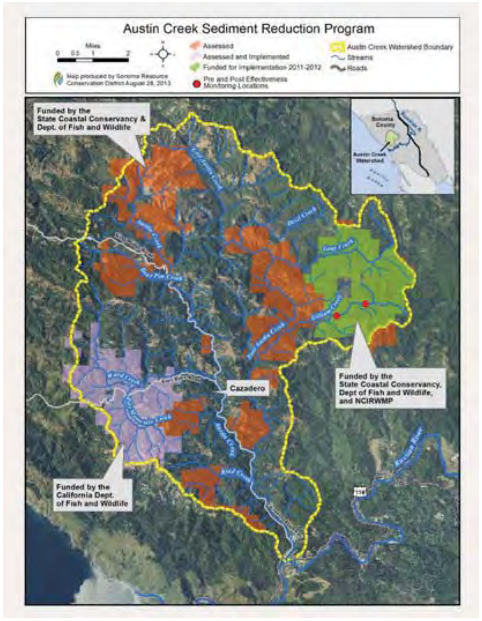
This project is part of an ongoing program to eradicate *Arundo donax* in the Russian River watershed. Sonoma RCD will continue its efforts to obtain funding for and implement projects on private lands that remove *Arundo* and restore native riparian vegetation to improve salmonid habitat and ecological function throughout the watershed.

CONTACT
Sonoma Resource Conservation District
201 Concourse Blvd. Suite B, Santa Rosa, CA 95403
707.569.1448
www.sonomarcd.org

NORTH COAST RESOURCE PARTNERSHIP

Lower Russian River Water Quality Improvement Project

SONOMA RESOURCE CONSERVATION DISTRICT



NORTH COAST RESOURCE PARTNERSHIP

STATEMENT OF THE PROBLEM

The Russian River serves as the primary water source for more than 600,000 residents in Mendocino, Sonoma and Marin counties. The watershed supports economically important activities including agriculture, production and processing of timber, gravel removal and processing, energy production, light industry, and commercial development. In the Lower Russian River Austin Creek is a major tributary to the Russian River. The Austin Creek watershed is primarily rural with no incorporated cities and the Town of Cazadero as the most populous area of the drainage. Austin Creek, as part of the Russian River watershed, is listed as impaired by fine sediment levels under section 303(d) of the Clean Water Act. The California Department of Fish and Wildlife and National Marine Fisheries Services has identified Austin Creek in their Coho Salmon recovery plans as an important steelhead and Coho salmon stream. California's 2002 Section 303(d) List of Water Quality Limited Segments identifies the pollution and stressors in the Lower Russian River as sedimentation, siltation, and pathogens.

PROJECT GOALS

1. Continue the goals of the Austin Creek Watershed Assessment and the RCD Austin Creek Watershed Restoration Program by improving water quality in the Austin Creek Watershed/Lower Russian River with sediment reduction projects
2. Effectiveness monitoring
3. Educate landowners and residents about water quality issues and solutions

PROJECT IMPLEMENTATION AND ITS ACCOMPLISHMENTS

The Austin Creek Sediment Reduction Program Phase I is a multi-phased education, sediment assessment and reduction program to reduce sedimentation in the watershed. The project work plan encompassed three main components to achieve its goals of sediment reduction, landowner collaboration and monitoring. The project stormproofs high priority sediment sources on nearly 12 miles of hydrologically connected road preventing over 13,000 yd³ of fine road derived sediment from entering the waters of Austin Creek and its tributaries Gilliam and East Austin. This project leverages multiple funding sources and builds off of several years of sediment source assessment and implementation in the watershed.

COMPLETION DATE

October 2014

PROJECT BUDGET

IRWM funds:	*$ 375,000*
Leveraged funds:	*$ 41,500*
TOTAL	**$ 416,500**

BENEFITS

Economic

- Approximately $86,636 for avoided costs of sediment deposition

Water Quality

- Preventing over 13,000 yd³ of fine road derived sediment from entering the waters of Austin Creek and its tributaries.

Watershed Rehabilitation

- Sediment reduction will enhance spawning and rearing habitat, creating conditions for increases in juvenile salmonid survival and salmonid populations

Cultural and Social

- Landowner engagement-Five large landowners, including California State Parks were engaged in the road project, adding to the RCDs comprehensive approach to sediment source assessment and implementation in the entire watershed and leading to increased participation by landowners to decrease sediment loading.
- Educational activities — including workshops — will increase public understanding of water quality issues in the watershed from sediment.
- Increased salmon populations have an intrinsic value outside the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- Over $400,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 1 job was created and 4 maintained by the implementation of this project.
- Construction materials necessary for the road project will be purchased locally. These materials include rock, fuel, culvert, hand tools, water/provisions, and heavy equipment rentals.
- Improved reliability of road access reduces the likelihood of road failure during most storm events
- Improved roads will improve access for emergency response vehicles

NEXT STEPS & RECOMMENDATIONS

The Sonoma RCD will continue to leverage existing funding and build on watershed restoration efforts in the Austin Creek Watershed in the Lower Russian River. This project builds off of several years of the Austin Creek Watershed Restoration Program which has included sediment source assessment and analysis, sediment reduction, fisheries habitat improvement through installation of large wood and riparian enhancement projects, water quality monitoring, and pre and post construction monitoring. The Sonoma RCD will continue its efforts to implement recommendations of sediment source analysis in the watershed and restore salmonid habitat. In the past two years the RCD has been able to leverage much of the work completed through this project and has been awarded grants totaling over $1,000,000.00 (with match included) for future implementation projects in the Austin Creek Watershed.

CONTACT
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Santa Rosa, CA 95403
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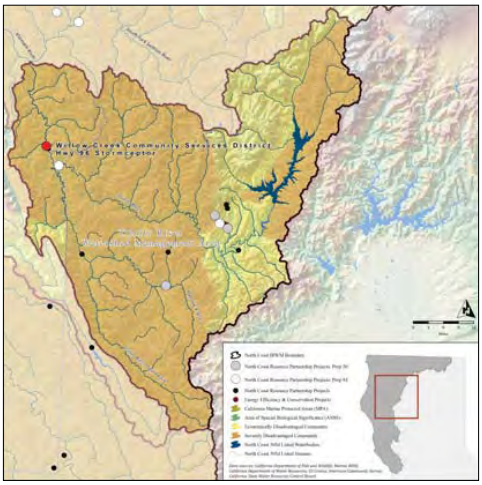
www.sonomarcd.org
info@sonomarcd.org

ACKNOWLEDGEMENTS
The RCD would like to thank the Department of Water Resources, California Department of Fish and Wildlife, State Coastal Conservancy, California State Parks, and local landowners for contributing to the access, permits, and funding that are making this project and program possible.

Highway 96 Stormceptor

WILLOW CREEK COMMUNITY SERVICES DISTRICT (CSD)



STATEMENT OF THE PROBLEM

While we have a pristine water supply source — Willow Creek — the drainage from Highway 96 and the Willow Creek commercial business district are diverted directly upstream from the existing domestic water intake for the CSD. The domestic water intake is at risk from premature failure from sediment and contaminants in stormwater and is at risk from major contamination and system shutdown in the event of an emergency spill or accident that discharges toxins into Willow Creek.

PROJECT GOALS

1. Long-term protection of water quality
2. Water supply reliability
3. Watershed protection from bacteriological and environmental contamination

THE SOLUTION

The project includes construction of a storm water capture, treatment, conveyance, and storage network that will help protect the existing Willow Creek domestic water system and instream habitat from contamination due to stormwater or accidental spills.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The project is comprised of three primary components:

1. *Interception*: the existing stormwater conduit near the Highway 96 bridge over the creek will be directed to an underground interceptor tank where particulates and oils will be removed.
2. *Conveyance*: the cleaned stormwater will be transferred from the interceptor tank through a perforated conduit in a drain rock lined trench that allows the water to percolate and recharge the water table with excess water conveyed to a detention basin.
3. *Detention*: An earth basin will be created in a low-lying region adjacent to the creek. It will be sized to maximize temporary stormwater storage, which will accumulate in the basin until it percolates or evaporates. By the time the percolated water reaches Willow Creek it will be sufficiently clean so that it does not pose a threat to the domestic water system or instream habitat.

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 25,000*
Leveraged funds:	*$ 110,000*
TOTAL	**$ 135,000**

BENEFITS

Economic

- Avoidance of a temporary shutdown of the water system due to toxic discharges or accidents on Highway 96 would provide an estimated benefit of $1,296 per day in lost revenue for the duration of the shutdown
- An estimated $149,850 in avoided replacement costs will be realized by preventing contaminants from eroding filters and other components of the domestic water system

Water Supply

- This project increases water supply reliability for Willow Creek by removing the potential for system shutdown due to toxic discharges or accidents on Highway 96

Water Quality

Prevention of contamination from spills or stormwater ensures high quality water for domestic water supply and environmental beneficial uses

Jobs and Local Economy

- About $135,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- The project will postpone peak discharge of stormwater from the commercial district into the creek, reducing the risk of a flood event and will reduce the cost of flood damage given a significant storm event

NEXT STEPS & RECOMMENDATIONS

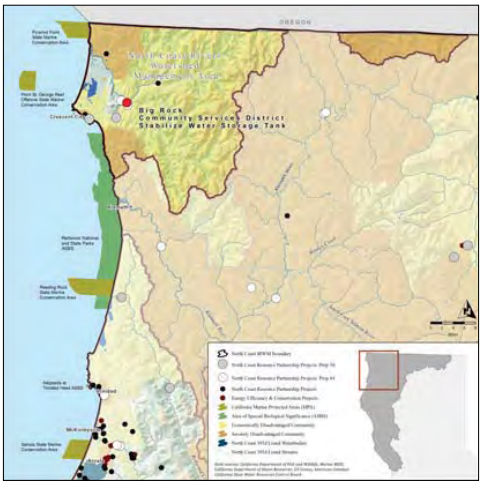
The CSD will maintain project infrastructure to ensure its longevity.

CONTACT
Lonnie Danel
Willow Creek Community Services District
Willow Creek, CA 95573
530.629.2136

NORTH COAST RESOURCE PARTNERSHIP

Water Tank Stabilization Project

BIG ROCK COMMUNITY SERVICES DISTRICT



STATEMENT OF THE PROBLEM

The Special District's water system is aging and in need of replacement. Its 100,000 gallon Redwood water storage tank was built in 1971 on a steep hillside with grades between 50 and 70%. Runoff from above has eroded the tank's foundation, increasing the probability that the gravel fill prism under the tank will fail during a 5.5 or greater magnitude earthquake and a wet winter. If this occurs, a massive landslide would follow, destroying the Township's water system, approximately 19 homes in Hiouchi, and portions of Highway 199. The damage would include probable loss of life and disruption of water service to other customers. The catastrophic debris front could reach the Smith River in minutes, depositing a large sediment and debris load into the river. The intensifying catastrophe would generate collateral water-quality issues for downstream water users and seriously harm salmonid habitat in a Wild and Scenic River.

PROJECT GOALS

1. Protect public health
2. Ensure water supply reliability
3. Minimize impacts to the environment
4. Maintain firefighting storage capacity

PROJECT IMPLEMENTATION

Primary engineer and contractor is GHD Engineering. The project replaces the system's existing water storage tank with a new steel tank built to modern seismic standards and anchored in granite bedrock. The Community Services District will locate the tank on land immediately adjacent to the existing site. Before construction, the District plans to improve the access road to the storage tank area. A temporary water system will be activated using an existing 50,000 gallon tank to maintain minimum water pressure in the system. Unfortunately water flow to the community will be somewhat reduced at that point. To address shortages, the District intends to enact water conservation measures and will expect fire suppression agencies to find alternative sources of water until the new water system is operational.

The construction phase includes excavating the new site to bedrock, building a concrete retaining wall, and pouring a concrete tank foundation and footings. Site drainage improvements and features to prevent damage to downslope properties will be added. The District will then install the new tank, piping, and valves, including a seismic shut-off valve to prevent a broken pipe from draining the entire tank. Communications, lighting, security, and monitoring equipment are next in the schedule of events.

When construction is complete, the new tank will undergo disinfection and water quality testing before being placed online. The District then will lift water-use limitations, restore fire protection services, dismantle the existing 100,000 gallon tank, and sell the Redwood staves.

PROJECT BUDGET

IRWM funds:	*$ 875,221*
Leveraged funds:	*$ 648,979*
TOTAL	**$ 1,524,200**

BENEFITS

Economic

- Estimated $9,019 per year for avoided costs of property damage
- Estimated $1,400 per year for reduced operations and maintenance costs
- Estimated $19,808,156 for avoided injury and death
- Estimated $829,549 for avoided costs of improved water supply reliability

Water Quality

While this project is designed to protect the community from a massive landslide—thereby avoiding a catastrophic release of sediment, housing, and forest debris upon a populated area—it would preserve the pristine water quality of the Smith River.

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Avoiding damage to salmonid habitat will help to maintain instream habitat for spawning and rearing, preventing decreases in steelhead and salmon populations

Social

- Avoided serious threats to public health, including the effects of disrupted emergency services
- Avoided damage to one of only three evacuation routes from Del Norte County and the associated utility lines

Jobs and Local Economy

- Over $1,500,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Other local economic benefits, including avoided losses of public and commercial thoroughfare into and out of Del Norte County and principal electrical/communications utility lines
- Avoided loss of access and water service disruptions to campgrounds and parks
- Avoided costs of emergency repairs
- Avoided costs of sediment and debris loading

NEXT STEPS & RECOMMENDATIONS

The Special District will maintain and monitor the new storage tank and continue to seek funding for and implement projects to upgrade aging infrastructure.

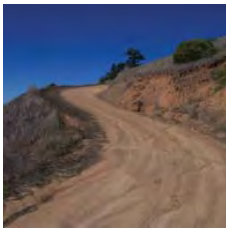
CONTACT
Craig Bradford
Big Rock Community Services District
Crescent City, CA 95531
707.458.9933

ACKNOWLEDGEMENTS
Unanimous support from the Del Norte County Board of Supervisors and the North Coast Resource Partnership

NORTH COAST RESOURCE PARTNERSHIP

Fish Friendly Farming and Fish Friendly Ranching Environmental Certification in the Russian, Navarro, and Gualala River Watersheds

CALIFORNIA LAND STEWARDSHIP INSTITUTE



STATEMENT OF THE PROBLEM

Grazing and agriculture in the Gualala, Russian and Navarro River watersheds can generate sediment that erodes from pastures, cultivated land, roads and creeks, chemical runoff from fertilizer and pesticide application, and contribute to higher water temperatures. Sediment, chemical runoff, and increased water temperatures reduce instream habitat quality.

Many of the agricultural lands in the project watersheds are owned and farmed by individuals with low incomes and limited means to implement best practices to minimize environmental damage. If future regulations require farmers and ranchers to meet more stringent requirements, they may not be able to maintain their operations at current levels, reducing employment opportunities for residents of disadvantaged communities.

PROJECT GOALS

1. Improve water quality
2. Enhance riparian and aquatic habitat
3. Improve drought preparedness and encourage adaption to climate change
4. Preserve agricultural heritage in Sonoma and Mendocino counties

THE SOLUTION

The Fish Friendly Farming (FFF) and Fish Friendly Ranching (FFR) Environmental Certification Programs increase ecosystem function on agricultural and grazing lands while sustaining economic viability. They implement water quality improvements including: sediment source control, road and gully repair, water conservation and use efficiency, enhancement of riparian corridors through invasive species removal and revegetation, and widening riparian corridors. This project will improve 20,000 acres in the Russian, Gualala and Navarro River watersheds with a focus on disadvantaged communities.

PROJECT IMPLEMENTATION

CLSI and the farmer produce and implement a detailed Conservation Plan that reviews potential sediment sources including production lands, roads, creek channels, and ditches. The Plan inventories potential for chemical runoff, water supply facilities, and the stream network and aquatic habitats. BMPs and corrective projects are implemented and the site is certified by NMFS, NCRWQCB, and the County Agricultural Commissioner. To maintain certification, the participant must be recertified every 5 years.

PROJECT BUDGET

IRWM funds:	*$ 190,000*
Leveraged funds:	*$ 520,000*
TOTAL	**$ 710,000**

BENEFITS

Economic

- Approximately $23,639 per year from increased instream flows for 10 years
- Approximately $718,133 per year from avoided costs of sedimentation for 10 years
- Approximately $62,580 over 50 years for improved ecosystem services

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Removing invasive species, increasing instream flows, reducing sediment loading, and restoring natural geomorphic processes will benefit wildlife habitat
  - » Reducing the number of livestock in streams will reduce bacterial contamination
  - » Requiring participating growers to use cover crops will increase carbon sequestration

Cultural and Social

- Bringing farmers together in a workshop may strengthen relationships, allowing them to transfer skills and information more efficiently
- The project will ensure additional water availability for environmental beneficial uses, reducing future water conflicts
- Assisting farmers/ranchers to comply with regulations helps safeguard the area's agricultural heritage

Jobs and Local Economy

- Over $700,000 will be spent locally using local labor and supplies when possible, contributing to State goals for environmental justice and social equity
- Increasing farmers' skills and technological understanding may translate into increased earnings as they develop more cost-effective, efficient, and productive practices.

NEXT STEPS & RECOMMENDATIONS

The California Land Stewardship Institute will continue to seek funding for and implement the FFF/FFR Environmental Certification Programs to increase environmental value and ecosystem function on agricultural and grazing lands while sustaining economic viability and preserving the Region's agricultural heritage.

CONTACT
Laurel Marcus
California Land Stewardship Institute
Napa, CA 94558
707.253.1226 ext 1

NORTH COAST RESOURCE PARTNERSHIP

Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program

CALIFORNIA LAND STEWARDSHIP INSTITUTE

STATEMENT OF THE PROBLEM

Some farmers on the Russian River and its tributaries divert water for frost protection during spring months and these diversions can rapidly reduce water flows to levels that are harmful to federally listed fish populations. This is especially problematic in dry years and climate change may increase the frequency and severity of these conditions. In 2009, NMFS proposed a moratorium on using stream diversions for frost control (NMFS 2009) and the SWRCB developed regulations that would regulate these diversions in 2011, but they were invalidated by the California court system in 2012. It is uncertain what will happen next, but the issue is ongoing.

The City of Ukiah's wastewater treatment plant (WWTP) produces effluent that is discharged into the Russian River. The City's permit from the NCRWQCB restricts the timing and amount of effluent discharged. Discharge needs often exceed the limits of the permit, especially when flows in the Russian River are low. The City has invested in a system to treat the water to standards acceptable for agricultural use. It has developed a 20-year plan to find beneficial uses for the effluent and frost protection is a potential use.

PROJECT GOALS

1. Reuse municipal treated water for agricultural frost protection and irrigation
2. Improve recovery of listed salmonids
3. Reduce water-related conflicts
4. Address critical water supply and quality needs of the disadvantaged community Ukiah
5. Agricultural climate adaptation

THE SOLUTION

This project will construct Phase 1 of the City of Ukiah's Master Plan Recycled Water Project, including a storage pond at the treatment plant, distribution lines to farms, a new pump station at the plant, and two storage ponds and pump systems on private land.

PROJECT IMPLEMENTATION

This project includes several components:

1. Implementation of a municipal recycled water system for agricultural frost control and irrigation to replace direct diversions,
2. Two water storage projects to replace direct diversions
3. Construction of Phase 1 of Ukiah's Master Plan Recycled Water Project and a storage pond at the treatment plant, a distribution line from the plant to the farms, and a new pump station at the plant

PROJECT BUDGET

IRWM funds:	*$ 523,500*
Leveraged funds:	*$ 960,899*
TOTAL	**$ 1,494,399**

BENEFITS

Economic

- Approximately $14,399 per year from increased instream flow to enhance water quality, ecosystems, and salmonid populations

Watershed Rehabilitation

- Improved fish and wildlife habitat
- Reduction in withdrawals for frost control is expected to increase salmonid survival

Cultural and Social

- Reduce conflict associated with frost control withdrawals
- Protection of salmonids has a benefit outside of the cultural framework and economic values often imposed by western society

Jobs and Local Economy

- Nearly $1.5 million will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Reduce costs of unauthorized wastewater discharges
- Reduce costs to City of Ukiah of conducting effluent impact studies
- Reduce costs for downstream users by limiting pollutant discharge and maintaining instream flows
- Use of treated wastewater will protect scarce water supplies
- Agricultural sustainability through enhanced reliability of water supplies for frost protection

NEXT STEPS & RECOMMENDATIONS

California Land Stewardship Institute will continue to participate in the Russian River Frost Program and seek funding for and implement projects that protect ecosystem services, salmonid populations, and agricultural sustainability in the Russian River watershed.

CONTACT
Laurel Marcus
California Land Stewardship Institute
Napa, CA 94558
707.253.1226 ext 1

NORTH COAST RESOURCE PARTNERSHIP

Coastal Watersheds Enhancement Project, Phase 2

GOLD RIDGE RESOURCE CONSERVATION DISTRICT

STATEMENT OF THE PROBLEM

The Gold Ridge district's coastal watersheds, including Salmon Creek and the Russian River tributary of Dutch Bill, once provided high quality habitat for coho salmon and steelhead. The Estero Americano, while not a coho-bearing stream, sits at the heart of the Pacific Flyway and serves as an important coastal wetland for numerous species of concern, including the winter-run steelhead trout. In recent decades, increased water diversions, sedimentation, and loss of habitat complexity have led to a decline in riparian health and alarming crash in salmonid populations.

Dutch Bill Creek saw a complete extirpation of its once thriving coho population, with the last remaining wild juvenile Coho observed during the summer of 2006. Since 2006 Dutch Bill Creek has been a priority site of juvenile Coho releases through the Russian River Coho Salmon Captive Broodstock Program. The creek suffers from two main limiting factors to salmon recovery: a lack of habitat complexity due to the absence of large wood, and large-scale summer water diversions. One of these diversions decreases streamflow by up to 0.3 cfs (which can amount to 100 percent of streamflow) over a period of several hours, on a frequency that varies between two and seven times per week.

The Salmon Creek and Estero Americano watersheds suffers from considerable sedimentation, water shortages, and riparian health impacts. Dairy farms within these watersheds are their most significant water users.

PROJECT GOALS

1. Streamflow augmentation in key reaches
2. Enhanced instream habitat
3. Fine sediment reduction
4. Public outreach and education

THE SOLUTION

The project will integrate a variety of strategies to improve water resources:

- Implement an off-channel water storage system in the Dutch Bill Creek watershed that will combine with irrigation improvements and other water conservation efforts to completely eliminate the creek's most significant diversion;
- Address key limiting factors to salmonids through Instream habitat improvements;
- Construct a large-scale roof rainwater catchment system on a dairy operation along Salmon Creek to reduce summer diversions from an alluvial well;
- Implement upland and streambank sediment source reduction projects throughout the coastal watersheds.

PROJECT IMPLEMENTATION

The project work plan includes four main components to achieve these goals:

1. Eliminating the largest diversion from Dutch Bill Creek through irrigation improvements and the construction of an approximately 250,000 gallon water storage tank and conveyance system;
2. Construction of 27 large wood structures along the Dutch Bill Creek to improve salmonid habitat;
3. Construct off-channel water storage for the largest remaining diversion on Salmon Creek;
4. Implement small-scale, landowner-initiated sediment reduction projects.

PROJECT BUDGET

IRWM funds:	*$ 307,750*
Leveraged funds:	*$ 144,500*
TOTAL	**$1,337,750**

BENEFITS

Economic

- Estimated $1.45 million annually for passive use value associated with increases in salmonid populations
- Estimated $7,427 per year for increased flows for environmental purposes
- Estimated $4,150 per year for avoided costs due to sedimentation

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flows, decreased sedimentation, and enhanced instream habitat will create conditions favorable to increased salmonid populations

Cultural and Social

- Outreach for this project is likely to increase public understanding of and support for water conservation and watershed enhancement projects
- Increased salmon populations have an intrinsic value outside the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- Over $ 1.3 million will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Approximately 12 jobs created/maintained
- At least two local businesses will have a more secure water source
- By providing capacity to store water, the project reduces the likelihood that people will experience unmet demands when water is scarce

NEXT STEPS & RECOMMENDATIONS

These projects further advance GRRCD's expanding water conservation program, working to provide immediate benefits to riparian systems while advancing technologies to prepare its communities for less predictable rainfall patterns in the long run. In addition to streamflow augmentation, these key reaches will benefit from instream habitat improvements and sediment source management. These components all contribute to the GRRCD's integrated approach to water management, balancing watershed health with community water resource needs.

CONTACT
Noelle Johnson
Gold Ridge Resource Conservation District
2776 Sullivan Rd, Sebastopol, CA 95472
707.823.5244

ACKNOWLEDGEMENTS
The project team would like to thank the USDA Natural Resources Conservation Service, the Department of Fish and Wildlife, Dragonfly Stream Enhancement, Streamline Engineering, FishAmerica Foundation, and participating landowners.

NORTH COAST RESOURCE PARTNERSHIP

Gualala River Sediment Reduction Program

GUALALA RIVER WATERSHED COUNCIL

STATEMENT OF THE PROBLEM

The USEPA Clean Water Act §303(d) lists the Gualala River as an impaired water body due to excessive sedimentation and high water temperature, which has resulted in declines in salmonid populations. In 2003 the Gualala River Technical Support Document (TSD) estimated that the Gualala River watershed's present erosion rate was 1,220 t/mi2/yr, with a background erosion rate of 380 t/mi2/yr. Newer sediment source assessments conducted at the scale of planning watersheds in the Gualala are consistent with the TSD finding . The Gualala River TSD finds that road-related erosion accounts for 58 percent of the total estimated watershed erosion rate and 85 percent of the anthropogenic portion of the estimated erosion rate.

PROJECT GOALS

1. Improve water quality and quantity in the Gualala River watershed
2. Work towards TMDL goal attainment

THE SOLUTION

Gualala River Watershed Council will collaborate with landowners to treat sediment sources on high and medium priority road networks to prevent sediment from entering the watercourses in the Lower Rockpile basin, a highly erosive area with excessively high in-stream sediment deposits in the Gualala River Watershed.

PROJECT IMPLEMENTATION

1. Conduct supplementary inventory assessment using GRWC database as a starting point. Confirm or reprioritize site needs based on assessment.
2. Site specific plans and specifications
3. Environmental documentation and permitting
4. Project construction
5. Final inspection and project closeout
6. Project monitoring and effectiveness assessment

PROJECT BUDGET

IRWM funds:	*$ 259,000*
Leveraged funds:	*$ 280,280*
TOTAL	**$ 539,280**

BENEFITS

Economic

- Estimated $11,419 annually for avoided costs associated with sediment deposition
- Estimated $14,490 annually for avoided emergency repair costs associated with culvert failures
- Estimated $26,700 per year for avoided costs associated with reduced road maintenance
- Estimated $113,800 per year in passive use value associated with enhanced riparian forest habitat over the next 50 years

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved instream habitat on 12.9 miles of blue line streams
  - » By removing sediment, restoring riparian habitat, and improving habitat for aquatic species the project will directly benefit salmonid habitat

Water Quality

- By treating sediment sources on high and medium priority road networks the project will prevent 25,827 cubic yards of sediment (or 1,464 tons per year) from entering 12.9 miles of watercourses in the Lower Rockpile basin

Cultural

- Increases in salmonid populations have an intrinsic value outside the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- Over $500,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Assist in maintaining and creating 5 to 10 jobs within the community.
- By reducing sediment, restoring riparian habitat, and improving instream habitat for aquatic species on 12.9 miles of streams, the project will help remediate impacts of declines in salmonid populations and restore recreational fisheries

NEXT STEPS & RECOMMENDATIONS

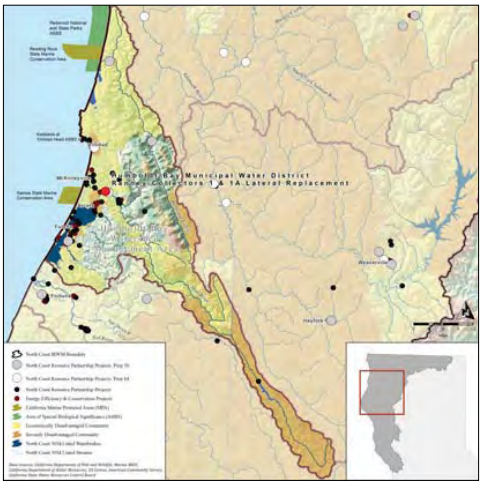
The Gualala River Watershed Council will continue to seek funding for and implement projects that reduce sedimentation and improve habitat in the Gualala River watershed.

CONTACT
Kathleen Morgan
Gualala River Watershed Council
Gualala, CA 95445
707.884.9166

NORTH COAST RESOURCE PARTNERSHIP

Ranney Collectors 1 & 1A Lateral Replacement

HUMBOLDT BAY MUNICIPAL WATER DISTRICT (HBMWD)



STATEMENT OF THE PROBLEM

HBMWD's water collection system is nearly 50 years old and its capacity to produce water has declined. HBMWD estimates that all of the laterals would progressively fail within the next 20 years, reducing water supply reliability and resulting in emergency operations and maintenance costs. With ongoing use of the existing system, engineering studies have shown that operation and maintenance costs associated with pumping, treatment, and overall system operation will be higher than with new collectors. Ultimately, the collectors will become unusable, requiring HBMWD to replace them after incurring extensive costs to keep the deteriorating system running.

Additionally, water treatment costs would increase. After it pumps and collects water, HBMWD treats the water to drinking water standards: chlorine is added, and during the winter, HBMWD processes the water at its Turbidity Reduction Facility (TRF). As the collection system has aged, HBMWD has had to increase flow velocity to maintain the same flow rate and volume production, which picks up more sediment and increases turbidity.

PROJECT GOALS

1. Provide a reliable supply of high quality drinking water
2. Reduce groundwater impacts
3. Improve energy efficiency

THE SOLUTION

The proposed project installs new laterals in Collectors 1&1A, ensuring capacity is maintained

PROJECT IMPLEMENTATION

This project focuses on the 2nd phase of a multi-phase project, installing new laterals in Collectors 1&1A by projecting new stainless steel laterals out from the existing caisson. Cores will be cut through the sides of the existing caissons and new laterals will be projected into the aquifer from within the existing caisson, minimizing environmental impact. The new laterals will reduce the flow velocities, reducing turbidity.

Given greater capacity of the new laterals and lower flow velocities, drawdown in the collectors will likely be reduced by several feet, reducing the energy required to pump water from the caisson to the treatment and distribution system. HBMWD provides flow to the collectors by releasing water from Ruth Lake, therefore, in addition to assuring water supply reliability, this project will maintain beneficial flows for salmonids in the Mad River.

Project Budget

IRWM funds:	*$ 666,624*
Leveraged funds:	*$ 966,372*
TOTAL	**$ 1,632,996**

BENEFITS

Economic

- Approximately $5,000,000 in avoided costs associated with expansion of the TRF
- Approximately $1.6 million in avoided costs associated with replacing Collectors 1 & 1A
- Approximately $1,800 annually for avoided costs associated with water treatment
- Approximately $16,800 annually for avoided costs associated with reduced energy use
- Approximately $4,462 over the life of the project for avoided costs associated with reduced CO_2 emissions

Groundwater

- Groundwater quality will be improved by spreading out groundwater production and recharge areas

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Maintenance of beneficial flows for salmonids

Cultural and Social

- Sustainable salmon populations have an intrinsic worth outside the cultural framework and economic terms often imposed by western society
- Reduced risk of shortage to HBMWD customers during periods of peak demand

Jobs and Local Economy

- Over $1.6 million will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Protecting late-summer flows in the Mad River will avoid impacts to recreation

NEXT STEPS & RECOMMENDATIONS

HBMWD conducted a systematic approach to assessment and planning for refurbishing its Ranney Collector Wells. Several phases of the refurbishment have been completed. The Collector 1&1A lateral replacement project is the next phase, with laterals in Collectors 2 and 4 to be replaced at a later stage.

CONTACT
Carol Rische
Humboldt Bay Municipal Water District
Eureka, CA 95501
707.433.5018

NORTH COAST RESOURCE PARTNERSHIP

Lower Mid-Klamath Habitat Protection — Road Decommissioning Implementation Project

KARUK TRIBE

STATEMENT OF THE PROBLEM

Thirty miles of road within the Mid-Klamath Watershed near the town of Orleans, California are a source of anthropogenic sediment discharge in Red Cap and Pearch Creek, 303(d) listed water bodies in the Klamath River Basin. The Red Cap Creek drainage does not meet fines or embeddedness values for the National Marine Fisheries Service Matrix of Factors and Indicators, or reference streams. These road networks are the primary threat to function of salmonid refugia, spawning, overall water quality, wildlife, and cultural beneficial uses in these waterbodies.

The road and culverts were designed and constructed using a 20-year flood standard and do not meet the current design standard (100-years). A Hydrologist with Six Rivers National Forest has predicted the culverts will fail during a 10–15 year storm event, which includes events with 6 to 8 inches of precipitation during a 24 hour period. The culverts also present an erosion risk from failure, potentially delivering 98,700 to 5,800,000 cubic yards of sediment to the watershed during such a year storm event.

PROJECT GOALS

1. Protect and enhance salmonid habitat
2. Benefit local economically disadvantaged communities

THE SOLUTION

This project decommissions roads to remove and stabilize unstable fill and reestablish the natural hillslope drainage pattern along the intervening road reaches.

PROJECT IMPLEMENTATION

The prescribed treatments include site-specific plans that will be implemented to reduce sediment sources and protect habitat with maximum efficiency. This project will implement proven decommissioning methods to remove and stabilize unstable fill at road/stream crossings, swales and springs, and reestablish the natural hillslope drainage pattern along the entire road using heavy equipment and hand labor.

Post-project erosion and sediment control measures and revegetation include sowing native grass seed and fertilizer by hand and using a 750 gallon hydroseeder when feasible, followed by the spreading of onsite native mulch material (brush, trees) where suitable material exists. If suitable mulch material is not onsite, certified weed-free rice straw will be utilized.

Willow cuttings/stakes may be used in post-excavated stream crossings, swales, and seeps. In addition, each excavated live stream crossing will be rock armored to minimize post project adjustments.

PROJECT BUDGET

IRWM funds:	*$ 300,000*
Leveraged funds:	*$ 75,000*
TOTAL	**$ 375,000**

BENEFITS

Economic

- Approximately $560 annually for reduced probability of culvert failure
- Approximately $212,344 annually for avoided costs associated with sedimentation
- Approximately $1,800 per year for avoided costs associated with reduced road maintenance
- Approximately $1,106 over the next 50 years for passive-use values associated with enhanced riparian habitat

Water Quality

- Sediment reduction efforts contribute towards meeting goals of the Klamath TMDL for sediment

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Enhanced salmonid habitat through decreasing sediment deposition is expected to lead to increased salmonid populations

Cultural and Social

- Reducing the number of road-related landslides will protect access
- Salmon are an important part of Karuk traditions and culture and provide material and spiritual sustenance

Jobs and Local Economy

- About $375,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

This project is a continuation of restoration efforts in the Mid Klamath and initiates restoration efforts in the Red Cap and Pearch Creek watersheds. It will be implemented in relation to the restoration strategy outlined in the Orleans Transportation and Road Restoration Project Environmental Assessment findings.

CONTACT
Earl Crosby
Watershed Restoration Coordinator, Department of Natural Resources
Karuk Tribe
Happy Camp, CA 96039
530.469.3454

NORTH COAST RESOURCE PARTNERSHIP

Mendocino County Working Landscapes Riparian Demonstration Project

MENDOCINO COUNTY RESOURCE CONSERVATION DISTRICT (MCRCD)

STATEMENT OF THE PROBLEM

Spanning approximately 30 miles on the upper main stem Russian River, more than 60 stands of *Arundo donax* have been identified. The *Arundo* invasion threatens to biodiversity and connectivity of riparian habitat in the Russian River, and directly impacts habitat for threatened salmonids. In addition, *Arundo* increases fuel loads, contributing to wildfire risk. It also has the potential to exacerbate flooding and contribute to downstream flood damage.

In Denmark Creek, a failing culvert upstream of a recently completed riparian and instream restoration project, is cutting off access to upstream spawning and rearing habitat for steelhead. The culvert, located on an abandoned segment of Highway 128, is not functioning and diverted flows are further eroding the stream channel. Within the next 20 years, the culvert is expected to fail in an episodic event and deliver fill to the channel, damaging downstream structures and restored habitat.

PROJECT GOALS

1. Demonstrate cost-effective methods of restoring riparian habitat
2. Demonstrate cost-effective methods of erosion control
3. Outreach and education to promote voluntary riparian enhancement

THE SOLUTION

MCRCD is proposing two riparian demonstration projects on working landscapes in the Upper Russian and Navarro watersheds. These include: Upper Russian River *Arundo* removal and riparianenhancement and Phase 2 of Denmark Creek Riparian Restoration.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

1. **Upper Russian River:** MCRCD and agricultural operators will remove large infestations of *Arundo* from the banks of the river channel. MCRCD will follow-up with native revegetation over a three-year period, particularly in areas where bank erosion is a concern. MCRCD will use native willow sprigging or willow mattresses on bank slopes and other native species on uplands. Monitoring and maintenance—which includes checking for reinvasion, controlling new infestations, and ensuring that revegetation maintains a sustainable survival rate—will occur for three years.
2. **Denmark Creek:** MCRCD will remove the failing culvert upstream of newly restored habitat, opening approximately 0.4 miles of available spawning and rearing habitat. MCRCD will also restore the streambank back to a 2:1 slope and revegetate bare soils with native California trees and shrubs, seed with native erosion control seed mix, and mulch with weed-free rice straw, creating approximately 0.3 acres of riparian habitat.

PROJECT BUDGET

IRWM funds:	*$184,800*
Leveraged funds:	*$ 23,244*
TOTAL	**$208,044**

BENEFITS

Economic

- Approximately $3,750 per year in avoided emergency repair costs associated with culvert failure
- Approximately $500 in avoided costs associated with road maintenance
- Approximately $3,686 per year in avoided costs associated with sediment deposition
- Approximately $856 over 50 years for passive use value associated with enhanced and increased riparian habitat

Water Quality

- Reduction of 7,172 tons of sediment delivered to Navarro River system
- Watershed Rehabilitation
- Improved fish and wildlife habitat
- Improved instream conditions create conditions for increased salmonid populations

Cultural and Social

- The project will demonstrate best practices for riparian restoration which will likely improve land management

Jobs and Local Economy

- All funds will be spent using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 8–10 jobs created/maintained
- Other local economic benefits:
  - » Improvements to aesthetic amenities at Denmark Creek are likely to contribute to improvement in recreation quality and quantity
  - » Decreased wildfire risk
  - » Decreased flooding risk

NEXT STEPS & RECOMMENDATIONS

Both parts of this project are components in larger programs that improve fisheries, water quality, and associated beneficial uses in their respective watersheds. MCRCD will continue to seek funding and implement projects that advance these programs.

CONTACT

Janet Olave
Mendocino County Resource Conservation District
206 Mason Street, Suite F, Ukiah, CA 95482, 707.462.3664

NORTH COAST RESOURCE PARTNERSHIP

Distribution System and Hydrants

SALYER MUTUAL WATER COMPANY (SMWC) *A NON-PROFIT, TAX-EXEMPT MUTUAL BENEFICIAL CORPORATION*

STATEMENT OF THE PROBLEM

Since 1998, the California Department of Public Health has maintained a standing boil order advisory for water users in the SMWC service area because the unfiltered source water does not meet Safe Drinking Water Act requirements. SMWC took over the operations in 2012 after regulatory violations, deferred maintenance resulting in leaks, low water pressure, and lack of proper chlorination led to abandonment of system by previous owners.

Power outages and frequent leaks, both detected and undetected, result in water outages and require extreme water conservation to avoid shortages, including bottled water purchases and bulk water deliveries. The system is insufficient for fire protection and Salyer is considered at high risk from wildland fires.

PROJECT GOALS

1. Water supply safety and reliability
2. Adequate flow for fire safety

THE SOLUTION

This project will build a dedicated distribution system and replacement of water mains that are beyond their useful life; installation of fire hydrants for fire protection and install/replace shutoff valves to reduce leaks and water shortages.

PROJECT IMPLEMENTATION

SMWC's distribution system project includes:

- Abandonment of the water system's existing distribution lines (approximately 10,000 feet)

Installation of new PVC piping. Trenching will be properly bedded and backfilled to reduce drainage problems and breaks caused by traffic loads. Surface will be restored to its original condition in accordance with environmental requirements. There will be adequate separation between raw water lines and septic lines/systems.

- Connection of residential services to new distribution system.
- Installation of fire hydrants for fire protection and main flushing.

Results of implementation of project:

- Reduced water shortages and outages; reduced energy use
- Reduced water waste and water unnecessarily pumped from river
- Preserving water flows in river downstream; protection of salmon habitat

PROJECT BUDGET

IRWM funds:	*$200,000*
TOTAL	**$200,000**

BENEFITS

Economic

- Approximately $14,750 per year for reduced costs of hazard insurance
- Approximately $759 per year for avoided costs of bottled water purchases associated with short-term water outages
- Approximately $2,360 per year for avoided costs of bulk water purchases associated with long-term water outages
- Approximately $1,600 per year for avoided costs associated with reduced energy demands
- Approximately $1,267 over 40 years from avoided costs of climate change due to reduced carbon emissions
- Approximately $4,090 per year from avoided costs associated with emergency repairs
- Approximately $720 per year in reduced uncompensated water loss — the current distribution system crosses properties haphazardly and it is difficult to detect and prove theft; project proponents estimate the water system has at least two unauthorized users
- Approximately $2,000 per year in avoided costs associated with operations and maintenance
- Approximately $3,510 per year in reduced water treatment costs
- Approximately $616 per year in increased instream flows for environmental purposes

Water Supply

- Increased water supply reliability for a disadvantaged community

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flows of 8 acre-feet per year will improve salmonid and other wildlife habitat

Jobs and Local Economy

- About $210,000 will be spent locally using local labor and supplies when possible, contributing to State goals for environmental justice and social equity
- Trinity Valley Consulting Engineers is a local firm who hires and/or contracts with local people as needed. Water operator will assist in planning and continue maintenance/treatment responsibilities.
- Reduction/elimination of outside water purchases and reduction in fire insurance costs
- Reduced risk of fire damage and loss of life
- Reduced costs associated with boil water advisory

NEXT STEPS & RECOMMENDATIONS

Salyer Mutual has two stand-alone infrastructure improvement projects that together assure a safe water supply. The CDPH-project focuses on surface water treatment and finished water storage and this NCIRWMP project focuses on the distribution system that will deliver water.

CONTACT
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Salyer Mutual Water Company
Salyer, CA 95563
530.629.2719

ACKNOWLEDGEMENTS
John Hamner, Rural Community Assistance Corporation

NORTH COAST RESOURCE PARTNERSHIP

Siskiyou County Septage Pond Closure

SISKIYOU COUNTY

STATEMENT OF THE PROBLEM

Siskiyou County inherited an unpermitted septage receiving facility when it acquired the Siskiyou County Airport from the United States Air Force in the 1970s. The septage receiving facility, which is an unlined pond, receives approximately 750,000 gallons of raw sewage each year from permitted haulers in the County. However, because the facility has exceeded its design life, is situated in an area of shallow groundwater, and lies approximately 900' east of Oregon Slough, a small tributary to the Shasta River and first order tributary to the Klamath River, concerns have been raised about the potential for groundwater and surface water impacts. (Both Shasta and Klamath rivers are 303(d) listed streams affected by organic enrichment and low dissolved oxygen.) Because of these concerns, the County is under a long-standing North Coast Regional Water Quality Control Board (RWQCB) directive to close the facility. Further, in 2009, the Klamath Riverkeeper notified the County and RWQCB of its intent to file a preemptory writ of mandate regarding use of the unpermitted facility. Although the Siskiyou County Board of Supervisors have long been committed to closing the unpermitted septage receiving facility, a lack of sufficient resources necessary to close and properly remediate the site has kept the facility open.

THE SOLUTION

With the award of Prop 84 funding, the Siskiyou County Board of Supervisors has resolved to close the facility by November 1, 2013, with remediation slated to occur during summer 2014. The Siskiyou County Septage Pond Closure project will excavate septage waste and impacted soil from the affected site and relocate it to an impermeable surface on the adjacent airport property where it will be allowed to air dry. It is anticipated that the dried material will then be applied to adjacent County-owned agricultural land that is used for hay production. However, if the dried waste is unable meet the criteria for land application, it will be transported to a lined landfill for disposal.

PROJECT GOALS

1. Protect ground and surface water quality
2. Ensure access to safe drinking water
3. Protect special-status fish species and habitat
4. Reduce exposure to fines, penalties, and litigation

PROJECT IMPLEMENTATION

The project will consist of the following components:

1. Excavation and drying
   - » Dewater and decant septage waste in situ
   - » Screen sludge for plastics, garbage, and other inert materials
   - » Transport sludge to drying bed and turn to accelerate drying
2. Site remediation
   - » Address any effluent and sampling requirements
   - » Backfill site with native soil and initiate revegetation
3. Disposal
   - » Test excavated material to determine appropriate method of disposal
   - » If determined safe and appropriate, dried waste will be applied to adjacent county-owned agricultural land
   - » If land application is determined to be infeasible, dried waste will be transported to and disposed of at an approved landfill

PROJECT BUDGET

IRWM funds:	*$ 389,775*
Leveraged funds:	*$ 130,594*
TOTAL	**$ 520,369**

BENEFITS

Economic

- Approximately $150,000 in avoided RWQCB levied fines and/or legal fees

Water Quality

- Elimination of a potential source of water contamination for current and future human use
- Reduced risk of groundwater contamination

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » By eliminating the ongoing disposal of nitrate and dissolved oxygen content waste adjacent to Oregon Slough, the project reduces potential impacts to critical habitat for adult and juvenile salmonids in the Shasta and Klamath Rivers.

Social

- Resolution of longstanding conflict over the ongoing use of the septage pond, which is a recognized source of potential ground and surface water contamination

Jobs and Local Economy

- Over $500,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Avoidance of regulatory fines
- Avoidance of legal fees

NEXT STEPS & RECOMMENDATIONS

Implementation of the RWQCB-approved septage facility closure plan. In addition, Siskiyou County will continue its efforts to protect public health and safety, as well as improve fish and wildlife habitat, through implementation of projects that safeguard water quality.

CONTACT

Greg Plucker, Director
Siskiyou County Community Development Department
806 South Main Street, Yreka, CA 96097
530.841.2100

ACKNOWLEDGEMENTS

Roy O'Connor, North Coast Regional Water Quality Board
SHN Consulting Engineers & Geologists
Katherine Gledhill and Karen Gaffney, West Coast Watershed
Bill Navarre, Siskiyou County Environmental Health Division

NORTH COAST RESOURCE PARTNERSHIP

West Weaver Creek Channel and Floodplain Rehabilitation

TRINITY COUNTY RESOURCE CONSERVATION DISTRICT (TCRCD)

STATEMENT OF THE PROBLEM

West Weaver Creek is a branch of Weaver Creek, a headwater tributary to the Trinity River. West Weaver Creek lies just west of the town of Weaverville, Trinity County, California. It has good water quality and is ideal for supporting habitat for Coho and Steelhead. West Weaver Creek has a reach 1,000 feet upstream of its confluence with Grub Gulch, adjacent to Highway 299 and mostly within the Weaverville Community Forest, which has been degraded by historic hydraulic mining and recent fires. This reach has poor salmonid habitat, and supplies fine sediment to Trinity River downstream. Currently, the project reach is incised with prominent in-channel bedrock exposure, minimal in-channel cover, little substrate to support spawning and macroinvertebrate productivity, and no high-flow refugia.

PROJECT GOALS

1. Salmonid habitat improvement
2. Reduce sediment yield to Trinity River
3. Advance technical methodology for salmonid restoration project modeling/ monitoring and performance measures

THE SOLUTION

TCRCD will implement creek rehabilitation on a degraded reach of West Weaver Creek, near Weaverville, Trinity County, California.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The project involves pool and riffle construction, spawning gravel augmentation, and riparian planting to improve instream habitat though increased in-channel and floodplain sediment sorting and retention, decrease fine sediment yield, improve passage to upstream habitat, increase spawning and rearing habitat, increase colonization surfaces for macroinvertebrates, and increase high flow refugia. The project will reduce water temperature in Willow Creek by increasing hyporheic exchange from gravel augmentation.

Located in the Weaverville Community Forest, the project allows local stewardship of important natural resources and strengthens development of community-based conservation. The U. S. Forest Service's Redwood Sciences Lab will continue their fish population monitoring and modeling of the creek, and their pre- and post-project monitoring will document the fish population response and benefits of the project in relation to the wider region. Fish habitat and water quality improvements will also provide benefits to the downstream Trinity River, expanding the geographic influence of this restoration project.

PROJECT BUDGET

IRWM funds:	*$ 441,500*
Leveraged funds:	*$ 266,700*
TOTAL	**$ 708,200**

BENEFITS

Economic

- Approximately $2,907,414 over 50 years from passive-use value associated with increased salmon populations
- Approximately $219 per year from avoided costs associated with reduced probability of sediment deposition
- Approximately $1,398 over 50 years for ecosystem services provided by enhanced/increased riparian habitat

Water Quality

- Construction of complex fish habitat structures and riparian forest rehabilitation may increase groundwater recharge and help rebuild productive floodplain soils, potentially reducing evapotranspiration and groundwater heating

Watershed Rehabilitation

- Improved fish and wildlife habitat
- Improved instream habitat creates conditions for increased salmonid populations
- Technical modeling/monitoring and performance measures will potentially help guide future projects and reduce costs associated with future efforts

Cultural

- Increased salmonid populations have an intrinsic value outside the cultural framework and economic terms often imposed by western society

Jobs and Local Economy

- Over $700,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- 8 jobs created/maintained

NEXT STEPS & RECOMMENDATIONS

Trinity County will continue to seek funding for and implement projects to improve riparian and floodplain habitat, protect surface and groundwater quality, and preserve the agricultural heritage of the Trinity River watershed.

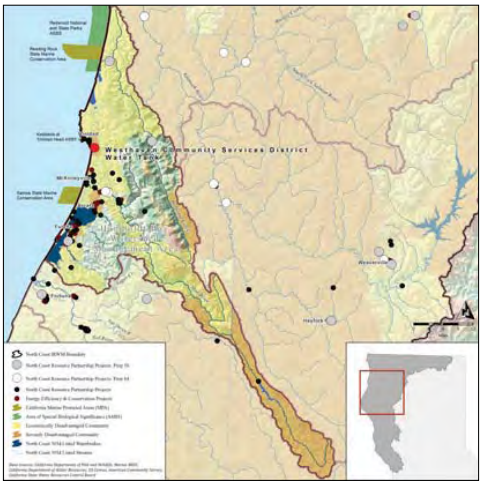
CONTACT
Alex Cousins
Trinity County Resource Conservation District
Weaverville, CA 96093
530.623.6004

ACKNOWLEDGEMENTS
Trinity County Resource Conservation District
Trinity River Restoration Program
Trinity River Watershed Council
Aaron and Amy King
U.S. Forest Service Shasta-Trinity National Forest Trinity River Management Unit
U. S. Forest Service Redwood Sciences Lab
ESA PWA (Environmental Science Associates)

NORTH COAST RESOURCE PARTNERSHIP

Westhaven Community Services District Water Tank

WESTHAVEN COMMUNITY SERVICES DISTRICT (WCSD)



STATEMENT OF THE PROBLEM

The WCSD water supply system relies on a single 100,000 gallon concrete storage tank with a metal roof supported by fir trusses in an advanced state of rot. A 2005 inspection listed the condition of the roof as a "system or operational defect and/or potential health hazard—costly to correct—to be included in any long-range water improvement project."

The roof has exceeded its lifespan. The deterioration of the trusses is such that a catastrophic event such as an earthquake or heavy winds could cause the roof to collapse. Without repair, it is highly likely the roof will fail in the next 5 years.

If the roof fails, it would take about 6 months to repair the existing tank and roof. In the interim, WCSD would issue a boil water order and provide bottled drinking water to its users. After initial cleanup, which would take several days, the WCSD would keep the tank in service and provide non-potable water during construction of a new tank. While the tank was out of service, WCSD would supply the system directly from the gravity fed slow sand filter. During peak demand, WCSD would augment supplies with untreated water directly from an open reservoir. Residents would be without a potable water source during replacement roof constructions—6 months—and without any water source during temporary roof construction—about 5 days.

PROJECT GOALS

1. Ensure an adequate, reliable, and sanitary supply of drinking water

THE SOLUTION

WCSD will construct a new tank that meets current seismic code, and allows it to repair the failing roof on its existing tank.

PROJECT IMPLEMENTATION

The project will:

1. Construct a new glass-lined steel 85,000 gallon storage tank adjacent to the existing concrete tank to allow the system to take the existing tank out of service
2. Replace the roof on the existing tank with a new free-span aluminum roof.

The project will also construct a new ring-wall foundation, install station piping, and install a cathodic protection system, tank floats and related controls. The new tank will operate in series with the existing tank.

PROJECT BUDGET

IRWM funds:	*$ 360,000*
Leveraged funds:	*$ 20,000*
TOTAL	**$ 380,000**

BENEFITS

Economic

- Approximately $60 per year in avoided costs associated with issuing a boil water notice
- Approximately $77,079 in avoided costs associated with bottled water purchases
- Approximately $28,548 in avoided costs associated with flushing the water system
- Approximately $999 in avoided costs associated with temporary loss of water supply
- Approximately $1,000 per year in avoided costs associated with reduced water treatment
- Approximately $449 in avoided costs associated with reduced energy use
- Approximately $15 in avoided costs of climate change from reduced carbon emissions
- Approximately $243 in avoided costs associated with temporary roof construction
- Approximately $155,000 in avoided costs associated with construction of a permanent roof

Water Supply

- Improved water supply reliability through reduced risk of periodic shortages

Water Quality

- Improved drinking water quality through reduced levels of harmful pollutants

Social

- Improved health through reduction of harmful pollutants in drinking water

Jobs and Local Economy

- About $380,000 will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

WCSD will continue to maintain and upgrade the water supply system to ensure reliable, high quality drinking water to its customers.

CONTACT
Richard Swisher
Westhaven Community Services District
Trinidad, CA 95570
707.677.0798

NORTH COAST RESOURCE PARTNERSHIP

Restoration of Lower Klamath River Habitats — Yurok Tribal Fisheries Program

YUROK TRIBE

STATEMENT OF THE PROBLEM

In the Lower Klamath River, Euro-American land use activities since the mid-1850s have caused drastic declines to fish runs and degraded habitats. Past agricultural practices and intense timber harvest and road-building activities have greatly simplified Lower Klamath watersheds. Large floods occurring over the last 150 years have exacerbated degraded watershed conditions by increasing rates of riparian loss, channel widening, and valley aggradation. Although conditions have been improving due to improved forest practices and ongoing upslope and instream restoration, the severe loss of habitat complexity and channel structure remains a primary limitation to the survival of native fish of the Lower Klamath, especially salmonids.

PROJECT GOALS

1. Enhance and restore native salmonid populations through a process-based approach
2. Promote economic stimulus to disadvantaged communities
3. Support implementation actions in the Klamath River TMDL Action Plan
4. Continue providing an inclusive framework for intra-regional cooperation, planning, and implementation

THE SOLUTION

The project restores spawning and rearing habitat for native salmonids and increases riparian forest resiliency on two miles in two priority Lower Klamath tributaries: Terwer Creek and Hunter Creek.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Project activities include: building constructed wood jams, implementing bioengineering techniques (willow baffles), and riparian revegetation in Hunter and Terwer creeks. Physical and biological monitoring will be conducted to assess project effectiveness and to help guide future restoration efforts. The Yurok Tribal Fisheries Program will immediately address known limiting factors and facilitate self-maintaining processes to ensure long-term benefits to native salmonids and the Yurok who rely on them for cultural, subsistence, and economic purposes. These actions will provide an economic stimulus to disadvantaged communities by providing employment to Tribal staff and patronizing local businesses.

PROJECT BUDGET

IRWM funds:	*$ 421,354*
Leveraged funds:	*$ 776,914*
TOTAL	**$ 1,198,268**

BENEFITS

Economic

- Approximately $777,505 over 50 years for use and passive use values associated with increased salmonid populations
- Approximately $2,744 per year for avoided costs associated with reduction in sediment deposition
- Approximately $48,229 over 50 years for passive use value associated with increased riparian habitat
- Approximately $2,864 over 50 years for ecosystem services provided by enhanced and increased wetlands
- Approximately $11,650 over 50 years for avoided costs of climate change from carbon sequestration

Groundwater

- The project's restoration techniques are expected to increase groundwater recharge

Water Quality

- Improved water quality will benefit the 303(d) listed Lower Klamath River and Hunter and Terwer Creeks

Cultural and Social

- Outreach for this project will increase public understanding of and support for watershed enhancement projects
- Increased community support for and participation in future projects will make restoration projects easier to implement and less costly
- The project will reduce wood piracy by increasing channel complexity, limiting vehicle access, working with stakeholders and agencies to improve awareness and law enforcement, and fostering stewardship
- Increased salmonid populations confer cultural benefits; a healthy river and robust salmon fishery are central to the Yurok tradition, cultural practices and well-being

Jobs and Local Economy

- Nearly $1.2 million will be spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- At least 10 high quality, resource-based jobs will be maintained

NEXT STEPS & RECOMMENDATIONS

Although this project is a stand-alone effort, it is part of a larger-scale effort by the Yurok Tribe to restore Klamath Basin habitats to levels that will support viable, robust populations of anadromous fish.

CONTACT
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Yurok Tribe, Klamath, CA 95548
707.482.2841 ext. 235

NORTH COAST RESOURCE PARTNERSHIP

I.3.2 PROPOSITION 84 PROJECT Summaries

Fish Friendly Farming Environmental Certification Program

CALIFORNIA LAND STEWARDSHIP INSTITUTE

STATEMENT OF THE PROBLEM

The FFF Environmental Certification Program worked with three agricultural landowners to identify and assess pollutant sources, prescribe Best Management Practices (BMPs), and implement projects to ameliorate and prevent their recurrence.

PROJECT GOALS

Short-term Goals:

- Felta Creek: replace non-native invasive plants species with appropriate native plant species
- King Ranch: expand and enhance riparian corridor
- Summerhome Park: replace non-native species in the riparian corridor with appropriate native plant species

Long-term Goals:

- Creation of dense native riparian corridors with habitat conditions that support listed salmonids and other wildlife
- Contribute to efforts to meet sediment and temperature TMDLs

THE SOLUTION

The Russian River watershed is listed as impaired by two main pollutants: fine sediment and high water temperature. These pollutants affect beneficial uses including cold freshwater habitat, fish migration and spawning, rare and endangered species, wildlife habitat, agricultural and municipal water supply and recreation. This program worked directly with landowners to implement three habitat improvement and sediment and water temperature reduction projects.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Felta Creek. California Land Stewardship Institute (CLSI) worked with the landowner and contractors to remove invasive non-native understory and replaced it with native understory plants and trees.

King Ranch. CLSI worked with the landowner to remove non-native invasive yellow star thistle and install native trees to further enhance a riparian slough created in 2002.

Summerhome Park. This project removed invasive, non-native understory plants from riparian corridor in the Guerneville area and replaced them with native understory from local native stock.

COMPLETION DATE

March 31, 2013

PROJECT BUDGET

IRWM funds:	*$210,510*
Leveraged funds:	*$112,811*
Total:	**$323,321**

BENEFITS

Economic

- Trees planted will provide an estimated economic benefit of $303,366/yr for the air quality benefit provided by carbon sequestration
- Removal of invasive non-native plants will provide an estimated economic benefit of $1,716 per/yr

Habitat and Ecosystem Function

- 21.5 acres of habitat (6,366 linear feet of stream) restored
  - » 14.3 acres of invasive non-native plants eradicated
  - » 1580 native understory plants and trees planted
- Establishment of riparian forest with regenerative capacity to sustain the shade canopy and cold water conditions required by salmonids

Cultural

- This project supports the watershed's long history of agriculture. Working with landowners to implement TMDL requirements helped them avoid fines associated with noncompliance.
- Landowners learn BMPs that can be effectively applied in perpetuity, increasing the likelihood of continued invasive plant management and maintenance of healthy riparian habitat
- Implementation of the projects implements TMDLs, reducing potential for conflict.

Jobs and Local Economy

- This project cost $ 323,321, which was spent in the area to improve farming practices using local supplies and labor when possible, thus contributing towards State goals of environmental and social justice.
- Jobs created or maintained : 2.8 full time person years

NEXT STEPS

Next steps include enrollment of other watershed landowners in the Fish Friendly Farming program and continued outreach and education of watershed residents.

CONTACT
California Land Stewardship Institute
Laurel Marcus
Executive Director
(707)253-1226 x1
laurelm@fishfriendlyfarming.org

ACKNOWLEDGEMENTS
The Center for Social and Environmental Stewardship for growing and installing the native plants

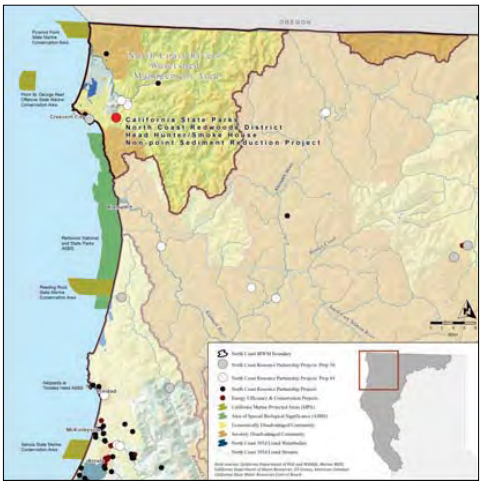
Bruce Hurst Firewood, Stipp Ranch, Chevalier Vineyard Management, Shelterbelt Builders and Dutton Ranches for Invasive plant control.

King Farms, Green Pastures Vineyard and Summerhome Park Association for sponsoring and contributing to the projects on their property.

NORTH COAST RESOURCE PARTNERSHIP

Head Hunter/Smoke House Non-Point Sediment Reduction

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION



STATEMENT OF THE PROBLEM

The Mill Creek Watershed Addition (MCA) was managed for timber, resulting in an extensive network of haul roads, skid networks, landings, and clear-cut slopes. These pose a threat to aquatic resources of Hunter, Mill, Rock, and Wilson Creeks.

PROJECT GOALS

Short-term Goals: prevent road-related sediment delivery to the drainage network

Long-term Goals: protect water quality and preserve salmonid habitat

THE SOLUTION

This project eliminated road-related erosion by recontouring the landscape to pre-disturbance topography. The landscape was re-formed into unbroken hillside, ridge top, stream drainage, etc. with no further maintenance required.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The project used techniques described in the CDFW California Salmonid Stream Habitat Restoration Manual Part X (2006).

- **Road segments.** Excavators and dozers removed vegetation growing on the cutbank, cutbench, and embankment, moved and compacted fill, and recontoured road surfaces. Trees and brush moved prior to excavation were used as mulch.
- **Landings.** Recontouring landings required the same methods as recontouring roads; however landings had larger embankment unit volumes .
- **Stream crossings.** Trees and brush were removed and a temporary dam of sandbags installed upstream to create a small pool. A trash pump and fire hose diverted stream surface flow. The excavator removed fill from crossing banks and excavated the stream channel. Bare soil surfaces were mulched with removed vegetation and the following winter, disturbed areas within 30 m of the channel centerline were reforested with native trees.
- **Sediment pollution reduction.** Roughly 43% of the total volume of fill was estimated to erode or fail and deliver to the drainage network. Restoring natural hydrologic and topographic patterns and recontouring the potentially unstable material eliminated excessive erosion likely to occur, alleviating downstream impacts.

COMPLETION DATE

August 3, 2010

PROJECT BUDGET

Total cost: $269,162

BENEFITS

Economic

- Contributes to efforts to revitalize commercial salmon fisheries
- Increased terrestrial recreation due to improved trail construction corridors
- Increased aquatic recreation due to improved whitewater rafting and kayaking
- Using a benefit of $6/ton to represent the sum of several avoided costs associated with reducing sedimentation, this project provided a benefit of $33,534[1]
- Using a benefit of $2,100 per tree, planting 223 native trees (60% survival rate) provides an estimated yearly carbon sequestration benefit of $351,225[2]

Habitat and Ecosystem Function

- 20,700 cubic meters of sediment stabilized/prevented from entering water courses
- Increased habitat connectivity and reduced terrestrial migration barriers
- Reduced pool filling, reduced stream bank erosion, improved cover and spawning habitat
- 250 feet of stream channel restored to hydrologic function
- 2.9 miles of abandoned logging roads decommissioned and restored to natural topography and hydrology

Jobs and Local Economy

- The project cost $269,162, which was spent locally, using local labor and supplies when possible, contributing to State goals for environmental justice and social equity.
- 9 jobs created/maintained

NEXT STEPS

Long-term management of the MCA will focus on restoring old growth forest characteristics to this former commercial timberland, providing opportunities for recreation, research, interpretation, and protecting biological and cultural resources (CDPR 2011).

CONTACT
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707.445.5344, bmerr@parks.ca.gov

REFERENCES

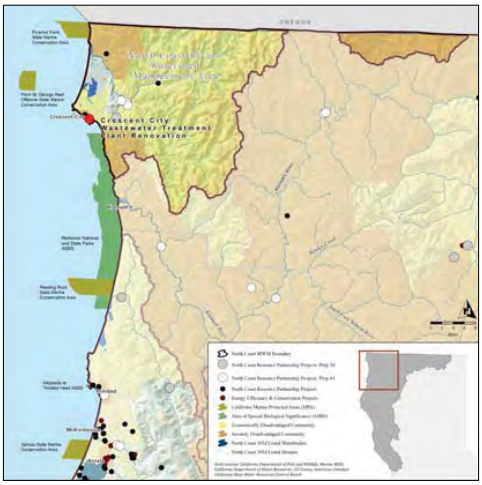
California Department of Parks and Recreation (CDPR). 2011. Local Watershed Plan, Mill Creek Property and Watershed, Del Norte Coast Redwoods State Park.

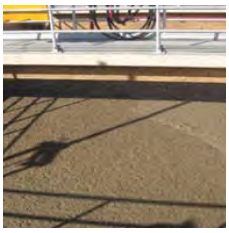
Flosi, G., R.N. Taylor, M. Love, B. Weaver, D. Hagans, E. Weppner, and K. Bates. 2006. California Salmonid Stream Habitat Restoration Manual, Volume 2. 4th edition. Part X Upslope Erosion Inventory and Sediment Control Guidance.

NORTH COAST RESOURCE PARTNERSHIP

Crescent City Wastewater Plant Renovation

CITY OF CRESCENT CITY





STATEMENT OF THE PROBLEM

The current facility is operating under a cease and desist order from the California Water Quality Control Board because it can no longer adequately meet the service area's need for safe and efficient treatment of wastewater. A new facility is critical to both current needs and anticipated growth for the next 20 years; there is currently a moratorium on development until wastewater issues are under control. A component of the project will install Membrane Bioreactor technology to treat wastewater to standards suitable for reuse in agricultural irrigation.

PROJECT GOALS

Improve the capacity of the Crescent City wastewater treatment system to adequately treat wastewater to meet pollution control standards for water discharged into the Pacific Ocean habitat.

THE SOLUTION

This project will be implemented in three stages; this Phase I stage included : new influent pumping equipment and controls, new grit removal system, primary clarifier modifications, upsizing and upgrade of site piping, removal of underground storage tank and diesel contaminated soil, addition of membrane bioreactors for production of Title 22 Water, ultra-violet disinfection for Title 22 Water, effluent pumping for Title 22 Water and bio-solids thickening and pumping, and the implementation of state-of-the-art technology using membrane bioreactors able to produce high quality effluent. The City will look for opportunities to use this system in the future.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The facility has installed the necessary equipment and performed initial testing that shows the system is capable of producing up to 1.2 mgd of recycled water. However, there is currently no economically viable use for recycled water given an anticipated golf course project did not move forward.

COMPLETION DATE

March 2014 (intended)

PROJECT BUDGET

IRWM funds:	*$ 935,602*
Leveraged funds:	*$ 40,000,000*
TOTAL	**$ 40,935,602**

BENEFITS

Economic

- Avoided water supply project benefit estimated at $3,770,000
- Stalled development will proceed

Water Quality

- Effluent discharge at Title 22 quality, improving discharge quality into the ocean

Jobs and Local Economic Benefit

- The project used local labor and supplies when possible, thus contributing to State goals for social equity
- Increased economic development

NEXT STEPS & RECOMMENDATIONS

The City of Crescent City will continue to seek funding for and implement further phases of the WWTP facilities plan.

CONTACT
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Crescent City, CA 95531
707.464.4405

NORTH COAST RESOURCE PARTNERSHIP

City of Etna Water Supply Improvement Project

CITY OF ETNA

STATEMENT OF THE PROBLEM

The City of Etna's water infrastructure had not been upgraded in over 30 years and was in need of improvement. Additionally, the existing structure blocked passageway for adult and juvenile salmonids.

PROJECT GOALS

Short-term goals

- Complete repairs and improvements to the City's water supply system
- Restore fish passage to 4.8 miles of habitat
- Install and use instream gauge

Long-term goals

- Ensure water supply reliability for the City of Etna
- Increasing anadromous fish population above dam site

THE SOLUTION

This project is located on Etna Creek in the Scott River watershed, a main tributary to the Klamath River. The 27,500-acre watershed supplies domestic water for the City of Etna, irrigation water for agriculture, and habitat for resident and anadromous fish. A water system feasibility study in 2004-5 showed need for extensive improvements to the diversion dam and related structures. Project completion ensures continued domestic water supply reliability for the City, fish access to habitat above the dam, and accurate stream flow data.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The water supply diversion consists of a reinforced concrete dam across Etna Creek. The dam crest was rehabilitated to improve fish passage over the spill way. The fish ladder was replaced with a reinforced concrete step and pool that has already provided fish passage. The sediment basin was reconstructed, a stream flow gage was placed on the supply line, and a fish screen was installed on the intake. City funding was used to replace 60-year old deteriorating steel pipeline with new waterworks standard PVC pipeline.

- August 18, 2010: Instream excavation began
- August 25, 2010: Diversion dam rehabilitation began
- September 1, 2010: Fishway construction began
- October 15, 2010: Sediment basin rebuilt
- November 29, 2010: Basic fencing completed
- December 10, 2010: Construction substantially completed

COMPLETION DATE

December 2010

PROJECT BUDGET

IRWM funds:	*$ 593,936*
Leveraged funds:	*$ 69,334*
Total cost:	**$ 663,270**

BENEFITS

Economic benefits

- Increased recreational benefit estimated at $31,277
- Avoided project costs are estimated to be $842,707
- A reliable water supply makes the City more attractive to potential new low-impact businesses and industries
- The City may now move ahead with economic development plans knowing the water supply is in excellent condition and capable of supplying water for predicted growth

Water Supply

- Avoided water supply costs associated with maintenance, water shortages, and water purchases are estimated to be $74,107
- Funding for the project has allowed the City to keep water rates low in this Economically Disadvantaged Community
- 60% decrease in summer water emergencies caused by insufficient flow

Habitat and Ecosystem Function benefits

- 4.8 miles of salmonid habitat newly available on Etna Creek above the dam

Cultural benefits

- Community cohesiveness. This project garnered community affirmation and was seen as a necessary and expedient use of funds for the benefit of Etna citizens while also fulfilling environmental conservation and fish habitat goals.
- Conflict reduction. This project is likely to ease water-related conflicts and demonstrates the City of Etna's commitment to collaborating with local and regional groups working towards solutions to water-related problems.

Jobs and Local Economic Benefits

- Project implementation cost $663,270, which was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity.
- Jobs maintained: 2 city employees.
- Secure and reliable source of pure mountain water kept high water-use businesses operating supporting 10-15 employees, depending on the season.
- In spite of an extreme dry year, the City of Etna supplied potable water for three large wildfire "Incident Camps" for over three weeks (over 2000 firefighters) for which the City was paid at the regular water rate.

NEXT STEPS

The installation of the stream flow gauge will provide baseline data for changing future conditions.

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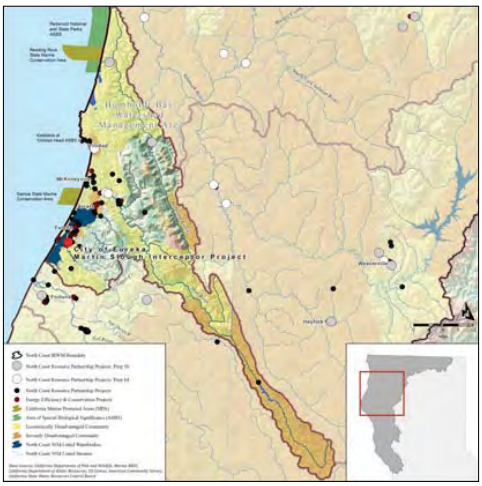
ACKNOWLEDGEMENTS
Morgan Eastlick, Etna City Engineer; Rico Tinsman, Planning; Pam Russell, Etna City Clerk; Dan Burbank and Brandon Facey, Etna M&O staff; Resource Management (biological survey); Jennifer Jenkins and Devon Theobald, Humboldt County Staff; Lisa Renton, Karen Gaffney, and Katherine Gledhill – all of whom, with incredible patience and kindness , made it possible for this project to come to pass.

NORTH COAST RESOURCE PARTNERSHIP

Martin Slough Interceptor

COUNTY OF HUMBOLDT



STATEMENT OF THE PROBLEM

Humboldt Bay supports a significant commercial oyster industry and recreational shellfishing. Both commercial and sport shellfish resources are impacted by runoff from urban and rural areas. Contamination from collection system overflows of raw sewage during high intensity rainfall events is a continued threat to commercial and recreational uses of the bay.

PROJECT GOALS

Short-term: construction of a wastewater interceptor system in four separate construction phases over four years

Long-term: Increased public safety and wastewater system reliability, elimination of aged wastewater lift stations, and improved wastewater system efficiency, safety, and capacity.

THE SOLUTION

Phase 1 of the Martin Slough Interceptor project provides storage capacity for more than 150,000 gallons of wastewater that, during high intensity (up to a 20-year storm) rainfall events, would otherwise be released into the Martin Slough Watershed as Sanitary Sewage Overflows (SSOs).

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

This grant cycle has funded the gravity interceptor pipeline and the Phase 2A pump station. To successfully implement the project, engineering design and construction specifications were set to the highest industry standards, utilizing state-of-the-art technology for both mechanical equipment and construction methodology, monitoring, and testing. High factors of safety were designed into the pump station by designing redundancy into dual (high flow/low flow) sets of pumps and controls, and backup power generation with sophisticated controls and current Supervisory Control and Data Acquisition (SCADA) technology. Additional factors of safety were designed into the gravity collection and transport system to ensure trouble free operation and environmental protection from SSO's over the life of the project. All structures and pipelines have been designed to current seismic and industry standards in conformance with the detailed soils analysis and recommendations presented in the Martin Slough Interceptor Geotechnical Study completed in March, 2003. Revegetation efforts within the project area where construction was completed consisted of reseeding with herbaceous species representative of pre-project species composition; and replanting woody riparian vegetation at a ratio of 2:1 (two individuals planted for each individual removed).

COMPLETION DATE

March 2013

PROJECT BUDGET

IRWM funds:	*$ 4,063,743*
Leveraged funds:	*$12,512,000*
Total cost:	**$16,575,743**

BENEFITS

Economic benefits

- $172,154.57 in avoided water treatment pumping and odor control costs
- $1,942,887.29 in avoided operations and maintenance costs
- $29,026,923 in avoided project costs
- $1,985,994 in avoided shell fisheries closures

Water Quality

- Enhancement of COMM, MAR, SHELL, SPWN, and WQE beneficial uses

Habitat and Ecosystem function benefits

- Ecosystem restoration benefits to improve salmonid and shellfish habitat
- Improved sport and commercial fishing industries
- Improved recreation and tourism industries

Jobs and Local Economic Benefits

- The project cost $16,575,743 which was spent using local labor and supplies when possible, contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

The entire Martin Slough Interceptor project, when complete in 2015, will convey wastewater flows from up to 16 decommissioned lift stations in the Martin Slough Basin to the City's Elk River Wastewater Treatment Facility in a safe and efficient manner that will reduce risks of Sanitary Sewer overflows (SSO's) into the Martin Slough Basin, Elk River, and Humboldt Bay.

CONTACT
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Kgierlich@ci.eureka.ca.gov

NORTH COAST RESOURCE PARTNERSHIP

Sonoma County Water Recycling and Habitat Preservation Project Phase 2A

CITY OF SANTA ROSA UTILITIES DEPARTMENT

STATEMENT OF THE PROBLEM

The Russian River is habitat for three federally listed salmonids and insufficient summer flows limit habitat suitability. Summer months are hot and dry and landscape irrigation increases. Increased use of irrigation water was identified as a factor in reduced flows.

PROJECT GOALS

Short-term Goals:

- Replace potable Russian River water with recycled water at existing irrigation sites

Long-term Goal:

- Reduce amount of water diverted from the Russian River to improve salmonid habitat
- Diversify water supply sources to ensure water supply reliability
- Test the implementation plan for an extensive urban reuse project

THE SOLUTION

The project involved the construction of pipelines, pump stations and filtration for delivery of tertiary treated recycled water to urban sites relying on potable water from the Russian River. This project contributed to reducing summertime diversions from the Russian River by replacing existing potable water in Santa Rosa with recycled water for landscape irrigation use which mainly occurs during the summer months.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Construction of the initial mainline alignment and the subsequent mainline expansion alignment included installing recycled water transmission and distribution line and various gate valves, recycled water services and meter boxes, blow offs, air and vacuum relief valves, and sampling stations.

For initial and expansion customer retrofits, construction included ensuring there was separation between irrigation and domestic systems, labeling irrigation equipment, installing advisory signs, converting existing hose bibbs to quick couplers, severing the irrigation system from the potable supply, removing potable water meters and installing new recycled water meters.

COMPLETION DATE

March 2013

PROJECT BUDGET

IRWM funds: $4,004,603
Leveraged funds: $9,563,415
Total cost: $13,568,018

BENEFITS

Economic

- Instream flow is estimated to have a value of $80 per acre foot per year (Brown 2007); therefore, this project provides an estimated benefit of $3,280 per year

Water Quality

- Reduction of recycled water discharge into the Russian River during winter months

Water Supply

- Increased water supply reliability through diversification of the City of Santa Rosa's water supply

Habitat and Ecosystem function

- Increase of 41 acre ft of water instream during critical summer months in the Russian River

Cultural and Social

- Education
  - » Public outreach included educational materials distributed to approximately 52,000 customers, raising awareness of the benefits of recycled water use
  - » Creation of a dedicated recycled water website — www.srcity.org/recycledwater — containing recycled water outreach materials and the City's User's Guide

NEXT STEPS & RECOMMENDATIONS

The City will continue to operate and maintain the recycled water system, provide Recycled Water Site Supervisor Training and customer site inspections to ensure recycled water is used per recycled water rules and regulations, and explore funding opportunities for Phase 1 West of the Santa Rosa Urban Reuse Project.

CONTACT
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jburke@srcity.org

REFERENCES

Brown, T.C. 2007. The Marginal Economic Value of Streamflow from National Forests: Evidence from Western Water Markets. In: M. Furniss, C. Clifton, and K. Ronnenberg, eds. Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18–22 October 2004. Gen. Tech. Rep. PNW-GTR-689. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. P. 458–466.

NORTH COAST RESOURCE PARTNERSHIP

Sediment Solutions for the Gualala, Phase III

GUALALA RIVER WATERSHED COUNCIL

NORTH COAST RESOURCE PARTNERSHIP

STATEMENT OF THE PROBLEM

Excessive sedimentation in the Gualala River watershed impacts salmonid habitat; sediment from improperly constructed/ maintained timber and ranch roads were identified by NCWQCB as comprising 85% of anthropogenic sediment sources.

PROJECT GOALS

1. Reduction of nonpoint sediment sources consistent with the Gualala TMDL Technical Source Document
2. Effectiveness monitoring
3. Stakeholder education

THE SOLUTION

Cooperating partners include 80% of landowners in this 342 mile2 coastal watershed, State and Federal Resource Agencies, and local land conservancies, non-profits and businesses. This project and other funding have enabled collaborators to:

- Upgrade, abandon or decommission 250+ miles of road, preventing *60,000 dump truck loads* of sediment from entering watercourses.
- Develop a Gualala River Watershed Monitoring Program Plan with a QAPP approved by NCRWQCB, SWRCB and CalEPA. Collected data allows evaluation of events, trends, effects of BMPs, and analysis of restoration project effectiveness
- Implement a Large Wood In The Stream Program to address salmonid limiting factors

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The project encompassed four main components to achieve goals of sediment reduction, landowner collaboration and monitoring:

- Timber and Ranch Road Sediment Reduction Implementation
  - » 20 sites treated on 2.12 miles of road saving 9,072 yds3 of sediment from entering Groshong Gulch waterways and the Gualala River estuary.
- Timber and Ranch Road Sediment Source Assessment
  - » Prioritized/planned treatment of 83 sediment sources on 10.18 miles of high priority roads to prevent 23,102 yds^3 from entering the North Fork and Gualala River estuary.
- Landowner Outreach and Education: Increased medium landowner participation
- Trend and Project Effectiveness Monitoring — GRWC Cooperative Monitoring program, 2008 to present

COMPLETION DATE

November 2009

PROJECT BUDGET

IRWM:	*$1,132,445*
Leveraged:	*$ 375,168*
Total Project Cost:	**$1,507,613**

BENEFITS

Watershed Rehabilitation

- Long-term sediment reduction
- Prevention of 5,950 yd^3 of sediment delivery to streams has an estimated economic value of $9,639[1]
- Decreased road maintenance costs
- Enhanced fire-fighting capabilities
- **Improved fish and wildlife habitat**
- Instream habitat restoration/ improvement

Cultural benefits — Landowner Outreach and Education

- Five non-industrial landowners incorporated 12,885 acres into GRWC programs
- Landowners received technical information to allow them to better steward the land, adding indirect future benefits

Jobs and Local Economic Benefits

- Project implementation cost $1,507,613, which was spent locally using local labor and supplies when possible, contributing to State goals for environmental justice and social equity.
- Assist in maintaining and creating 5 to 10 jobs within the community.

NEXT STEPS

The Gualala River Watershed Council will continue its efforts to implement the sediment TMDL and restore salmonid habitat in the watershed.

CONTACT
Gualala River Watershed Council
P.O. Box 1269
Gualala, CA 95444
707.884-9166
grwc@mcn.org

1 Using a benefit of $6/ton to represent the sum of several avoided costs associated with reducing sedimentation; Hansen, L. and M. Ribaudo. 2008. Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment. U.S. Department of Agriculture. Technical Bulletin No. 1922.

Salt River Ecosystem Restoration Project

HUMBOLDT COUNTY RESOURCE CONSERVATION DISTRICT

NORTH COAST RESOURCE PARTNERSHIP

STATEMENT OF THE PROBLEM

Hydrologic function in the Salt River watershed has been lost due to a combination of factors. Historic land reclamation, levee and tide gate construction, channel aggradation and invasive vegetation have led to a loss of hydraulic conveyance and ecological processes both in the Salt River channel and its tributaries.

PROJECT GOALS

Restore and enhance hydrologic, sediment transport, wetland, and floodplain function in the Salt River watershed by restoring geomorphic features and tidal influence and reducing sedimentation from upper tributary watersheds.

THE SOLUTION

The four primary components of the project include:

1. **River Restoration**— Restoration of hydraulic capacity, in-stream fish habitat, and water quality for approximately 7 miles of the Salt River, and lower Francis creek.
2. **Estuary Restoration** — Restore Riverside Ranch, an approximately 400-acre property, to tidal marsh while retaining some 75 acres of short grass habitat.
3. **Upslope Sediment Reduction** — Ongoing work with private landowners in the Williams, Francis, and Reas Creek sub-watersheds to implement projects to control erosion and decrease sediment and restore riparian habitat.
4. **Adaptive Management Plan** — Initiate a long-term process of monitoring and management to assure continued project performance within a working landscape.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Project activities include: excavation and rehabilitation of 7 miles of river channel, construction of different types of sediment management areas, restoration of floodplain function, vegetation removal, re-vegetation with livestock fencing, tide gate modification/removal, channel realignment, wetland restoration, levee set-backs and regrading, spoils transport and placement, and channel maintenance.

The main Salt River channel is designed to maximize sediment transport capacity while restoring more functional channel morphology. The channel is designed with a low-flow channel to allow fish passage and an inset floodplain to accommodate flows with a recurrence interval of one to two years and allow for sediment deposition in key areas. The two-year floodplain is re-established as riverine wetland habitat. Disturbed areas above the two-year floodplain are to be planted with native species. The project will minimize sediment deposition in the channel by promoting higher water velocities while allowing the floodplain to function as a sediment deposition zone. Expansion of tidal exchange in the restored tidal marsh area and the increase in tidal flows and salt water effects in the lower Salt River channel are expected to help maintain desired plant communities and channel configuration by increasing scour and inhibiting willow growth.

COMPLETION DATE

The project is being implemented in several phases. Phase 1 will restore tidal marsh and enhance tidal prism in the area known as Riverside Ranch. Phase 1 will be completed by December, 2013. Phase 2 will restore the lower Salt River channel up to and including the lower reach of Francis Creek. Construction on Phase 2 is expected to be completed in 2014.

PROJECT BUDGET

IRWM funds:	*$ 1,169,502*
Leveraged funds:	*$ 12,469,794*
TOTAL	**$ 13,639,296**

BENEFITS

Economic

- Estimated savings of $5,420,335 for avoided projects over the life of this project
- Estimated savings of $60,000/year for avoided wastewater violations fines
- Improved agricultural production in the Eel River delta

Water Quality

- Enhancement of MIGR, RARE, WET, WQE, FLD, and COLD beneficial uses

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » 15 miles of migration routes and rearing habitat restored
  - » Restoration of wetland habitat and floodplain function
- Reduced flooding risk for the City of Ferndale

Cultural

- Improved opportunities for fishing and tourism industries
- Increased agricultural viability by minimizing losses due to chronic flooding and sediment accretion

Jobs and Local Economy

- Almost $3.5 million was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Approximately 100 jobs created/maintained
- Other local economic benefits: by reducing the impacts of annual flooding in this area agricultural producers will realize significant economic benefits. Currently, the annual loss of forage and pasture results in producers incurring additional expenses for feed, pumping out flood waters, farming, and re-seeding flooded areas. This can cost over $160,000 annually. Additionally, by reducing the annual flooding the County of Humboldt and the City of Ferndale will be saved from having to expend funds to protect and repair roads and other infrastructure.

NEXT STEPS & RECOMMENDATIONS

We're looking ahead to continuing to work with our partner agencies and the community to restore and maintain hydrologic function in the watershed and monitor the ecological and agricultural benefits of the project. Efforts to restore instream, riparian, and estuarine habitat along the Salt River and its tributaries will continue as funding permits.

CONTACT

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Humboldt County Resource Conservation District
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707.786.9766

Mid Van Duzen River Ranch Road Sediment Reduction Program

HUMBOLDT COUNTY RESOURCE CONSERVATION DISTRICT
YAGER/VAN DUZEN ENVIRONMENTAL STEWARDS (YES)

NORTH COAST RESOURCE PARTNERSHIP

STATEMENT OF THE PROBLEM

In December of 1999, the Environmental Protection Agency (EPA) completed the "*Van Duzen River and Yager Creek TMDL for Sediment* "(EPA 1999). The Total Maximum Daily Load (TMDL) stratified the basin into three distinct sub-basins, the lower basin, the middle basin (Mid Domain), and upper basin. EPA identified the Mid Domain encompassing approximately 202 square miles as contributing the largest amount of sediment to the Van Duzen River at 3,319 tons/mi2/yr .

One of the Water Quality concerns identified by EPA in the TMDL was expressed as "the challenge for resource managers is to reduce the risk of management-associated sediment delivery, particularly in the event of large storms, through implementing a prevention and restoration strategy, which will result in protection of these critical habitat values" (EPA 1999).

Project Goals

1. Improve salmonid habitat and increase spawning and rearing habitat
2. Improve water quality with respect to sediment delivery in the Mid-Van Duzen River through implementation of sediment source treatments on road reaches and stream crossings

THE SOLUTION

Members of the Yager/Van Duzen Environmental Stewards (YES) initiated an ownership-wide assessment aimed at identifying controllable sources of road-related sediment. YES members include approximately 80,000 acres of non-industrial, private ranch lands in the Mid Domain of the Van Duzen River watershed. Approximately 420 miles of road were inventoried and a total of 1,020 sites were recommended for erosion control and/or erosion prevention treatment.

This project implemented erosion control treatments which reduced sediment delivery. The project also built community trust and allowed for voluntary improvement of natural resources providing public benefit and prosperity for Humboldt County.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The implementation of the project encompassed two work seasons starting July 2009 and ending October 2010. To prepare for implementation the database presented in the "Watershed Assessment and Erosion Prevention and Erosion Prevention Planning Project for the Middle Van Duzen River" (PWA 2003) was verified and adjusted to identify priority sites for sediment source treatments. Sites specific plans were developed. Priority was based on: erosion potential, distance from Class I streams, volume of potential sediment reduction, comparison of implementation cost vs. sediment volume, dependence of the landowner on the road, and accessibility for implementation. Sediment source treatments were based on site-specific conditions and standard practices as verified through field visits.

COMPLETION DATE

June 2011

PROJECT BUDGET

IRWM funds:	*$278,381*
Leveraged funds:	*$ 58,436*
Total cost:	**$336,817**

BENEFITS

Economic

- Sediment reduction provided an estimated benefit of $20,592
- reduction in lower domain flood events

Water Quality

- 3,432 tons of sediment prevented from entering the watercourse over the next 20 years
- Improvements to beneficial uses including MIGR, RARE, WET, WQE, FLD, SPWN, and REC2

Habitat and Ecosystem Function

- Improved salmonid spawning and rearing habitat

Cultural

- Hosting local workshops and a "Partners Day" event sharing with landowners and partners from across the nation the benefits of collaborative locally led conservation can have in rural communities

Jobs and Local Economy

- The project cost $336,817, which was spent using local labor and supplies when possible, contributing to State goals for environmental justice and social equity
- 10 jobs were created. During a time when there was no market for logs, local contractors were able to stay employed working on restoration projects
- "Restoration jobs tend to double their value in economic output as those investments ripple through the economy" (Moseley & Pincus)

NEXT STEPS & RECOMMENDATIONS

This project documented the effectiveness that landowners can have when working collaboratively with partners. YES leveraged this success into other valuable grant opportunities and collaborative partnering opportunities. With funding support from US Fish and Wildlife Service – Partners Program and the Headwaters Fund, YES developed outreach materials to share this model of success as well as a database documenting all of the work completed by the YES members.

CONTACT

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Yager/Van Duzen Environmental Stewards, Fortuna, CA 95540

ACKNOWLEDGEMENTS

Pacific Watershed Associates, Natural Resources Conservation Service, University Cooperative Extension, US Fish and Wildlife Partners Program, Ca Department of Fish and Wildlife, County of Humboldt, North Coast Regional Land Trust.

Mattole Integrated Water Management Program

MATTOLE RESTORATION COUNCIL (MRC)

STATEMENT OF THE PROBLEM

Excessive sedimentation and increased summertime water temperatures, predominantly caused by land-use impacts and road construction, have led to the listing of the Mattole River on the 303(d) list and development of a basin-wide TMDL.

PROJECT GOALS

Short-term: Implement sediment reduction projects, enhance riparian canopy, and install large-scale water storage

Long-term: Reduce water temperatures, improve streamflow and enhance spawning and rearing habitat for salmonids

THE SOLUTION

Because of its land-use history, complex geology, intense rainfall and mixed ownership, the Mattole basin presents unique challenges for TMDL implementation. MRC's Good Roads, Clear Creeks Program, of which this project is a component, offers a means for voluntary treatment of sediment and temperature problems through inventory, treatment and monitoring within a hydrological context (MRC, 2005).

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Within the project area, the Mattole Integrated Water Management Program accomplished the following tasks:

- Treatment of 284 sediment sources: 236 road upgrades sites, 17 road decommissioning sites, 4 agricultural ponds, and 27 stream bank sites. These projects resulted in the removal of approximately 19,220 yds^3 of sediment and the stabilization of an estimated 96,920 yds^3 of sediment over the expected life of the projects (15 years).
- Installed large-scale water storage and completed forbearance agreements for 12 properties
- Installed 735,000 gallons of storage (8x 50,000 gallon systems; 3 x 100,000 gallon systems; 1 x 35,000 gallon system)
- Planted 38,282 trees along 13.25 miles of project area riparian zones.
- Installed 850 ft. of willow fence
- Distributed riparian tree, shrub, and grass seed on 10.5 acres
- Conducted riparian assessments along the mainstem of the Mattole River
- Removal of Noxious Weeds across approximately 200 acres
- Collected data on stream channel condition at 60 sites
- Collection of turbidity and discharge data at 11 tributary streams

COMPLETION DATE

March 2013

PROJECT BUDGET

IRWM funds:	*$1,543,743*
Leveraged funds:	*$1,413,061*
Total cost:	**$2,956,804**

BENEFITS

Economic benefits

- Sediment removal from chronic sources has an estimated economic benefit of $157,008 /yr and from episodic sources, such as landslides, and a one-time benefit of $31,136[1]
- Planting 38,282 trees (60% survival rate) yielded an estimated economic benefit of $48,235 over a 50 year period
- Invasive species removal on approximately 200 acres yielded an estimated economic benefit of $24,000 per year[3]

Water Quality

- 5,189 tons of sediment removed from potential landslide sites
- 26,168 tons of sediment stabilized from roads, agricultural ponds, and stream banks

Water Supply

- Installed 12 large-scale water storage at 12 properties
- Habitat and Ecosystem function benefits
- Planted 38,282 trees along 13.25 miles of riparian zones
- Installed 850 feet of willow fence
- Distributed riparian tree, shrub, and grass seed on 10.5 acres of sediment reduction sites

Jobs and Local Economic Benefits

- The project cost $2,956,804, which was spent using local labor and supplies when possible, contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

The Mattole Integrated Water Management Program was complemented by other efforts throughout the watershed. Numerous ongoing activities in the watershed fall outside of this grant's scope and funding, but contribute to comprehensive restoration and conservation efforts. Extensive sediment reduction projects continue as well as forestry projects including fuels reduction projects and community outreach and education.

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NORTH COAST RESOURCE PARTNERSHIP

Navarro Watershed Road Sediment Reduction Project

MENDOCINO COUNTY RESOURCE CONSERVATION DISTRICT (MCRCD)

STATEMENT OF THE PROBLEM

Water quality and salmonid habitat in Indian, North Fork Navarro and Rancheria Creek subwatersheds in the Navarro River basin have been severely impacted by excess sediment loading from upslope sources including erosion and sediment delivery associated with networks of unimproved, poorly drained forest/ranch roads.

PROJECT GOALS

Short-term goals: reduce anthropogenic erosion and sediment delivery by implementing erosion control and prevention treatments on properties in the Indian Creek and upper Rancheria Creek basins.

Long-term goal: contribute towards salmonid habitat improvement and to promote sediment and temperature TMDL goals in the Navarro watershed.

THE SOLUTION

Prescriptions employed for this project were based on road related sediment source inventories (PWA 2003, 2004) and work was performed using methods outlined in *Handbook of Forest and Ranch Roads* (Weaver and Hagans 1994).

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Work was undertaken during summer low-flow periods of '08 and '09 to minimize any impacts to water quality. No overland flow was observed at these locations while work was underway.

Between September 3, 2008 and October 30, 2009, 119 sites along approximately 18.6 miles of road were treated, including 103 stream crossings, 6 road drainage discharge points, 4 landslides, and 4 ditch relief culverts. Approximately 9 miles of hydrologically connected road reaches adjacent to sediment delivery sites were treated with road shaping and road drainage structures to disperse road surface runoff and prevent the delivery of fine sediment from roadbed erosion. An additional 12 miles of road networks were upgraded by leveraging Proposition 50 funds to obtain both 319(h) funding and NRCS cost-share support. Together this facilitated landscape level improvements to water quality.

Digital photography was used to document site conditions before, during, and after earthwork and implementation of erosion control and erosion prevention treatments at project locations.

COMPLETION DATE

October 2009

PROJECT BUDGET

IRWM funds:	*$ 585,067*
Leveraged funds:	*$ 450,000*
Total cost:	**$1,035,067**

BENEFITS

Economic

- Using a benefit of $6/ton[1] to represent several avoided costs associated with reduced sedimentation, prevention of 5,950 yd^3 of episodic, storm-driven sediment delivery to streams in the project area has a one-time estimated value of $9,639
- Using a benefit of $6/ton[1], prevention of 8770 yd^3 of chronic sediment delivery from road surface erosion has an estimated yearly value of $14,205 through 2019
- This project contributes to regional efforts to revitalize salmon fisheries

Water Quality

- Road upgrades save on annual maintenance costs and reduce the risk of episodic stream crossing failures and substantially reduce potential sediment delivery to streams
- Road related erosion is the most controllable source of anthropogenic sediment, and implementing these treatments supports all downstream beneficial uses
- Upland sediment control enhances instream water quality and habitat for anadromous cold water fish species, like coho salmon and steelhead-trout, some of the most sensitive beneficial uses in the watershed.

Other

- Reduction in flood event frequency/intensity

Habitat and Ecosystem Function

- Improved ecosystem function through elimination of road-associated barriers and fragmentation, increasing habitat connectivity and reducing migration barriers

Cultural

- Open Enrollment Workshop topics included effects of sediment delivery on aquatic habitats and techniques to improve road drainage
- Landowners will be able to improve management practices long-term, increasing sediment reduction contributed by this project

Jobs and Local Economy

- The cost of the project was $1,035,067, which was spent using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Approximately 12 to 15 jobs were created/maintained by the project
- Other economic benefits included: local business such as building supply, feed supply, culvert and fuel distributers—all received benefits due to the project

NEXT STEPS & RECOMMENDATIONS

With the successful completion of this project watershed landowners and agencies have a sound foundation for implementing further watershed restoration as funding becomes available.

CONTACT

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ACKNOWLEDGEMENTS

The MCRCD wishes to acknowledge the support of the following individuals and groups:

The Anderson Valley Land Trust, State Coastal Conservancy, State Water Resources Control Board, the Mendocino Water Agency, and the local volunteer Advisory Group-- for their efforts to create a comprehensive watershed plan

Ken Montgomery, local horticulturist and owner of Anderson Valley Nursery, for supporting and supplying locally grown, site specific native plant material and nurturing students to appreciate native plants and their role in the natural world

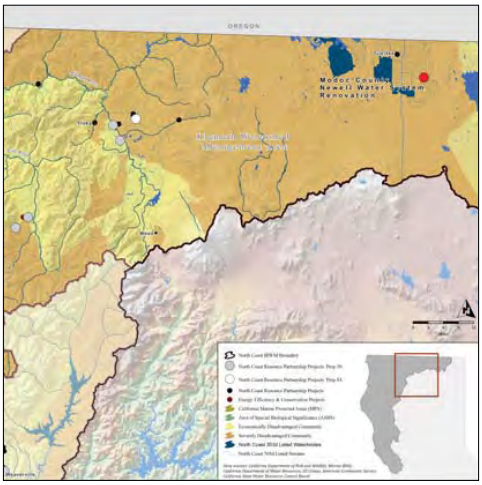
Tom Schott, visionary NRCS District Conservationist emeritus—for leading the effort to implement both watershed restoration and coordinated permitting in the Navarro

The Navarro Watershed Working Group (NWWG) and the Anderson Valley community for their support of the Navarro River Resource Center

NORTH COAST RESOURCE PARTNERSHIP

Newell Water System Renovation

COUNTY OF MODOC



STATEMENT OF THE PROBLEM

The economically disadvantaged Town of Newell's water system was originally constructed as a temporary facility for Japanese-American internment during WWII; however, it continued to serve the community 60 years later. Leak tests performed in 2001 demonstrated nearly 60% of the groundwater pumped up was being lost to leaks and bacterial contamination was occurring through the leaks.

PROJECT GOALS

Short-term goals:

- Replace deteriorated drinking water pipelines to protect public health
- Stop loss of treated drinking water

Long-term goals:

- Ensure safe drinking water supply reliability for the community of Newell

The Solution

The Newell drinking water system consisted of three wells, two storage tanks (25,000 and 100,000 gallons) and an unknown length of distribution and lateral service pipelines.

Approximately 25,000 feet of the known system was original steel pipe dating from the 1940s and there were also ductile iron pipes with leaded joints. All of these pipes were still in use far beyond their useful life and inspections showed that the pipes were rusting from the inside out.

Only two of the District's three wells were operational; Well No. 3 was not functioning. Water from all three pumps needed to be redirected to storage before entering the distribution system to correct chlorination contact time deficiencies. Additionally, an old well that had not been properly abandoned had the potential to further contaminate the water system.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

This project included completion of final engineering plan and specifications and project construction. Construction tasks included:

- Installation of 30,445 ft of drinking water pipe, 2" thru 10" (5.7 miles)
- Boring and jacking 132 feet of casing pipe under State Highway 140 and the Railroad
- Installation of 3 water truck outlets
- Installation of 26 new fire hydrants; reconnection of 9 existing fire hydrants
- New turbine pump in well house #3
- Installation of new welded steel 100,000 gallon drinking water storage tank
- New water meters at each of the 3 pump houses
- Installation of 101 new water meters, boxes and home services

COMPLETION DATE

November 30, 2010

PROJECT BUDGET

IRWM funds: $ 1,496,963
Leveraged funds: $ 1,000,000
Total cost: $ 2,496,963

BENEFITS

Economic

- Reduced operational costs of $916,219
- An economic benefit of $711,997 from an avoided well construction project that would have been necessary without this project
- Enhanced fire-fighting capabilities will provide an economic benefit of $98,445

Water Quality

- Bacterial contamination due to access through leaks has been reduced to zero
- Water quality meets/exceeds federal and state drinking water requirements

Water Supply

- System leakage has been reduced to zero, resulting in water supply reliability for the community of Newell which has a monetary benefit of $118,449

Other

- System electrical and control systems have been brought up to current safety and building code standards, ensuring the safety of water system employees
- The new system reduced staff workload by approximately 90%, freeing them to focus on other maintenance projects to protect community health and well-being

Jobs and Local Economy

- The project cost $ 2,496,963, which was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity.

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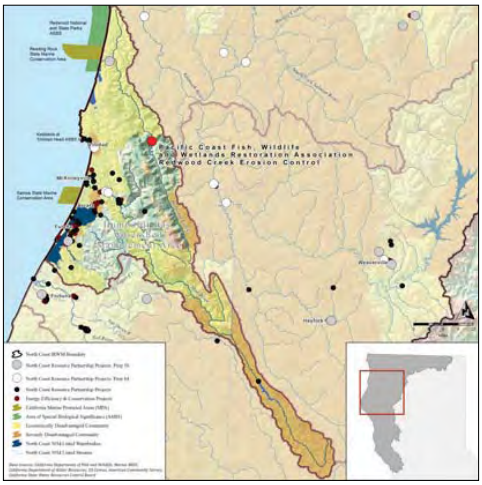
NORTH COAST RESOURCE PARTNERSHIP

Redwood Creek Erosion Control Project, Lacks Creek and Coyote Creek Subwatersheds

PACIFIC COAST FISH, WILDLIFE AND WETLANDS RESTORATION ASSOCIATION



STATEMENT OF THE PROBLEM

The Redwood Creek watershed in northern California contains important habitat for salmon and steelhead production and sediment input is a known limiting factor for salmonid production.

PROJECT GOALS

Short-term:

- Reduce persistent delivery of fine sediment from road surfaces and cutbanks
- Reduce or eliminate episodic erosion from road failures during large magnitude storms

Long-term:

- Improve and protect beneficial uses of water and riparian habitat in Redwood Creek by reducing the potential for road-related erosion

THE SOLUTION

The project consists of erosion prevention treatments on prioritized road segments in Lacks and Coyote Creek watersheds in Humboldt County, California to significantly reduce sediment delivery, improving watershed health, water quality and salmonid habitat.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Work was performed using accepted techniques in conformance with existing/future management plans. Road upgrading included installing rolling dips and ditch relief culverts, road shaping, excavating unstable fillslope, and upgrading stream crossings. Road decommissioning included road ripping/decompaction, installing cross-road drains, and in-place and export outsloping.

Work was undertaken during low-flow periods to minimize water quality impacts. Excavators opened access to each site, excavated soil and organic debris, placed excavated spoil on stable slopes, decompacted roadbeds, outsloped old roadbeds, mulched treated roads, constructed crossroad drains, and installed ditch relief and culverts. Bulldozers were used to create access, push excavated material to disposal sites, groom off-site spoil disposal sites, and rip, outslope and construct rolling dips. Dump trucks were used to endhaul spoil on the decommissioned roads.

COMPLETION DATE

October 2009

PROJECT BUDGET

Total cost: $537,971

BENEFITS

Economic

- Prevention of 64,000 yd^3 of sediment delivery has an estimated economic value of $103,680[1]

Habitat and Ecosystem Function

- Sediment reduction reduces pool aggradation, increases spawning substrate and water quality, enhancing salmonid habitat

Jobs and Local Economy

- $537,971 was spent using local labor and supplies when possible, contributing to State goals for environmental justice and social equity

Flood Control

- Reducing erosion lessens channel aggradation and potential for flooding in the Orick community

NEXT STEPS & RECOMMENDATIONS

Based on small-scale post-treatment adjustments at several decommissioned crossings, side slopes should be laid back more than 2 to 1 (<50%) if there is evidence that spring flow seepage emerges from or discharges onto excavated streambank sideslopes. Additionally, road treatment on lower hillslopes may be complicated by problematic upslope roads. If upslope sediment delivery sites are identified, a thorough assessment should be completed during wet winter months paying particular attention to potential hydrologic impacts to the target road. If upslope conditions show potential for hydrologic impacts to roads proposed for treatment, the treatment plan should be modified to remediate impacts.

CONTACT

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PO Box 4574
Arcata, CA 95518

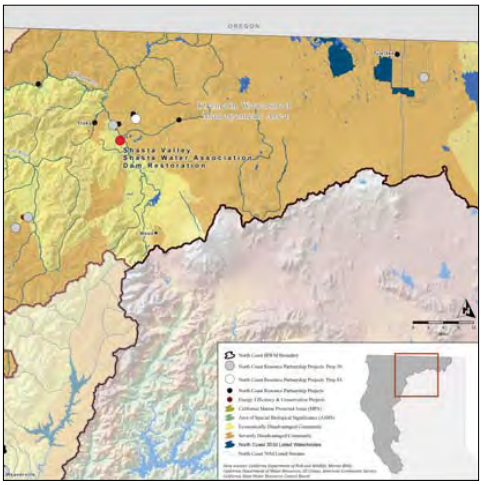
CITATION

1 Using a benefit of $6/ton to represent the sum of several avoided costs associated with reducing sedimentation; Hansen, L. and M. Ribaudo. 2008. Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment. U.S. Department of Agriculture. Technical Bulletin No. 1922.

NORTH COAST RESOURCE PARTNERSHIP

Shasta Water Association Dam Restoration

SHASTA VALLEY RESOURCE CONSERVATION DISTRICT



STATEMENT OF THE PROBLEM

Flashboard dams were used in the mainstem Shasta River each summer to divert water to irrigate agricultural lands. Operation of these dams resulted in either complete or partial barriers to fish passage during the irrigation season, April 1–October 1. Additionally, these dams were identified in the Shasta River TMDL as major contributors to poor water quality conditions in the river.

PROJECT GOALS

The goal of the project was to implement a project that meets fish passage and water quality objectives while conforming to state regulations and maintaining economically viable agricultural operations.

THE SOLUTION

Project construction began in summer 2008. This included installation of the boulder weir, construction of the fish screen and installation of pipelines. Instream construction occurred during the hot summer months when salmonids were least likely to be present. Instream construction activities were largely completed October 2008. Pipeline construction efforts began in November 2008 and were completed by April 2009.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

June 2007–October 2008

- Pre-project monitoring (years one & two)

July 2008

- Temporary water supply lines installed.
- Channels built to bypass river for construction in channel.
- Preliminary construction of pipelines associated with pump station

August 2008

- Begin dewatering upper project area. Conduct necessary fish rescue exercises.
- Begin construction of fish screen.
- Begin construction of boulder riffles.
- Dam removal

October 2008

- Placement of the Shasta River back into its natural channel.
- Demolition of pump station.

December 2008

- Installation of shade structure over pump station.
- Installation of electrical panels.

January 2009

- Continue working on pump station to make it operable prior to April 1.
- Revegetation of streambanks with willows.

April–October 2009, 2010, 2011, 2012 & 2013

- Post project monitoring

January 2012–November 2013

- Implement on-farm efficiency and riparian protection projects: water conservation, tail water reduction, riparian sensing, and off-stream livestock systems.

COMPLETION DATE

April 2009: Dam restoration activities

December 2013: On-farm efficiency and riparian protection projects

PROJECT BUDGET

IRWM funds:	*$ 878,275*
Leveraged funds:	*$2,017,337*
Total cost:	**$2,895,612**

BENEFITS

Economic

- Reduced costs of irrigation water for Water District members of about $1,679,890
- Avoided project costs of about $7,081
- Avoided maintenance costs of about $285,920
- Avoided energy costs of about $499,870

Water Supply

- A more reliable water supply will protect against agricultural losses
- Improved water use management

Habitat and Ecosystem Function

- Reduction in surface area of water impounded
- Year-round fish passage

Cultural

- Protection of the watershed's agricultural heritage

Jobs and Local Economic Benefits

- The project cost $4,802,000 which was spent using local labor and supplies when possible, contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

Continue to modify agricultural operations to limit impacts on water quality and salmonid habitat in the Shasta River to protect salmonid populations and the area's agricultural heritage.

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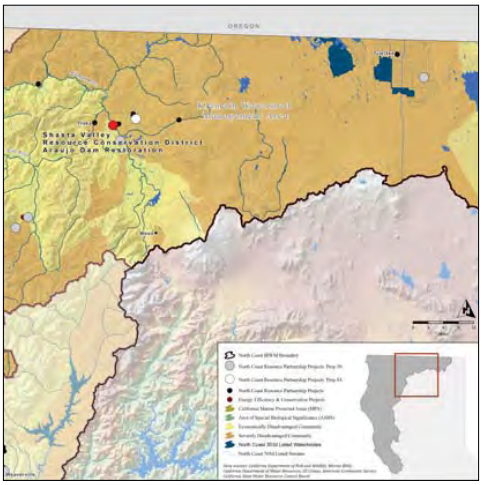
NORTH COAST RESOURCE PARTNERSHIP

Araujo Dam Restoration Project

SHASTA VALLEY RESOURCE CONSERVATION DISTRICT



STATEMENT OF THE PROBLEM

Historic land use practices dating back to circa 1912 include the annual installation of "flashboards" in a dam structure, to raise water levels high enough to ensure they feed irrigation ditches located upstream. Impacts included low dissolved oxygen levels, increased water temperature, and the presence of a fish passage barrier during summer and earl fall.

PROJECT GOALS

The goal of the Araujo Dam Project was to implement a project to meet fish passage and TMDL water quality objectives while ensuring that water users meet regulatory requirements and can maintain the economic viability of the agricultural operations.

THE SOLUTION

In 2005 the Natural Resources Conservation Service (NRCS) began working with landowners on a solution to provide irrigators with their adjudicated water rights while at the same time providing for year-around fish passage. These early planning efforts also focused on individual on-farm efficiency evaluations for the five ranches involved in this project. The early planning efforts allowed NRCS to be one of the first major contributors of funding to support construction activities and helped the Shasta Valley Resource Conservation District leverage enough funding for the project to begin construction activities.

The first phase of construction began in July 2007 and included instream components such as the installation of the boulder weir, construction of the fish screen and the new pumping station. Instream construction activities occurred when salmonids were least likely to be present—during the hot summer months. Instream construction activities were largely completed with the removal of the Araujo Dam in October of 2007. Shortly after the removal of the dam the second phase of construction began with the installation over 5 miles of pipelines. Construction efforts began in November of 2007 and were completed in September 2009.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

The following activities were implemented to meet this goal:

- Removal of the Araujo Dam
- Installation of a "boulder weir" that provides for year-round fish passage while at the same time providing water for irrigators
- Installed 4 individual electric pumps that will encourage water users to conserve water
- Protected fish from the 4 diversions by installing a fish screen that meets current CA Department Fish and Wildlife and National Marine Fisheries Service criteria
- Installed pipelines to assist with better water management and reduce tailwater
- Implemented a monitoring program to document pre and post project conditions and to assess if the goals of this project were achieved

COMPLETION DATE

October 2009

PROJECT BUDGET

CA SWRCB Prop50—IRWM	$769,904
CA Department of Fish and Game	$1,111,620
U.S. Fish and Wildlife Service	$74,338
Natural Resources Conservation Service	$447,191
National Fish and Wildlife Foundation	$230,348
TOTAL	**$2,633,401**

BENEFITS

Economic

- Avoided maintenance costs of approximately $99,341

Water Conservation and Reuse

- Increased flow

	Diversion (acre-ft/season)	Diversion (cubic-ft/sec)
Pre-project	4373.9	12.1
Post-project	1993.2	6.6

  - » 2009 actual water savings as a result of on-farm water conservation activities associated with the Araujo Dam Removal and Water Quality Improvements Project.

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Improved fish access to 32 miles of rearing habitat
  - » Reduced predation by non-native fish due to increased pond water circulation
  - » Diversion screening to reduce fish losses in fields

Cultural

- Agricultural heritage preservation. These projects have assisted with attaining compliance with TMDL requirements, thus helping to ensure agricultural sustainability in the watershed.
- Conflict resolution. This area of the North Coast has received a lot of attention for tension between agricultural and environmental interests; this project provides positive outcomes for both.

Jobs and Local Economy

Over $2.5 million was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS AND RECOMMENDATIONS

Similar projects should be undertaken throughout the watershed in order to have a significant effect on stream water temperature and dissolved oxygen levels.

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NORTH COAST RESOURCE PARTNERSHIP

Raw and Recovered Water for Irrigating Public Agencies

TRINITY COUNTY WATERWORKS DISTRICT #1

STATEMENT OF THE PROBLEM

During summer months, irrigation use in Hayfork increases, requiring the water treatment plant to operate at 85–90% capacity. Use of treated drinking water for irrigation increased operational costs and restricted the District's ability to serve new customers. Additionally, several large users of irrigation water pumped directly from Hayfork Creek, impacting creek flow during dry summer months.

PROJECT GOALS

Short-term Goals:

- Lower demand for potable water use in irrigation in Hayfork Valley
- Reuse normally wasted filter backwash water

Long-term Goals:

- Cost-effectively solve irrigation needs of facilities using large amounts of irrigation water
- Add to the life expectancy of the current water plant
- Increase summer flows in Hayfork Creek
- Stable water supply near Hayfork airport for fire suppression activities

THE SOLUTION

The water treatment plant used nearly 150,000 gallons of water per day (gpd) to backwash the filtering system, which treated nearly 1.2 million gpd for the Town of Hayfork. The project recovered this backwash water to provide to large irrigation users who previously purchased potable water for irrigation. Pipeline and meters have been installed, with some using the system while others are first making needed conversions to onsite plumbing.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

A separate tie-in to the District's raw water source was constructed and new metered pipeline was installed. Six hundred feet of pipe and a control system was installed to feed raw-water from the holding pond to the new recycled pipeline to augment the recycled water supply. Fourteen thousand feet of pipeline was installed to distribute the recycled water and meters were installed at customer sites.

The backwash recycling portion of the project has been fully functional for several months and is functioning as designed. In July 2010, one customer alone had used about 2.3 million gallons of non-potable water.

COMPLETION DATE

July 2010

PROJECT BUDGET

IRWM funds:	*$ 990,347*
Leveraged funds:	*$ 45,000*
Total cost:	**$ 1,035,347**

BENEFITS

Economic

- The estimated economic benefit of increased instream flow is $3,846,430[1]
- Increase in amount of potable water available for new commercial and residential development

Water Quality

- Reduced power consumption and chemical costs for treatment of water formerly used for irrigation
- Instream temperature reduction due to increased flows
- Avoided costs of projects to improve water quality due to low flows

Habitat and Ecosystem Function

- Increased instream flows improve salmonid habitat

Cultural and Social

- Environmental justice: habitat improvement will ultimately assist in increasing salmonid populations in the Hayfork Creek/South Fork Trinity River system for harvest by tribes downstream

Jobs and Local Economy

- $1,035,347 was spent locally when possible, using local supplies and local labor, contributing toward State goals of environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

One customer was unable to connect to the recycled water pipes because it has a very old and difficult system of plumbing. Obtaining funding for a capital improvement project that will include new piping throughout that facility should be a high priority.

CONTACT
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Trinity County Waterworks
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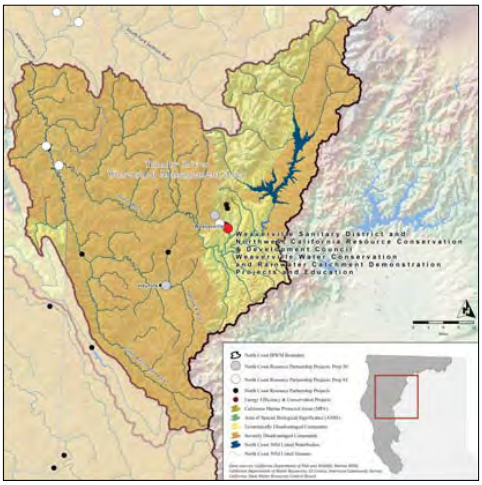
CITATIONS
[1] Brown, T.C. 2007. "The Marginal Economic Value of Streamflow from National Forests: Evidence from Western Water Markets." In: M. Furniss, C. Clifton, and K. Ronnenberg, eds. Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18-22 October 2004. Gen. Tech. Rep. PNW-GTR-689. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. p. 458-466

NORTH COAST RESOURCE PARTNERSHIP

Weaverville Water Conservation and Rainwater Catchment Demonstration Projects and Education

WEAVERVILLE SANITARY DISTRICT (WSD) & NORTHWEST CALIFORNIA RESOURCE CONSERVATION & DEVELOPMENT COUNCIL (NCRCD)



STATEMENT OF THE PROBLEM

Weaverville experiences water reliability and capacity issues during summer droughts. During extended drought periods streams can be completely dried up by water diversions, forcing residents to purchase bottled water for consumption and resulting in periodic fish kills.

PROJECT GOALS

1. Support and improve local and regional water supply reliability
2. Improve instream conditions for salmonid species
3. Demonstrate water collection and conservation methods and conduct public outreach

THE SOLUTION

This project contains three elements that, when implemented, will meet Coho Recovery Plan recommendation RW-II-B-01: "Develop incentives for water right holders to dedicate instream flows for the protection of coho salmon (Water Code § 1707)."

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

1. Modification of a historic agricultural ditch that diverted 1cfs to irrigate a series of small pastures, yards, and orchards. Project implementation keeps about 485,000 gallons per day instream.
2. Rainwater catchment demonstration and water conservation workshops to capture more than 160,000 gallons of stormwater, leaving approximately 41,000 gallons instream during the low flow period.
3. Installation of two 12,500 gallon potable water tanks for the Weaverville Community Services District to replace a leaking 24,000 gallon redwood tank, saving at least 73,000 gallons annually

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 135,023*
Leveraged funds:	*$ 24,588*
TOTAL	**$ 164,451**

BENEFITS

Economic

- Estimated benefit of $205 per year in increased instream flows[1]
  (The estimate above was developed using a value of 833,419 gallons of water that remain instream due to project implementation)

Water Supply

- Savings of 188,419 gallons of treated potable water through conservation measures, reducing water treatment costs
- Water supply reliability
- Reduced costs of water purchases

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Increased instream flow of 834,180 gpd
  - » Reduced late summer mortality for Fish in Weaver Creek
  - » Attainment and maintenance of water quality standards for lower water temperatures and improved biological conditions

Cultural benefits

- Sustain the area's agricultural heritage through provision of alternative water supplies and implementation of conservation measures
- Concerted public outreach to educate residents on drought adaptation measures

Jobs and Local Economic Benefit

- The project uses local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Increased fire-fighting capacity of 1000 gallons

NEXT STEPS & RECOMMENDATIONS

WSD and 5C will continue to collaborate with landowners and other organizations to improve water supply reliability and instream habitat in the Weaver Creek watershed.

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CITATIONS

1. Brown, T.C. 2007. "The Marginal Economic Value of Streamflow from National Forests: Evidence from Western Water Markets." In: M. Furniss, C. Clifton, and K. Ronnenberg, eds. Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18-22 October 2004. Gen. Tech. Rep. PNW-GTR-689. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. p. 458-466

NORTH COAST RESOURCE PARTNERSHIP

Westport County Water District Water Supply Reliability Project

WESTPORT COUNTY WATER DISTRICT

STATEMENT OF THE PROBLEM

Westport is a small unincorporated residential community in Mendocino County. The Westport County Water District (District) provides water service to approximately 70 households and had issues ensuring reliable water supply due to limited storage.

PROJECT GOALS

Short-term Goal:

- Improve water supply reliability for residents in Westport

Long-term Goal:

- Protect fisheries and stream flow in Wages Creek
- Improve Westport's fire protection capabilities

THE SOLUTION

Wages Creek supports coho salmon and the District's bypass flows were set up to correspond to annual cycles of fish migration in accordance with state guidelines (DFG and NMFS 2002). In 2002, the District faced water shortage issues when winter rains came late and it was not able to meet its bypass flows despite a back-up groundwater well.

The District's water system consists of a water right on Wages Creek where a wet well and pump move water through a direct filtration system to a tank above the community's Fire Department buildings. From storage, water is gravity fed to the community distribution system, which was served by a 100,000 gallon redwood water tank constructed in the late 1970s. This project replaces the old tank with a new, seismically stable 100,000 gallon steel storage tank.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Project construction began in 2008. The hillside behind the existing tank was graded, seeded and erosion protection measures installed.

The foundation was installed in December 2008. Tank construction began with the roof and top ring, which was lifted to install the next lowest ring until all the rings were in place.

Internal plumbing was connected and a galvanic cathodic protection system and safety equipment were installed. The tank began to be filled for system use on December 7, 2009.

COMPLETION DATE

March 31, 2010

PROJECT BUDGET

IRWM funds: $ 374,241
Leveraged funds: $ 26,050
Total cost: $ 400,291

BENEFITS

Economic benefits

- Project implementation has resulted in avoided water shortage costs estimated to have an economic benefit of $2,371
- Avoided water supply purchases are estimated to have an economic benefit of $3,479
- Reduced fire losses have an estimated economic benefit of $ 557,194

Water Quality

- Improved water quality has enabled the District to ensure that bypass flows are met to protect beneficial uses including RARE, SPWN, and COLD, all of which benefit from enhanced instream flow

Water Supply

- 70 homes will have access to safe, reliable water supplies

Habitat and Ecosystem Function

- By assuring minimum bypass flows to protect fisheries in Wages Creek, this project supports the goals of the Recovery Strategy for coho salmon (CDFG, Recovery Strategy for California Coho Salmon, 2004)

Local Jobs and Economy

- $400,291 was spent using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

The enhanced flexibility provided by the new tank has allowed the District to take advantage of storm events to fill tanks and to stop pumping from Wages Creek when the creek falls below bypass flows. The District is adjusting to having the new storage available and as time goes on will be able to better manage the system to achieve bypass flow requirements while protecting beneficial uses.

CONTACT

Westport County Water District
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REFERENCES

California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS). 2002. Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams. CDFG, Sacramento, CA.

Winzler & Kelly. 2003. Westport County Water District Proposition 204 Water Supply Feasibility Study. Winzler & Kelly, Eureka, CA.

NORTH COAST RESOURCE PARTNERSHIP

Salmon Creek Sediment Reduction and Water Conservation Program, Phase 1 and 2

GOLD RIDGE RESOURCE CONSERVATION DISTRICT

STATEMENT OF THE PROBLEM

Working with our partners, we conducted multiple assessments of stream and estuary habitat and ecological function throughout the watershed, including an extensive inventory of road-related erosion and sediment delivery to streams. Restoration work stemming from these assessments has focused on the treatment of anthropogenic sediment sources, enhancement of instream physical habitat, and more recently, the improvement of instream flows, particularly during the summer-fall dry season.

PROJECT GOALS

1. Improve instream flow during warm season
2. Decrease sedimentation to Salmon Creek through erosion control measures
3. Reach out to community to increase awareness and participation

THE SOLUTION

GRRCD worked with local contractors and stakeholders to implement this project, which is focused on sediment reduction and water conservation throughout the Salmon Creek watershed.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

Project implementation included the construction of eight residential and small agricultural-scale rainwater catchment systems and upgrades to the Bodega Water Company distribution system. Workshops were held to provide landowners with information to manage water for long-term water supply security.

COMPLETION DATE

October 2012

PROJECT BUDGET

Phase 1 (Prop 50 Initial):

IRWMP — $340,913

Cost share — $370,000

Phase 2 (Prop 50 Supplemental)

IRWMP - $384,409

Cost share - $45,000

Totals for Prop 50 grants:

IRWMP — $725,322

Cost share — $415,000

BENEFITS

Economic

- Increased instream flow has an estimated benefit of $1,360 per year[1]
- Avoided operational costs estimated at $178,543
- Avoided water supply cost estimated at $139,823 based on transportation costs of importing water into the watershed

Water Supply

- Reduction in household and industry demand by up to 35%
- Total Annual Water Supply Benefits value of $593,393 (Prop 50 Phase 1) and $595,713 (Prop 50 Phase 2)

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » An additional 17 ac-ft retained for instream flows per year
  - » Reduction of fine sediments from 9 miles of Rural Roads

Cultural benefits

- 500 residents actively participated in water conservation practices
- 1500 residents educated through the water conservation program

Jobs and Local Economic Benefit

- Over $750,000 was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity

NEXT STEPS & RECOMMENDATIONS

We continue our efforts under the Prop 84 Round 1 grant, which is assisting with implementation of a large water storage project with the goal of eliminating summer diversions for a dairy in the watershed, and will partially fund a second round of rainwater catchment system design and implementation (a total of at least eight additional rainwater systems.

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ACKNOWLEDGEMENTS
NOAA Restoration Center
State Coastal Conservancy
CA Department of Fish and Wildlife
NFWF 5-Star
USDAs Natural Resources Conservation Service
Salmon Creek Watershed Council
Prunuske Chatham Inc.
Pacific Watershed Associates
Streamline Engineering
DragonFly Enhancement
Piazza
Pearson Exploration
Sierra Pipeline
Landowners

CITATIONS

1. Brown, T.C. 2007. "The Marginal Economic Value of Streamflow from National Forests: Evidence from Western Water Markets." In: M. Furniss, C. Clifton, and K. Ronnenberg, eds. Advancing the Fundamental Sciences: Proceedings of the Forest Service National Earth Sciences Conference, San Diego, CA, 18-22 October 2004. Gen. Tech. Rep. PNW-GTR-689. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. p. 458-466

NORTH COAST RESOURCE PARTNERSHIP

Mattole Integrated Coastal Watershed Management Program

MATTOLE RESTORATION COUNCIL (MRC)

STATEMENT OF THE PROBLEM

The lower Mattole River and Mattole River estuary are impaired by excessive sediment production in surrounding tributary watersheds. Excessive sediment production is closely linked with high summertime water temperatures, low dissolved oxygen levels, and other biological water quality limitations. Significant sediment is released from the Mattole River estuary during major storm events, which is discharged into the King Range ASBS, damaging tidal and near-shore habitats.

PROJECT GOALS

1. Reduction of sediment within the lower Mattole River and estuary
2. Improvement of water quality — especially water temperature and sediment
3. Improvement of the estuarine habitat
4. Effectiveness monitoring

THE SOLUTION

This project had specific components to address stated goals – project management, feasibility studies, planning and design, implementation and construction, photodocumentation performance evaluation, and site repair.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

MRC completed a sediment assessment of the subwatersheds surrounding the town of Petrolia; results were compiled in a Sediment Assessment Report that included prioritized treatment sites. Overall, 130 sites were treated:

- 50 culverts
- 25 road segments/7.5 miles of road reshaped
- 70 rolling dips
- 13 armored fords
- 12 armored critical dips
- 6 willow structures
- 19 bioengineered riprap wing deflectors
- Channel excavation at 10 sites
- 11 crossings excavated
- 1.75 miles of road decommissioned

COMPLETION DATE

January 2012

PROJECT BUDGET

IRWM funds:	*$ 384,813*
Leveraged funds:	*$ 341,889*
TOTAL	**$ 726,702**

BENEFITS

Economic

- Stabilization of 75,000 yds^e of sediment yields a total estimated economic benefit of $500,000
- Planting 10,000 hardwood and conifer seedlings to restore riparian habitat will yield an estimated economic benefit of approximately $1,000 per year
- This project is expected to provide an estimated benefit of $5,824,800 in avoided TMDL costs
- Avoided invasive non-native plant eradication projects estimated at $47,180

Water Quality

- Monitoring has documented a ~15% reduction in stormflow turbidity in a treated basin (West Branch of East Mill Creek) relative to a control basin, following sediment treatment

Watershed Rehabilitation

- Improved fish and wildlife habitat

Jobs and Local Economic Benefit

- Over $726,702 was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- Number of temporary/seasonal jobs created per year over the 3 year project period: approximately 30; Number of staff positions in Mattole Watershed Restoration Groups maintained during the life of the contract: approximately 8

NEXT STEPS & RECOMMENDATIONS

MRC intends to continue monitoring the project to assess effectiveness and implementing other projects that reduce sediment, improve water quality, and improve freshwater and brackish estuarine habitat in the Mattole watershed.

CONTACT

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ACKNOWLEDGEMENTS

California Department of Water Resources and County of Humboldt

State Coastal Conservancy

Bureau of Land Management

Mattole River and Range Partners- the Mattole Salmon Group and Sanctuary Forest

All community members and landowners who participated in this work

CITATIONS

Hansen, L. and M. Ribaudo. 2008. Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment. U.S. Department of Agriculture. Technical Bulletin No. 1922.

[2] Shaw, M., L. Pendleton, D. Cameron, et al. 2009. The Impact of Climate Change on California's Ecosystem Services. California Climate Change Center. CEC-500-2009-025-F.; Nordhaus, W. 2008. A Question of Balance: Weighing the Options on Global Warming Policies. New Haven: Yale University Press.; U.S. Department of Energy, Energy Information Administration. 1998. Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings. April.

NORTH COAST RESOURCE PARTNERSHIP

Forsythe Creek Sediment Control Project

MENDOCINO COUNTY RESOURCE CONSERVATION DISTRICT (MCRCD)

STATEMENT OF THE PROBLEM

The Forsythe Creek Watershed, sub basin to the West Fork of the Russian River, drains 48 square miles, about 30,000 acres, of the Coast Range north of Ukiah and south of Willits, and joins the West Fork of the Russian in Redwood Valley. The sub basin supports Chinook salmon, steelhead trout, and in the past also supported coho salmon. Declining watershed conditions including high water temperatures and sediment delivery led to a landowner and resource manager-driven watershed restoration planning process.

PROJECT GOALS

1. Improved water quality for beneficial uses
2. Improved fish habitat and fish passage through road repair and upgrading stream crossings
3. Demonstrate recommended land management practices to at least 100 area residents
4. Improved human safety

THE SOLUTION

The Forsythe Creek Sediment Control Project will implement recommended road sediment reduction strategies from the Forsythe Creek Watershed Assessment (2005) on two subwatersheds in the Forsythe Creek watershed. The MCRCD will implement prioritized road upgrades using California Department of Fish and Wildlife (CDFW) recommended methods on approximately 25 miles of roads, preventing 139,423 yards^3 of sediment from entering the Russian River system.

PROJECT IMPLEMENTATION AND ACCOMPLISHMENTS

All project sites were inventoried using CDFW approved protocols. Prescriptions will be implemented by sub-watershed to minimize heavy equipment costs. Four bridges will be installed on Mill Creek, stream crossings will be upgraded, culverts replaced, perched soil excavated and other improvements implemented in accordance with accepted standards.

COMPLETION DATE

Ongoing

PROJECT BUDGET

IRWM funds:	*$ 1,791,564*
Leveraged funds:	*$ 677,850*
TOTAL	**$2,469,414**

Matching funds were provided by: NRCS, the Mendocino County Department of Transportation, and Caltrans.

BENEFITS

Economic

- Avoided road maintenance and reconstruction benefits are approximately $2,195,689
- Sediment reduction is estimated to provide a benefit of $56,466[1]

Water Quality

- Prevention of more than 65,000 yds^3 of sediment delivery to Forsythe Creek and the Russian River system

Watershed Rehabilitation

- Improved fish and wildlife habitat
  - » Ecosystem connectivity
  - » Improved salmonid habitat

Cultural

- Increased recreational opportunities
- Improvements to natural resources on Tribal lands downstream of project

Jobs and Local Economy

- Over $2m was spent locally using local labor and supplies when possible, thus contributing to State goals for environmental justice and social equity
- This project has provided employment to twelve local businesses and consultants such as: design engineering, a bridge builder, a professional geologist, a construction company, three heavy equipment operations, and three environmental consulting firms.

NEXT STEPS & RECOMMENDATIONS

This project is one of several ongoing projects to restore fish habitat and improve water quality in the Forsythe Creek watershed.

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ACKNOWLEDGEMENTS
Our thanks go to Church of the Golden Rule and Jim Lindsey for their consistent support throughout the project and Al Ridout's patience during bridge construction was very much appreciated.

NORTH COAST RESOURCE PARTNERSHIP

I.3.3 CALIFORNIA ENERGY COMMISSION ENERGY EFFICIENCY & CONSERVATION BLOCK GRANT

TABLE 41 CEC ENERGY EFFICIENCY & CONSERVATION BLOCK GRANT PROJECTS, 2010

PROJECT NAME	COST	PROJECT SUMMARY
COUNTY OF HUMBOLDT		
Agricultural Farm Bureau — Lighting Fixtures	$4,746	The proposed project will replace the 2 existing furnaces with two 240 kBTU/hour furnaces each with AFUE of 90%. After the proposed changes the furnaces will use 4,080 therms/year. Energy savings will be 1,785 therms/year. Savings will be $1,731/year with a simple payback of 8.3 years.
Agricultural Farm Bureau — Forced Air Furnace	$14,340	Energy and power savings will be 5,794 kWh/year and 2.3 kW. Savings will be $916/year with a simple payback of 5.2 years.
Airport Lighting	$4,434	The proposed project will replace 48 T12 fixtures with 48 T8's, 1 incandescent exit sign with 1 LED exit sign, and 5 incandescent flood lights with 5 CFL flood lights. After the proposed changes the lighting will use 17,995 kWh/year with peak usage of 14.5 kW. Energy and power savings will be 20,218 kWh/year and 2.8 kW. Savings will be $3,321/year with a simple payback of 1.3 years.
Animal Shelter Lighting	$10,233	The proposed project will replace existing T8's with higher efficiency T8's. After the proposed changes the lighting will use 17,034 kWh/year and with peak usage of 9.1 kW. Energy and power savings will be 3,835 kWh/year and 2.1 kW. Savings will be $527/year with a simple payback of 19.4 years.
Arcata Veterans Building — Forced Air Furnace	$6,943	The proposed project will replace the two existing furnaces with two 120 kBTU/hour furnaces each with AFUE of 95%. After the proposed changes the furnaces will use 707 therms/year. Energy savings will be 414 therms/year. Savings will be $401/year with a simple payback of 17.3 years.
Clark Complex Lighting Project	$2,056	The proposed project will replace 21 T12 fixtures with 21 T8's. After the proposed changes the lighting will use 808 kWh/year with peak usage of 1.5 kW. Energy and power savings will be 745 kWh/year and 1.2 kW. Savings will be $132/year with a simple payback of 15.6 years.
Courthouse Lighting	$16,193	The lighting system will be upgraded through a combination of occupancy sensors and fluorescent lighting retrofits. Most of the existing fluorescent fixtures will be retrofitted, not replaced. The existing lamps and ballasts will be removed and disposed of. The new T8 lamps and electronic ballasts will be installed in the existing fixture with minimal physical modification of the fixture. Occupancy sensors can replace existing switches. Based on the reduction in hours of operation and higher efficiency lamps and ballasts the energy and power savings, resulting from lighting retrofits, will be 45,649 kWh and 11.5 kW, respectively.
Courthouse Parking Exhaust Fan	$5,760	EEM-1: Install Demand-Controlled Ventilation System in Courthouse Garage. The proposed project will add Carbon Monoxide (CO) sensors to control the operation of two ventilation fans in the courthouse parking facility. These two fans currently run continuously, 8,760 hours per year. After the retrofit the fans will each run approximately 3432 hours per year. After the proposed changes the two fans will use 15,191 kWh per year. Energy savings will be 23,583 kWh/year. Savings will be $2,731/year with a simple payback of 2.1 years.
Courthouse -Replace CV with VAV	$482,752	EEM-4: Replace Constant Volume Systems with Variable–Air-Volume Systems at the Courthouse
Courthouse — Efficient Motor Replacement	$67,901	EEM-5: Replace Old Low Efficiency Motors with Premium Efficiency Motors in the Jail and Courthouse
Environmental Health Lighting	$1,066	The proposed project will replace 18 T12 fixtures with 18 T8's. This retrofit will effectively increase the efficacy (lumens/watt) of the lighting system, while maintaining current lighting levels. Typically, upgrading to third generation T8 lamps with electronic ballasts will also increase the quality of the light primarily through higher color rendering and significant reduction of flicker normally associated with older fluorescent lighting systems. After the proposed changes the lighting will use 976 kWh/year with peak usage of 0.9 kW. Energy and power savings will be 813 kWh/year and 0.7 kW. Savings will be $144/year with a simple payback of 7.4 years.
Eureka Veterans Hall Lighting	$4,913	The proposed project will also replace 42 T12 fixtures with 42 T8's, 17 incandescent exit sign with 17 LED exit signs, and 31 incandescent flood lights with 31 CFL flood lights. After the proposed changes the lighting will use 3,227 kWh/year with peak usage of 3.1 kW. Energy and power savings will be 7,647 kWh/year and 5.4 kW. Savings will be $1,347/year with a simple payback of 3.6 years.
Fortuna Veterans Hall — Furnace	3,784	The proposed project will replace the existing furnace with a 150 kBTU/hour furnace with AFUE of 95%. After the proposed changes the furnace will use 1,436 therms/year. The proposed project will replace an existing blower with a 95% efficient blower. After the proposed change the blower will use 419 kWh/year with peak usage of 0.46 kW.
Repair Garage Lighting	$18,229	The proposed project will add an occupancy sensor to one CFL fixture, replace 26 metal halide fixtures with 26 T8 fixtures, replace 77 T12 fixtures with 77 T8's, add occupancy sensors to 42 T8 fixtures and delamp four T8 fixtures from four lamps to two lamps. After the proposed changes the lighting will use 38,681 kWh/year with peak usage of 17.2 kW. Energy and power savings will be 31,486 kWh/year and 11.7 kW. Savings will be $5,555/year with a simple payback of 3.3 years.

PROJECT NAME	COST	PROJECT SUMMARY
Garberville Veterans Building — Forced Air Furnace	$33,401	The proposed project will replace the 3 existing furnaces with two 90 kBTU/hour furnaces each with AFUE of 95%. After the proposed changes the furnaces will use 479 gallons/year. Propane savings will be 262 gallons/year. Savings will be $609/year. The proposed project will replace the 3 existing air conditioners with two air conditioners with capacities of 60 kBTU/hour and 48 kBTU/hours respectively each with SEER of 15. After the proposed changes the air conditioners will use 2,160 kWh/year. Electricity savings will be 720 kWh/year. Savings will be $130/year. Simple payback for the overall project will be 45.2 years.
IT Building Lighting	$4,287	The proposed project will replace 61 T8 fixtures with 61 higher-efficiency T8's, add an occupancy sensor to one fixture, replace 5 incandescent flood lights with 5 CFL flood lights, replace 10 T12 fixtures with 10 T8 fixtures. After the proposed changes the lighting will use 6,769 kWh/year with peak usage of 3.6 kW. Energy and power savings will be 3,014 kWh/year and 1.4 kW. Savings will be $414/year with a simple payback of 10.4 years.
Jail Lighting	$20,681	The lighting system will be upgraded through a combination of exit sign replacements and fluorescent lighting retrofits. The existing fluorescent fixtures will be retrofitted, not replaced. The existing lamps and ballasts will be removed and disposed of. The new T8 lamps and electronic ballasts will be installed in the existing fixture with minimal physical modification of the fixture. Exit signs can be replaced with energy efficient signs.
Jail Ozone Laundry	$35,000	Ozone laundry systems are quickly being recognized as being an energy efficient alternative to traditional systems because of their lowered hot water consumption. Two ozone laundry systems are proposed for this site. The ozone systems will be incorporated into four of the five existing machines that have a capacity between 50 and 55 lbs. Ozone will be produced on site and used as a cleaning agent. The chemical properties of ozone make it a powerful oxidizing, cleaning and bleaching agent. No hot water is used during an ozone based laundering process, so significant hot water savings are possible. Based on current estimates, this project is expected to result in an annual savings of 4,190 therms. Other benefits of ozone laundry systems are decreased rinsing requirements and longer fabric life.
Jail — Replace Inlet Guide Vanes with Variable Frequency Drives	$63,783	EEM-3: Replace Inlet Guide Vanes with Variable Frequency Drives for the Air Handling Units at Jail
Jail — Efficient Motor Replacement	see Courthouse Project	EEM-5: Replace Old Low Efficiency Motors with Premium Efficiency Motors in the Jail and Courthouse
Library Lighting	$6,217	The proposed project will add occupancy sensors to some fixtures, add daylight sensors to some fixtures, replace metal halide fixtures with T8 fixtures, and slightly delamp some overlit areas. After the proposed changes the lighting will use 33,482 kWh/year with peak usage of 9.2 kW. Energy and power savings will be 22,060 kWh/year and 1.2 kW. Savings will be $3,489/year with a simple payback of 1.8 years.
Motor Pool Lighting	$5,572	The proposed project will replace 21 T8 fixtures with 21 higher-efficiency T8's, eight metal halide high bays with eight fluorescent high bays, replace two incandescent lamps with two CFL lamps, replace one mercury vapor fixture with a CFL fixture, and utilize twelve wall and fixture mount occupancy. After the proposed changes the lighting will use 7,273 kWh/year with peak usage of 4.7 kW. Energy and power savings will be 5,944 kWh/year and 3.4 kW. Savings will be $1,065/year with a simple payback of 5.2 years.
Public Health Lighting	$14,090	The proposed project will convert T12's to T8's, convert incandescents and incandescent floods to CFL, add occupancy sensors to some fixtures, and delamp some overlit areas. After the proposed changes the lighting will use 22,994 kWh/year with peak usage of 12.3 kW. Energy and power savings will be 21,527 kWh/year and 9.7 kW. Savings will be $3,798/year with a simple payback of 3.7 years.
Public Health Outside Air Damper Repair	$776	EEM-2: Repair Outside Air Damper for Air Handling Unit on Public Health Building Roof
Public Works Building — Forced Air Furnaces	$10,500	The proposed project will replace the three existing furnaces with three 62 kBTU/hour furnace with AFUE of 95%. After the proposed change the furnaces will use a total of 1,905 therms/year. Energy savings will be 666 therms/year. Savings will be $646/year with a simple payback of 16.3 years.
Public Works Building — Lighting	$11,834	The proposed project will convert T12's to T8's, convert incandescents and incandescent floods to CFL, add occupancy sensors to some fixtures, and delamp some overlit areas. After the proposed changes the lighting will use 22,004 kWh/year with peak usage of 12.3 kW. Energy and power savings will be 21,527 kWh/year and 9.7 kW. Savings will be $3,798/year with a simple payback of 3.7 years.
Soils Lab Lighting	$3,894	The proposed project will convert T12's to T8's, convert incandescents and mercury vapor lamps to CFL's, add occupancy sensors to some fixtures, add daylight sensors to outside lights, and install lower wattage lamps in some overlit areas. After the proposed changes the lighting will use 5,948 kWh/year with peak usage of 12.3 kW. Energy and power savings will be 8,541 kWh/year and 1.9 kW. Savings will be $1,049/year with a simple payback of 3.7 years.
COUNTY OF TRINITY		

PROJECT NAME	COST	PROJECT SUMMARY
Jail Furnace	$10,636	The existing heating and cooling equipment will be replaced with a split heating and cooling heat pump system servicing one of the two inmate dorms at the Trinity County Jail in Weaverville. These dorms are described as F-dorm and G-dorm, these two dorms are same in size and construction built in 1982. The new system has an HSPF rating of 8 and a SEER rating of 13. Energy will be saved by increased efficiency on the heating and cooling equipment. Despite the increase in electricity use, the total energy savings of the project is estimated at 199 mmBtu (source Btu).
Library HVAC	$45,573	The county is proposing to replace two HVAC roof pack units atop Weaverville Library and one split system serving conference room section of building. All three existing units are full propane heat/AC and are 19 yrs old. All three existing units will be converted to a air-to-air heat pump HVAC systems. The energy savings projected is 20,879 kWh per year and $22,367 per year at current rates with a simple payback (before rebates) of 6.8 years and a EECBG cost-effectiveness ratio of 9.56. Additional savings are projected with intangible savings from maintenance reduction and lowered personnel costs from repairing and maintaining the old pumps.
Murray Building — Furnace Replacement	$24,808	Trinity Co. is proposing to replace three gas split systems that are 23 yrs old of which two serve a county rental portion of the Murray building and one serves the Sheriff Sub station portion of building. The project would consist of determining new heating and cooling loads for the rental portion of building and replacing ducting as needed due to deterioration. The rental area is currently served buy two systems that previously handled a much larger area before remodeled to existing square footage. This portion of project would be sizing a single new heat pump system that would service this area independently.
CITY OF ARCATA PROJECTS		
Alliance Pump Station Lighting	$3,472	The proposed project will convert T12's to T8's and incandescents to CFL's and, add occupancy sensors to some fixtures. After the proposed changes the lighting will use 1,721 kWh/year with peak usage of 1.5 kW. Energy and power savings will be 1,932 kWh/year and 4.0 kW. Savings will be $266/year with a simple payback of 13.0 years.
City Hall Air Conditioning	$29,138	The proposed project will replace the 2 existing air conditioners with two air conditioners of capacities 24.2 kBTU/hour and 33.1 kBTU/hour respectively both with SEER's of 15. After the proposed changes the air conditioners will use 9,432 kWh/year. Energy savings and power savings will be 5,727 kWh/ year and 3.5 kW. Savings will be $788/year with simple payback time of 13.7 years.
Corp Yard Lighting Retrofits	$20,690	The proposed project will do the following: Convert halogen to CFL; Convert high-pressure sodium to CFL; Convert incandescent to T8; Convert incandescent floods to CFL floods; Add motion sensors to CFL floods; Convert mercury vapor to T8; Convert T12's to T8's; Delamp overlit areas; Add occupancy sensors. After the proposed changes the lighting will use 21,418 kWh/year with peak usage of 12.2 kW. Energy and power savings will be 28,714kWh/year and 12.5 kW. Savings will be $3,954/year with a simple payback of 5.2 years.
D Street HVAC	$6,740	The proposed project will replace the existing furnace with two 80 kBTU/hour furnaces with AFUE of 95%. After the proposed change the furnaces will use a total of 440 therms/year. Energy savings will be 260 therms/year. Savings will be $252/year with a simple payback of 26.7 years.
Foodworks Lighting	$16,097	The proposed project will do the following: Convert T12's to T8's; Convert HPS to CFL flood; Convert Incandescent exit signs to LED exit signs; Convert metal halides to T8's; Convert T12's to T8's; Add occupancy sensors to T8's. After the proposed changes the lighting will use 24,338 kWh/year with peak usage of 12.0 kW. Energy and power savings will be 21,064 kWh/year and 8.6 kW. Savings will be $3,798/year with a simple payback of 4.3 years.
Foodworks Refrigeration	$12,199	On each refrigeration unit, some (and perhaps all) of the efficiency measures (evaporator fan controls, new motors, and door heater controls) will be installed. In all but one unit, the existing shaded pole evaporator fan motor is replaced with a EC motor. The EC motors are roughly 65% more efficient and realize savings through lowered kW demand. In total, the retrofits are expected to save 30,098 kWh/ year and 2.7 peak kW.
LED Streetlights	$17,860	This project physically replaces the cobra-head component of a pole-mounted street light, in order to retrofit the fixture from HPS to LED technology. This is a one-to-one retrofit, with no other modifications required. The street lights in question use either 200-watt, 250-watt or 310-watt HPS lamps, with additional wattage necessary for ballast power. All energy savings are projected to result from the combined efficiency of the LED fixture head and electronic controller, in comparison to the HPS lamp and ballast combination. Each HPS-to-LED retrofit is expected to save 131 watts for a 200W fixture, 54 watts for a 250W fixture, and 185 watts for a 310W fixture.
Wastewater Treatment Plant Automatic Aeration	$5,659	As part of the treatment process aeration pumps in the treatment marshes pump in air to provide oxygen used by microorganisms to digest waste. Running the aeration pumps based on oxygen demand rather than on a fixed schedule will save 55,841 kWh and $7,668 per year.
CITY OF BLUE LAKE		
Booster Pumps Replacement	$24,246	The water pumping facility currently operates 6,000 hours per year (based on historical documentation). Two pumps operate daily pumping water from the Humboldt Bay Municipal Water District line to two holding tanks owned by the city. The existing pumps are over 25 years old with one running at 54% efficiency and the other at 60%. The city plans to replace both pumps with premium efficiency motors and appropriately sized pumps. The energy savings projected is 21,155 kWh per year and $3,596 per year at current rates with a simple payback (before rebates) of 6.7 years.
CITY OF CRESCENT CITY		

PROJECT NAME	COST	PROJECT SUMMARY
Variable Frequency Drive Pumps	$120,000	The City is proposing to replace three existing inefficient water pumps (used for pumping potable water) with premium efficiency motors coupled with variable frequency drives. The energy savings projected is 214,553 kWh per year and $9,069 per year at current rates with a simple payback (before rebates) of 13.2 years.
CITY OF ETNA		
Replace Furnace w/Heat Pump	$40,612	The city is proposing to replace two old, inefficient fuel-oil boilers and hydronic heating system and one old A/C units with a state-of-the-art ground-coupled heat exchanger system which will provide heating and cooling for the building. The energy savings projected is 159 gals. of fuel oil per year at approx. $2,306 per year and 2,483 kWh savings worth approx. $224 at current rates with a simple payback of 17.6 years.
CITY OF EUREKA		
Adorni Building — Replace Electric Water Heaters with Heat Pumps	$5,200	The proposed project will replace the two existing electric resistance tank water heaters with two air-source heat pump tank water heaters each with and Energy Factor (EF) of 2.35. By replacing the water heaters, energy savings will be 3,709 kWh/year and 6.4 kW.
Adorni Building — Lighting Retrofits	$31,930	The lighting system will be upgraded either through retrofits or fixture replacement. Linear fixture retrofits will replace T12 lamps with third-generation T8 lamps. Magnetic ballasts will be replaced with NEMA premium efficiency ballasts. A combination of lamp count and ballast factor will be used to maintain existing light levels for the lowest energy consumption. Incandescent lamps will be replaced on a one-for-one basis with equivalent compact fluorescent lamps. Fluorescent exit signs will be replaced with LED versions. Occupancy and photocell sensors will be used to control fixtures where appropriate. Replaced equipment will be disposed based on existing regulations, including recycling, e-waste, and universal waste. The energy and power savings will be 67,966 kWh and 14.7 kW, respectively.
City Hall Solar PV	$119,903	The proposed Project is a 14.7 kW AC Photovoltaic Generation facility located at the Eureka City Hall. The project will be a roof mounted grid tied solar electric system, which will work concurrently with electrical energy supplied by the utility service provider during daytime hours. The total available building rooftop and/or land area footage meets the required installation area for the Project. The proposed 14.7 kW (AC) PV system will produce approximately 20,455 kWh per year.
Service Garage Lighting	$23,092	The proposed project will convert T12's to T8's, convert metal halides to T8, convert high-pressure sodium exterior lights to CFL floods, add photocells to the exterior lights, add occupancy sensors to some fixtures, and delamp some overlit areas. After the proposed changes the lighting will use 32,684 kWh/year with peak usage of 22.6 kW. Energy and power savings will be 18,186 kWh/year and 7.4 kW. Savings will be $2,876/year with a simple payback of 8.0 years.
CITY OF FERNDALE PROJECTS		
Ferndale Elementary School Lighting	$12,539	The proposed project will convert T12's to T8's, replace incandescent lamps with CFL's, control selected fixtures with occupancy sensors, and add daylight sensors to outside fixtures. After the proposed changes the lighting will use 22,307 kWh/year with peak usage of 17.9 kW.
Ferndale High School Lighting	$29,766	The proposed project will convert T12's to T8's, replace incandescent lamps with CFL's, control selected fixtures with occupancy sensors, add daylight sensors to outside fixtures. After the proposed changes the lighting will use 43,378 kWh/year with peak usage of 32.9 kW.
CITY OF FORTUNA PROJECTS		
LED Street Lighting	$78,412	This project physically replaces the cobra-head component of a pole-mounted street light, in order to retrofit the fixture from HPS to LED technology. This is a one-to-one retrofit, with no other modifications required. The street lights in question use either 70-watt or 100-watt HPS lamps, with additional wattage necessary for ballast power. All energy savings are projected to result from the combined efficiency of the LED fixture head and electronic controller, in comparison to the HPS lamp and ballast combination. Each HPS-to-LED retrofit is expected to save 47 watts for a 70W fixture, and 66 watts for a 100W fixture.
CITY OF POINT ARENA PROJECTS		
Replace Wastewater Treatment Pumps	$18,775	Point Arena operates its wastewater treatment facility with an inefficient water pump which operates daily, pumping water from sewage and storm drain systems. The existing pump is 30 years old and runs at 55% efficiency. The city plans to replace the motor with a premium efficiency motor and rebuild the existing pump with stainless steel impeller (projected to yield 69% overall-pump-efficiency when calculated net efficiency at optimal load set-point). The proposed replacement pump is a 25 HP, 3600 RPM, premium efficiency TEFC motor with the existing rebuilt pump.
CITY OF RIO DELL PROJECTS		
Air Conditioner & Furnace Replacement	$22,513	The proposed project will replace the three, existing old, slightly oversized 80 kBTU 80% AFUE furnaces with three efficient 60 kBTU/hour 95.5% AFUE furnaces. Four existing 24 kBTU 8 SEER AC units will be replaced with four 24 kBTU/hour 13 SEER units. Energy will be saved by increased efficiency on both units, by optimizing the furnace for the load, and sealing ducts.
CITY OF TRINIDAD PROJECTS		

PROJECT NAME	COST	PROJECT SUMMARY
City Hall Insulation & Furnace Replacement	$24,600	The city is proposing to insulate the ceiling with R-21 blown-in insulation and R-24 spray-on foam insulation in the floor and replace (2) 25+ year old inefficient furnaces with (2) 95% energy efficient propane furnaces yielding 167 Therms combined savings. An additional independent ventilation system will be required to with provide sufficient fresh air for high-occupancy events when the building tends to overheat. The energy savings projected are 3,310 kWh and 161 Therms per year and $920 annual savings at current rates with a simple payback of 26.8 years.

I.4 PROJECT MAPS

The maps that illustrate the location of (1) all NCIRMWP implementation projects to date and (2) projects in each of the six WMAs are included in the main body of the document. These maps are meant to provide the context for project implementation (e.g. watershed features, jurisdictional boundaries) and to demonstrate regional equity in project geographic distribution. The map data sources are provided in Appendix Q.

I.5 PROJECT ENVIRONMENTAL COMPLIANCE

The NCIRWMP Implementation grant proposal is exempt from the California Environmental Quality Act (CEQA) Guidelines §15262 (Feasibility and Planning Studies) and §15306 (Information Collection) because it consists of basic data collection and resource evaluation activities which would not result in the disturbance of any environmental resource and because it involves planning studies for possible future actions which the participating agencies have not yet approved. Potential environmental impacts of all individual projects listed in the North Coast IRWM Plan have been or will be evaluated in accordance with CEQA by the project proponents. This Plan does not legally bind participants to carry out projects listed in the plan.

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX J
NCIRWMP PROJECT IMPACT & BENEFIT ANALYSIS

APPENDIX J
NCIRWMP PROJECT IMPACT & BENEFIT ANALYSIS

Following are the tabular results of NCIRWMP implementation project impact/benefit assessment. Section 10 ("Implementation Impacts & Benefitsprovides the methodology and discussion for these results.

TABLE 42 INDICATORS OF PROJECT IMPACTS AND BENEFITS

TYPE OF CAPITAL	INDICATOR OF BENEFIT OR IMPACT	PHYSICAL UNIT OF MEASURE	ECONOMIC UNIT OF MEASURE[1]
Natural	Instream Flow	Gallons/Day; Acre-feet/Year	$80-$120/acre-foot per year[2]
	Water Quality	DO; Temperature; Bacteria; Sediment; Meet/ exceed regulatory target (e.g., TMDL)	Sediment: Up to $11 per ton of sediment[3]
	Riparian, Upland, and/or Forest Habitat Quality/Quantity	Acres; Linear measure; Measure of function (e.g., number of plants; tons of carbon sequestration)	Riparian Habitat: $120 per acre per year[4] Wetland Habitat: $2,000–$4,000 per acre per year[5] Carbon Sequestration: $15 per ton of carbon dioxide equivalent sequestered (increases at a real rate of 2.5% per year)
	Salmonid Population	Change in number of adult fish	Project and species-specific values
Human-Built	Water Supply for Domestic Use	Gallons/Day; Acre-feet/Year	$80-$120/acre-foot per year[6]
	Water Supply for Agricultural Use	Gallons/Day; Acre-feet/Year	$80-$120/acre-foot per year[7]
	Water System Operations	O&M effort/cost; Numbers of violations/fines	Project Specific
	Wastewater System Operations	O&M effort/cost; Numbers of violations/fines	Project Specific
	Road Operations	O&M effort/cost; Miles upgraded; Miles decommissioned;	Project Specific
	Culvert Operations	O&M effort/cost; Changes in risk/ probability of failure;	Project Specific
	Flood Control	Number of structures affected; Other infrastructure affected; Damage characterization	Project Specific
	Critical Infrastructure Reliability	Customers/day of shortage; Emergency response timing;	Water Supply: $19–$27 per household per month[8]
	Recreational Facilities	Users/day; Measure of quality (e.g., congestion; uniqueness of experience, etc.)	$128 per camping day, $54 per fishing day, $28 per hiking day, $33 per motorboating day, $61 per mountain biking day, $79 per picnicking day, $25 per sightseeing day, $33 per swimming day, $89 per wildlife viewing day. [9]
	Energy Use	KwH used; Carbon emissions	$15 per ton of carbon dioxide equivalent (increases at a real rate of 2.5% per year)
Human	Loss of life or injury	Number of people affected	Value of a statistical life or avoided cost of injury
	Skill development	Number of people affected; Skills affected	Project Specific; Typically not monetized
	Education	Number of people affected; Behaviors changed	Project Specific; Typically not monetized
Social	Conflict Resolution	Describe effect	Project Specific; Typically not monetized
	Information Development and Sharing	Describe effect	Project Specific; Typically not monetized
	Cultural Heritage	Describe effect	Project Specific; Typically not monetized

TABLE 43 INDICATORS OF BENEFITS AND IMPACTS OF PROPOSITION 50 IMPLEMENTATION PROJECTS

TYPE OF CAPITAL	INDICATOR OF BENEFIT OR IMPACT	# OF PROJECTS	PHYSICAL CHANGE	ECONOMIC VALUE[10]	BENEFICIARIES	
					DACS	TRIBES
Natural	Instream Flow	7	Increased instream flows to benefit ecosystems and salmon; improved water management		•	•

TYPE OF CAPITAL	INDICATOR OF BENEFIT OR IMPACT	# OF PROJECTS	PHYSICAL CHANGE	ECONOMIC VALUE[10]	BENEFICIARIES	
					DACS	TRIBES
	Water Quality	17	Sediment reduction (442,000 yd3 stabilized) Avoided TMDL Enforcement or other projects	>$40 million	•	•
	Riparian, Upland, and/or Forest Habitat Quality/Quantity	8 3	New habitat (332 acres) Invasive species removed (214 acres) Carbon sequestration		•	•
	Salmonid Population	18	Enhanced fisheries and fish populations Improved fish passage and new habitat for fish populations (153 miles)		•	•
Human-Built	Water Supply for Domestic Use	4	Increased availability of water for municipal or domestic use; improved water management		•	
	Water Supply for Agricultural Use	3	Increased availability of water for agricultural use; improved water management		•	
	Water System Operations	3	Avoided water treatment costs and other O&M costs	>$172,000	•	
	Wastewater System Operations	3	Avoided wastewater violations	$60,000	•	
	Road Operations	7	Roads decommissioned (7.76 miles) Roads upgraded (95 miles) Avoided road maintenance costs	>$3 million	•	
	Culvert Operations	8	Changes in culverts to improve fish passage		•	
	Flood Control	4	Flood damage reduction	>$160,000	•	
	Critical Infrastructure Reliability	4	Enhanced firefighting capabilities		•	
	Recreational Facilities	8	Protect and increase recreation access		•	•
	Energy Use					
Human	Loss of life or injury					
	Skill development Education	10	Professional and volunteer training		•	•
Social	Conflict Reduction and Resolution	5			•	•
	Information Development and Sharing	8	Enhanced monitoring programs		•	•
	Cultural Heritage	10	Enhanced salmonid populations Agricultural preservation		•	•

TABLE 44 INDICATORS OF BENEFITS AND IMPACTS OF PROPOSITION 84 IMPLEMENTATION PROJECTS

TYPE OF CAPITAL	INDICATOR OF BENEFIT OR IMPACT	# OF PROJECTS	PHYSICAL CHANGE	ECONOMIC VALUE[11]	BENEFICIARIES	
					DACS	TRIBES
Natural	Instream Flow	13	Increased instream flows to benefit ecosystems and salmon; improved water management	$850,000	•	•
	Water Quality	19	Sediment reduction (184,000 yd3 stabilized) Avoided TMDL Enforcement or other projects (18 projects)	$6 million	•	•
	Riparian, Upland, and/or Forest Habitat Quality/Quantity	14	New habitat (563 acres) Invasive species removed (313 acres) Carbon sequestration (10 projects)	$650,000	•	•
	Salmonid Population	21	Enhanced fisheries and fish populations Improved fish passage and new habitat for fish populations (4 miles)	$22 million	•	•

TYPE OF CAPITAL	INDICATOR OF BENEFIT OR IMPACT	# OF PROJECTS	PHYSICAL CHANGE	ECONOMIC VALUE[11]	BENEFICIARIES	
					DACS	TRIBES
Human-Built	Water Supply for Domestic Use	9	Increased availability of water for municipal or domestic use; improved water management		•	•
	Water Supply for Agricultural Use		Increased availability of water for agricultural use; improved water management		•	
	Water System Operations	8	Avoided costs of emergency repairs Avoided treatment costs Avoided O&M costs	$2.5 million $740,000 $530,000	•	•
	Wastewater System Operations	3	Avoided fines	$380,000	•	•
	Road Operations	9	Roads decommissioned (7.76 miles) Roads upgraded (95 miles) Avoided road maintenance costs ($370,000)		•	•
	Culvert Operations	1	Avoided failure		•	•
	Flood Control	2	Avoided flood damage		•	
	Critical Infrastructure Reliability	3	Enhanced firefighting capabilities Improved water supply reliability	$2.2 million	•	•
	Recreational Facilities	7	Protect and increase recreation access		•	
	Energy Use	3	Reduced carbon emissions Reduced energy costs	$250,000	•	
Human	Loss of life or injury	2	Avoided loss of life and injury	$20 million	•	
	Skill development Education	16	Professional and volunteer training		•	•
Social	Conflict Reduction and Resolution	7			•	•
	Information Development and Sharing	4	Enhanced monitoring programs		•	•
	Cultural Heritage	15	Enhanced salmonid populations Agricultural preservation Increased forest biodiversity		•	•

TABLE 45 ESTIMATED PROJECT BENEFITS FOR WATER SUPPLY, QUALITY, & SERVICES

WATER SUPPLY BENEFITS					
POTENTIAL BENEFIT	PHYSICAL AMOUNT OF BENEFIT	SUGGESTED PHYSICAL UNITS	ESTIMATED ECONOMIC VALUE	SUGGESTED ECONOMIC UNITS	EXAMPLE OF APPLYING ECONOMIC UNITS
Increased Instream Flow for Environmental Purposes		Gallons per year; Gallons per minute; Acre-feet per year		$80–$120 per acre-foot per year[12] This value represents the market prices paid in California water markets for water in 2013. This value should be applied to the increase in the volume of water that is left instream to support ecological functions. The value of this benefit accumulates over time. A higher value may be appropriate if water is being made available for San Francisco Bay area ($160-$250) or Central Valley ($80-$280) users.	A project helps a farmer install drip irrigation equipment. The farmer is then able to reduce withdrawals from the river by one acre-foot per year, which leaves more water instream to protect habitat for salmon and other species. The value of the benefit is $80 per year, for as many years as the water is guaranteed to remain as instream flow.

WATER SUPPLY BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Increased Instream Flow for Agricultural Purposes		Gallons per year; Gallons per minute; Acre-feet per year		$80–$120 per acre-foot per year1 This value represents the market prices paid in California water markets for water in 2013. This value should be applied to the increase in the volume of water available to agricultural users. The value of this benefit accumulates over time. A higher value may be appropriate if water is being made available for San Francisco Bay area ($160-$250) or Central Valley ($80-$280) users.	A project covers irrigation ditches, which reduces evaporation by one acre-foot per year. This water is available to irrigate more acreage than before. The value of this benefit is $57 per year, for as many years as the water is available to meet agricultural demands.
Increased Instream Flow for Municipal Purposes		Gallons per year; Gallons per minute; Acre-feet per year		$80–$120 per acre-foot per year 1 This value represents the market prices paid in California water markets for water in 2013. This value should be applied to the increase in the volume of water available to municipal users. The value of this benefit accumulates over time. A higher value may be appropriate if water is being made available for San Francisco Bay area ($160-$250) or Central Valley ($80-$280) users.	A project provides rebates for water-efficient toilets, which reduces per-capita water use and overall water use by one acre-foot per year. This water is available to meet municipal demands from population growth than before. The value of this benefit is $121 per year, for as many years as the water is available to meet municipal demands.
Change in Timing and Volume of Instream Flow		Cubic feet per second (cfs) over a particular period (document evidence of scarcity during this period)		Project specific / Not monetized Water that provides an increased instream flow during periods of scarcity is particularly valuable. Other benefit categories (e.g., increased instream flow for environmental purposes) already capture some of the benefit associated with increased instream flows. To the extent that increased instream flows occur during periods of scarcity, those values may underestimate the true value of this flow.	A project provides rain tanks that allow a farmer to collect water during the wet season and replace irrigation withdrawals during summer months. This would increase the river's flow during typically drier periods, when water is more scarce and additional flows are more critical for maintaining fish habitat. The exact value of this additional flow, above the average value provided for instream flow for environmental purposes, may not be known, but its importance should be described.
Increased Water Supply Reliability		Number of household customers; Reduction in frequency of water shortages (e.g., once in five years, once in ten years); Reduction in magnitude of shortage (e.g., 10% reduction, 20% reduction)		$19–$27 per household per month[13] These values represent how much households are willing to pay to avoid specific types of water shortages. At the low end, respondents said they were willing to pay about $19 per month to avoid a 10% shortage that occurs once every 10 years. At the high end, they were willing to pay about $27 per month to avoid a 50% shortage that occurs once every 20 years. The lower value is appropriate for improvements in reliability in situations where shortage is likely to occur infrequently and/or for short periods of time. The higher value is appropriate for improvements in reliability in situations where shortage occurs frequently and/or for longer periods of time.	A project that installs low-flow appliances results in a decrease in per-capita water demand. This reduces the likelihood the water utility must enforce water rationing, mandating a 10 percent reduction in water consumption when droughts occur, which is about once every 10 years in the watershed this utility depends on. This utility serves 500 customers, so the value of this benefit is about $9,500 per month or $114,000 per year. This is a tricky benefit to quantify. Project-specific conditions should be taken into account and may affect values considerably.
Increased Groundwater Recharge		Percent increase; Gallons per year; Acre-feet per year		Project Specific/Not monetized The benefits that arise from groundwater recharge may be addressed by other benefit categories (e.g., increased instream flow for multiple purposes, improved habitat, avoided costs, etc.) If other categories don't cover the benefit, describe specifics here.	A project diverts stormwater to constructed wetlands, increasing recharge to the aquifer. This may produce a wide range of benefits, including increased instream flows, avoided pumping costs, avoided costs of adapting to subsidence, etc. Where possible, address this effect in these other, direct, benefit categories.

WATER SUPPLY BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Avoided Water Supply Purchases		Volume of water purchased per year (or at the frequency purchases would be avoided);		Project specific: $ per unit of raw water purchased per year This value depends on the types and costs of avoided water purchases. It's best to rely on information from the project area. If water would have been purchased yearly, the benefit accrues annually. If it's every 5 or 10 years, value accrues periodically over time.	A project decreases water demand by installing low-flow appliances. This decrease in water demand means that the community no longer has to purchase $100,000 worth of water from a neighboring water district each year. The value of this benefit is $100,000 per year. It could potentially increase over time if water supply purchases would have increased.
Avoided Water Supply Projects		Description of the avoided project, including physical benefits, and timing of actions		Project specific: Cost of avoided project(s), including capital, replacement, and operations & maintenance costs, as applicable. This benefit is equal to the costs of other potential future projects aimed at increasing/improving water supplies that are avoided as a result of the project.	A project covers a reservoir, decreasing evaporation. Since more water is available from the reservoir, a planned expansion that would have cost $500,000 no longer has to take place. The value of this benefit would a one-time avoided cost of $500,000. If the reservoir expansion would have cost $500 per year more to maintain, the annual avoided cost would be $500 dollars, and is additional to the one-time capital cost.
Avoided Water Shortage Costs See also Avoided Water Supply Purchases, Increased Water Supply Reliability		Gallons per year; Acre-feet per year; Percent change in frequency /severity of water shortages		Project specific: Avoided costs associated with water shortages The value of this benefit may already be included elsewhere (e.g., avoided water supply purchases, increased water supply reliability). To the extent that the project's capacity to reduce costs attributable to water shortages has not already been captured, it could be included here.	A community increases the efficiency of municipal water use resulting in a decrease in water demand. This decrease in water demand results in an avoided water shortage each summer. Historically, the community had incurred costs of $100,000 during its annual water shortage, from lost business opportunities. This project would have an annual benefit of $100,000.
Avoided Electric Costs		Energy units (kWh) per year; Acre-feet of water pumped per year		Project specific: $ per kWh per year If a project specific change in electricity use is available, it can be multiplied by local electricity prices to estimate the value of the benefit. (PG&E current rates for different customers can be found at: http://www.pge.com/nots/rates/tariffs/rateinfo.shtml)	A project decreases leakage from irrigation piping resulting in a decrease in energy used to pump water for irrigation. The value of the benefit would be equal to the avoided electricity costs.
Avoided Costs Associated with Emergency Repairs		Project Specific		Project specific: Avoided costs associated with labor and capital to make the emergency repair. Insofar as the avoided costs have not been included elsewhere, they can be included here. To the extent that the project avoids costs associated with emergency repairs, the value of those costs may be included as a benefit.	For the past 10 years, emergency crews have been called on to repair an old water pipe, on average, every two years. A project that replaces that pipe would provide a benefit equal to the average annual costs of those avoided repairs.
Revenue from Water Sales to New Customers		Gallons per year; Acre-feet per year		Project specific: $ amount of net increase in revenue	A utility fixes leaky distribution pipes, which allows it to sell more water to meet demands it currently cannot meet without developing new supplies. The benefit is equal to revenue earned from the additional water sales.

WATER QUALITY BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Sediment Reduction		Tons per year		Project specific/Up to $11 per ton of sediment[14] This value represents the sum of several avoided costs associated with reducing sedimentation (e.g., avoided reservoir dredging, avoided flood damage, avoided sediment filtration costs). The actual value likely is less than $11 per ton, and depends on the types of downstream users likely to benefit.	A project involves planting 100 trees in a previously barren riparian area resulting in reduced sediment from erosion. The project reduces sedimentation to the stream by one ton per year. The annual value of the benefit is $11 per year. Alternately, the water treatment plant downstream can document that it will spend $1,000 less per year on treatment supplies to remove the sediment. The benefit in that case will be $1,000 per year. This is a hypothetical, project-specific benefit.
Decreased Water Temperature		Avoided project; Change in maximum daily temperature, by day		Project specific To avoid double counting of habitat benefits, the value of this benefit is equal to the costs of other potential future projects aimed at reducing water temperature that are avoided due to this project's impact. If there are not potential avoided future projects, this benefit may still have biophysical value, but does not necessarily provide an economic benefit.	A project involves planting 100 trees along a stream These trees shade the stream and decrease the water temperature. Due to lower water temperatures from this project, another future project costing $100,000 is no longer necessary. This benefit has a one-time value of $100,000.
Increased Dissolved Oxygen (DO)		Avoided project; Change in DO concentration		Project specific To avoid double counting, the value of this benefit is equal to the costs of other potential future projects aimed at increasing DO concentrations that are avoided due to this project's impact. If there are not potential avoided future projects, this benefit may still have biophysical value, but does not necessarily provide an economic benefit.	A project involves planting 100 trees between a farm and a stream. The decrease in nutrient runoff from the farm improves dissolved oxygen concentrations in the stream. Due to the improved dissolved oxygen concentrations from this project, another future project costing $100,000 is no longer necessary. This benefit has a one-time value of $100,000.
Bacteria/ Contaminant Reduction		Avoided project; Change in bacteria/ contaminant concentration		Project specific To avoid double counting of habitat- and recreation-related benefits, the value of this benefit is equal to the costs of other potential future projects aimed at decreasing bacteria/ contaminant concentrations that are avoided due to this project's impact. If there are not potential avoided future projects, this benefit may still have biophysical value, but does not necessarily provide an economic benefit.	A project involves planting 100 trees between a livestock operation and a stream. The decrease in runoff from the feedlot reduces bacteria concentrations in the stream. Due to the improved bacteria concentrations from this project, a future project costing $100,000 is no longer necessary. This benefit has a one-time value of $100,000.
Additional Water Quality Projects Avoided		Avoided projects		Project specific To avoid double counting of habitat- and recreation-related benefits, the value of this benefit is equal to the costs of other potential future projects aimed at improving water quality that are avoided due to this project's impact.	If the project improves water quality in other ways, it provides a benefit by improving aquatic habitat and recreational opportunities. To avoid double counting, the value of habitat- and recreation-related benefits are calculated elsewhere. To the extent that this project can replace other efforts aimed at improving water quality, it provides an additional benefit equal to the costs of avoided projects.
Avoided Water Treatment Costs		Gallons per year; Acre-feet per year		Project specific: Difference in water treatment costs per unit of water per year If a local value for water treatment costs is available, multiply it by the relevant quantity to estimate the annual benefit.	A project involves lining a reservoir that holds municipal drinking water, resulting in improved water quality and decreased treatment costs for the water supply. The value is the difference between what the utility paid to treat the water before the project and after the project.

WATER QUALITY BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Avoided Culvert Failures		Number of culvert failures avoided		Project specific: Cost of avoided culvert failures Use local values describing historical costs associated with culvert failures to estimate the value of reducing future culvert failures. These might include costs of: fixing/ replacing pipes at emergency rates; flood damage to land owners; and user delays for motorists. This is a one-time value applied when the culvert would likely have failed.	A project involves excavating and reinstalling one culvert that is at a risk of immediate failure. Culvert failures in the area have cost an average of $10,000 per failure in emergency repairs and localized damage to roads and structures. This one-time value can be applied to describe the benefit of this project.
Flood Damage Reduction		To determine flood damage reduction benefits, see specific instructions below.		Project specific Calculate expected annual damage using relevant model, such as U.S. Army Corps of Engineers HEC-Flood Damage Assessment or the Flood Rapid Assessment Model (F-RAM).	If the project decreases the frequency and/ or magnitude of potential future flood events, it provides a benefit equal to the value of avoided flood damages. The economic costs associated with expected annual damage may include avoided physical damage; avoided costs associated with loss of functions such as income and wages; avoided emergency response and cleanup; and avoided, but unquantifiable, public safety and health impacts.

OTHER ECOSYSTEM SERVICE BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Fishery Improvement See also Increased Instream Flow for Environmental Purposes; Habitat Restoration		Number of fish per year; Percent population increase; Density (fish/m^2)		Project and species-specific values; Partially captured by other benefits Some of the value of this benefit is captured in the value of increased instream flow for environmental purposes. If the project makes targeted efforts to improve fish populations, there are several species-specific values applicable from the literature that reflect the commercial, recreation, and existence values of improved fish populations. These values are dependent on site conditions and are not straightforward calculations.	A project installs 50 pieces of large woody debris in a river resulting in a 5% increase in local salmon and steelhead populations over 30 years. The value of this salmon-specific benefit is based on the commercial, recreation, and existence value of this increase in fish populations.
Increased Quantity or Quality of Recreation or Public Access		Number of recreation days, by type of activity		$128 per camping day, $54 per fishing day, $28 per hiking day, $33 per motorboating day, $61 per mountain biking day, $79 per picnicking day, $25 per sightseeing day, $33 per swimming day, $89 per wildlife viewing day.15 These represent the net value associated with a day spent participating in different recreational activities (not including the costs of participating in the activity). Generally, increases in quality of recreational opportunities are not easily quantifiable, but should be discussed qualitatively.	A project creates a new hiking trail along a river. This new trail attracts more individuals to hike in the area and encourages people who already hike in the area to take more hiking trips. Recreation managers in the area count an average of 10 hikers per day using the trail. Assuming all of these people would not have gone hiking but for this new trail, the value associated with the trail is approximately $280 per day or about $100,000 per year. It is important to recognize that some of these people may have hiked elsewhere, so they would have benefited from their hiking trip either way. For this reason, it is easy to overestimate this benefit, so care should be taken to clearly document assumptions.

OTHER ECOSYSTEM SERVICE BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Improved Fish Passage See also Fishery Improvement; Increased Instream Flow for Environmental Purposes; Habitat Restoration		Number of fish per year; Percent population increase; Density (fish/m^2)		Project and species-specific values; Partially captured by other benefits Avoid double counting with the value of increased instream flow for environmental purposes (and, if calculated, the improvement in fisheries). If the project makes targeted efforts to improve fish populations, there are several species-specific values applicable from the literature that reflect the commercial, recreation, and existence values of improved fish populations. These values are dependent on site conditions and are not straightforward calculations.	A project installs an additional culvert under a roadway resulting in 5 stream miles of new steelhead rearing habitat. This is expected to increase steelhead populations in the watershed by 10 percent over 10 years. The value of this salmon-specific benefit is based on the commercial, recreation, and existence value of this increase in fish populations.
Habitat Restoration See also Fishery Improvement; Increased Instream Flow for Environmental Purposes		Acres of habitat type		$120 per acre per year (riparian habitat)16 $2,000–$4,000 per acre per year (wetland habitat)17; Project-specific These values represent estimates of the total annual economic value associated with riparian and wetland habitat. Other values may be available from the literature to apply to other habitat types and may differ considerably from these values (e.g., upland forest ecosystems, scrubland, etc.).	A project involves removing an abandoned development alongside a river. In the process, trees are planted and the native riparian conditions are restored, increasing riparian habitat by one acre. The value of that new habitat would be $120 per year.
Invasive Plant Removal		Acres of habitat improved		$120 per acre per year (riparian habitat)6 2,000–$4,000 per acre per year (wetland habitat)7 To the extent that a project improves the functionality of habitat, it provides benefits proportional to the incremental improvement of the habitat. To avoid double-counting, habitat restoration benefits should not be claimed on the same land that receives benefits for removing invasive plants.	A project removes invasive blackberries from one acre of a riparian area, resulting in better growing conditions for native vegetation and improved wildlife habitat. Biologists estimate the changes improve the productivity of the landscape for supporting native species, from about 50 percent of optimal function to 100 percent of optimal function. The value of the benefit would be equal to half of the value associated with riparian habitat, or about $60 per year.
Flood Control See also Flood Damage Reduction		Area and type of land protected; Change in flood probabilities		Project specific In order to avoid double counting with previous flood-related benefits, the value of this benefit should be equal to historical costs associated with past floods minus those costs already accounted for in other benefit categories.	If the project decreases the frequency and/or magnitude of potential future flood events, it provides additional benefits beyond those estimated by F-RAM. These benefits are equal to avoided future flood-related costs (e.g., avoided displacement, avoided injuries, avoided municipal opportunity costs, avoided flood preparation costs).
Reduction in Shellfish Closures		Number of days per year of reduced closures; Change in quantity of commercial shellfish production; Change in shellfish-related recreation days		Project specific The value of this benefit relies on the type of shellfish closure, its duration, and its total effect on commercial shellfish production and recreational shellfish activity.	Historically, high bacteria levels in a river have resulted in annual closures in a nearby shellfish-producing area. A project effectively reduces bacteria levels resulting in no more shellfish closures. The value of the value of the benefit is equal to the value of commercial and recreational shellfish activities adversely affected by the closure.

OTHER ECOSYSTEM SERVICE BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED PHYSICAL UNITS**	**ESTIMATED ECONOMIC VALUE**	**SUGGESTED ECONOMIC UNITS**	**EXAMPLE OF APPLYING ECONOMIC UNITS**
Decreased Operation and Maintenance Costs		Project specific		Project specific: Avoided costs associated with labor and capital for operations and maintenance. If the project decreases any operation and/or maintenance costs not accounted for in other benefit categories, count those benefits here. The value of the benefit is equal to the avoided operation and maintenance costs per year.	A project upgrades a municipal reservoir, resulting in a reduction in treatment and conveyance costs of $50,000 per year. Insofar as these values have not been accounted for elsewhere, the value of this benefit is $50,000 per year.
Avoided Costs of Road Maintenance		Miles of road;		Project specific: Average road maintenance costs per mile including labor and capital. In order to avoid double-counting with previous maintenance-related benefits, the value of this benefit should reflect only those avoided costs not yet accounted for.	A project re-grades a segment of roadway, decreasing annual costs associated with runoff and erosion. Historically, an average of $5,000 was spent addressing problems related to poor grade. The improvements reduce the annual maintenance efforts by half for 10 years. The value of this benefit is equal to $2,500 per year over 10 years.
Enhanced Fire-Fighting Capabilities		Area protected per year; Avoided costs associated with other sources of water; Avoided costs of delays associated with responding to fires		Project specific FEMA has developed a benefit-cost model that uses project-specific characteristics to estimate the value of avoided costs associated with natural disasters such as fires. If the project improves fire-fighting capabilities, it provides a benefit equal to the avoided costs associated with bringing in water from other sources to fight fires, the costs of delays in responding to fires, and fire-related damage.	A project increases the annual storage capacity of a pretreatment reservoir and reduces annual water demand, expanding the community's capacity to provide water for fighting wildfires in the region. The benefit is equal to the costs of fighting fire associated with hauling water from farther away, and potentially the damage avoided from being able to respond to fires more quickly. If these benefits are difficult to quantify monetarily, describe qualitatively.
Reduced Risk of Wildfire		Amount of fuel load reduced; predicted reduction in annual fire risk		Project specific; Non Monetized This benefit may be difficult to quantify. Factors to consider include probability of large fire and changes in potential damage costs, fire fighting costs, insurance costs, etc.	A project thins forests, reducing the risk of a catastrophic wildfire. The benefit is equal to the reduced annual probability of fire times the costs associated with fighting fires, the costs of delays in responding to fires, and fire-related damage.

COMMUNITY AND SOCIAL BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED UNITS**	**ESTIMATED ECONOMIC VALUE**	**POTENTIAL ECONOMIC UNITS**	**EXAMPLE OF CALCULATING ECONOMIC VALUE**
Education or Technology Benefits		Number of people reached; Description of effects of technology (e.g., saved labor, better accuracy, etc.)		Project specific; Not monetized This benefit may be difficult to quantify in monetary terms. If the project provides opportunities for people to enhance their education or to develop, test, or document a new technology in a way that should result in water supply, water quality, or flood reduction benefits it results in a benefit associated with education or technology.	A project uses youth volunteers from the local community to conduct stream restoration. The students learn about the river's ecosystem. This represents an investment in the region's human capital, which may improve the individual success of the students and the community's capacity to address related issues in the future.
Avoided Public Water Resources Conflicts		Describe and quantify the conflicts		Project specific; Not monetized This benefit may be difficult to quantify in monetary terms. Evidence of an effect may be illustrated through reduced litigation costs or reduced enforcement or regulatory costs.	A project provides opportunities for public collaboration around water conservation efforts. This allows stakeholders to share information, identify and agree on problem definitions, and address issues before they rise to official levels. This may avoid short-run costs and builds a region's social capital, which may increase its capacity to address similar problems more efficiently and cost-effectively in the future.
Social Health and Safety		Describe the effects		Project specific; Not monetized These types of benefits are difficult to quantify in monetary terms. If the project reduces the public's exposure to water-related hazards not captured by the benefit categories above, it might provide additional benefits to social health and safety.	A project reinforces a critical water main whose failure, given a seismic event, would disrupt the fire-fighting capacity of the community. The benefit is reduced risk of incurring emergency costs and improved resilience if disruptions occur.
Other Social Benefits		Number of people		Not monetized By and large, these types of benefits are difficult to quantify in monetary terms.	Projects may also possess other social benefits, for example, a project might redress inequitable distribution of environmental burdens or have a disproportionate beneficial effects on disadvantaged communities, Native Americans, or other distinct cultural groups.
CLIMATE CHANGE MITIGATION					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED UNITS**	**ESTIMATED ECONOMIC VALUE**	**POTENTIAL ECONOMIC UNITS**	**EXAMPLE OF CALCULATING ECONOMIC VALUE**
Carbon Emissions Reductions from Reduced Electricity Use		Reduction in emissions of CO2 equivalent (CO2E) per year, in tons. Reduced electricity use per year in kWh. To calculate emissions for the project area, go to http://oaspub.epa.gov/powpro/ept_pack.charts		$15 per ton of carbon dioxide equivalent (increases at a real rate of 2.5% per year)18 Reducing emissions has a benefit equal to the value of these avoided costs. If the weight of avoided carbon dioxide equivalent is known, apply the first value to the weight of avoided emissions. If only the amount of avoided electricity is known, apply the second value ($22 per MWh) to the amount of avoided electricity. The value of this benefit accumulates annually.	A project reduces leakage from irrigation piping resulting in a reduction in electricity used to pump and convey water for irrigation. The reduction in energy use results in a reduction in electricity generation, which reduces greenhouse gas emissions by one ton of CO2 equivalent per year. The value of the benefit is $15 for the first year, increasing by 2.5 for every year thereafter.

COMMUNITY AND SOCIAL BENEFITS					
POTENTIAL BENEFIT	**PHYSICAL AMOUNT OF BENEFIT**	**SUGGESTED UNITS**	**ESTIMATED ECONOMIC VALUE**	**POTENTIAL ECONOMIC UNITS**	**EXAMPLE OF CALCULATING ECONOMIC VALUE**
Education or Technology Benefits		Number of people reached; Description of effects of technology (e.g., saved labor, better accuracy, etc.)		Project specific; Not monetized This benefit may be difficult to quantify in monetary terms. If the project provides opportunities for people to enhance their education or to develop, test, or document a new technology in a way that should result in water supply, water quality, or flood reduction benefits it results in a benefit associated with education or technology.	A project uses youth volunteers from the local community to conduct stream restoration. The students learn about the river's ecosystem. This represents an investment in the region's human capital, which may improve the individual success of the students and the community's capacity to address related issues in the future.
Carbon Emissions Reductions from Other Reduced Energy Use		Reduction in emissions of CO2 equivalent (CO2E) per year, in tons. Reduced energy use per year (e.g., gallons of diesel fuel). To calculate emissions reductions from different energy sources, go to http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results		$15 per ton of carbon dioxide equivalent (increases at a real rate of 2.5% per year)19 Reducing emissions has a benefit equal to the value of these avoided costs. If only the amount of energy is known, convert the energy to carbon dioxide equivalent, and multiply by the value above. Additional resources for these calculations are available at http://www.eia.gov/oiaf/1605/emission_factors.html	A project reduces the need to transport water by truck, resulting in a decrease in diesel used for transportation, which reduces greenhouse gas emissions by one ton of CO2 equivalent per year. The value of the benefit is $15 for the first year, increasing by 2.5 for every year thereafter.
Carbon Sequestration		Number of trees planted, by type; Volume of CO2 sequestered per year (in tons) May use the Tree Carbon Calculator to estimate carbon dioxide sequestration from tree planting projects: http://www.fs.fed.us/ccrc/tools/ctcc.shtml		$15 per ton of carbon dioxide sequestered (increases at a real rate of 2.5% per year)20 If estimates of carbon sequestration are not available but an estimate of number of trees planted is available, use the following value estimates: $0.64 for per hardwood planted per year; $0.49 per conifer planted per year; These values represent the average annual value of carbon sequestered by different kinds of trees, assuming a moderate growth rate over 50 years, discounted at a rate of 3 percent.	A project involves planting 1,000 coniferous trees along a riparian area. As these trees grow they sequester and store carbon dioxide. This benefit is roughly equivalent to $490 per year.

TABLE 46 ESTIMATED PROJECT BENEFITS FOR DESIGNATED BENEFICIAL USES OF WATER

Note: These descriptions provide information that helps inform the economic value of the benefit categories listed above, but the economic value for these categories is not calculated independently.

BENEFICIAL USES OF WATER FOR ALL BENEFIT TYPES		
POTENTIAL BENEFIT	**SUGGESTED UNITS**	**DESCRIPTION**
Enhancement of Beneficial Uses	Number of downstream water bodies affected	
Enhancement of Beneficial Uses	Water body names and volumes	
Enhancement of Beneficial Uses	Percentage of each water body affected	
Enhancement of Beneficial Uses	Beneficial uses affected by project	
Enhancement of Beneficial Uses	Change in beneficial use activity expected for the affected portion of each water body	
Enhancement of Beneficial Uses: Sport Fishing	Increase in sport fishing days per year	
Enhancement of Beneficial Uses: Water Contact Recreation	Increase in open days per year	
Enhancement of Beneficial Uses: Wildlife Habitat	Acres of riparian habitat restored per year	
Enhancement of Beneficial Uses	Number of downstream water bodies affected	
Enhancement of Beneficial Uses	Water body names and volumes	

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX K
FINANCING HISTORY & FUTURE FINANCING

APPENDIX K
FINANCING HISTORY & FUTURE FINANCING

Following are the tabular results of the NCRP-commissioned NCIRWMP long-term implementation and financing assessment. Section 12 ("Long-term Financing & Implementation") provides methodology and discussion for these results.

TABLE 47 SUMMARY OF NCIRWMP USE OF IRWM FUNDS

IRWMP FUNDING CALL	TOTAL IRWM AWARDS	MATCHING FUNDS	TOTAL INVESTMENT	AWARDS AND LOCAL MATCH
Proposition 50, Round 1	$23,076,904	$26,133,289	$49,210,193	47% IRWMP Award and 53% Local Match
Proposition 50, Round 2 & Supplemental	$4,058,720	$1,041,889	$5,100,609	80% IRWMP Award and 20% Local Match
Proposition 84, Round 1	$7,809,950	$3,711,342	$11,521,292	68% IRWMP Award and 32% Local Match
Proposition 84, Round 2	$5,129,524	$5,763,888	$10,893,412	47% IRWMP Award and 53% Local Match
Total	**$40,075,098**	**$36,650,408**	**$76,725,506**	**52% IRWMP Award and 48% Local Match**

TABLE 48 SUMMARY OF FUNDING AND FINANCING TO DATE

APPLICANT	PROJECT	FUNDED CAPITAL COSTS	SOURCE OF CAPITAL FUNDING		SOURCE OF O&M FUNDING	O&M FINANCE CERTAINTY
			State Award	Local Match		
PROPOSITION 50 ROUND 1						
California Land Stewardship Institute	Fish Friendly Farming Environmental Certification Program	$213,510	$210,510	$3,000	Landowners	Grant funded/ landowners
California State Parks — North Coast Redwoods District	Head Hunter/Smoke House Non-point Sediment Reduction Project	$273,146	$273,146	$0	Operating funds	NA
City of Crescent City	Crescent City Wastewater Treatment Plant Renovation	$1,290,000	$910,000	$380,000	Utility Rates	Secure/annually budgeted
City of Etna	City of Etna Water Supply	$663,269	$593,936	$69,333	Utility Rates	Partially secure
City of Eureka	Martin Slough Interceptor Project	$14,525,971	$4,069,684	$10,456,287	Utility Rates	Secure/annually budgeted
City of Santa Rosa	Sonoma County Water Recycling and Habitat Preservation Project	$10,015,085	$4,004,603	$6,010,482	Utility Rates	Secure/annually budgeted
Covelo Community Services District	Covelo Wastewater Facilities Improvement Project	$1,094,068	$1,065,591	$28,477	Utility Rates	Partially secure
Graton Community Service District	Graton Wastewater Treatment Upgrade and Reclamation Project	$3,050,267	$1,116,648	$1,933,619	Utility Rates	Secure/annually budgeted
Gualala River Watershed Council	Sediment Solutions for the Gualala: Phase III	$159,574	$159,052	$522	Landowners	Grant funded/ landowners
Humboldt County Resource Conservation District	Salt River Restoration Project	$5,192,571	$1,573,878	$3,618,693	Operating funds	Secure/annually budgeted
Humboldt County Resource Conservation District	Mid Van Duzen River Ranch Road Sediment Reduction Program	$581,986	$440,948	$141,038	Landowners, operating funds	Landowner maintenance
Mattole Restoration Council	Mattole Integrated Water Management Program	$2,935,674	$1,668,674	$1,267,000	Landowners, operating funds	NA
Mendocino County Resource Conservation District	Navarro Watershed Road Sediment Reduction Project	$1,180,884	$673,633	$507,251	Operating funds	Landowner maintenance
Modoc County	Newell Water System Renovation	$1,493,228	$1,485,228	$8,000	Utility Rates	Partially secure
Pacific Coast Fish, Wildlife & Wetlands Restoration Association	Redwood Creek Erosion Control	$567,971	$567,971	$0	Operating funds	NA
Shasta Valley Resource Conservation District	Shasta Water Association Dam Restoration	$2,632,177	$1,926,351	$705,826	Operating funds	Grant funded/ landowners
Shasta Valley Resource Conservation District	Araujo Dam Restoration	$1,632,490	$769,903	$862,587	Operating funds	Grant funded/ landowners
Trinity County Waterworks District #1	Raw & Recovered Water for Irrigating Public Agencies	$1,027,394	$912,219	$115,175	Utility Rates	Secure/annually budgeted

APPLICANT	PROJECT	FUNDED CAPITAL COSTS	SOURCE OF CAPITAL FUNDING		SOURCE OF O&M FUNDING	O&M FINANCE CERTAINTY
			State Award	Local Match		
Weaverville Sanitary District	Weaverville Sanitary District Water Reclamation Project	$306,688	$280,688	$26,000	Utility Rates	Secure/annually budgeted
Westport County Water District	Water Supply Reliability Project	$374,241	$374,241	$0	Utility Rates	Partially secure
PROPOSITION 50 ROUND 2 AND SUPPLEMENTAL						
Gold Ridge Resource Conservation District	Salmon Creek Sediment Reduction and Water Conservation Program	$1,140,322	$725,322	$415,000	Operating funds, landowners	Grant funded/ landowners
Mattole Restoration Council	Mattole Integrated Coastal Watershed Management Program	$1,321,554	$879,665	$441,889		Grant funded/ long-standing program
Mendocino Land Trust	Big River Lower Mainstem Restoration Project	$662,169	$662,169	$0	State, federal, and private grants, operating funds	Grant funded/ State Parks budget
Mendocino Resource Conservation District	Forsythe Creek Upslope Road Sediment Reduction Project	$1,976,564	$1,791,564	$185,000	Landowners, operating funds	NA
PROPOSITION 84 — ROUND 1						
City of Fort Bragg	Waterfall Gulch Transmission Main	$788,305	$550,000	$238,305	Utility Rates	Secure/annually budgeted
Del Norte Resource Conservation District	Del Norte Agricultural Enhancement Program	$400,000	$255,000	$145,000	Operating funds	Landowner maintenance
Gold Ridge Resource Conservation District	Bodega Bay HU Water Resources Management Project	$955,205	$700,000	$255,205	Operating funds	Grant funded/ landowners
Gualala River Watershed Council	Gualala River Sediment Reduction Program	$908,280	$600,000	$308,280	Landowners	Grant funded/ long-standing program
Happy Camp Community Services District	Happy Camp Water Treatment System Upgrade	$504,000	$253,000	$251,000	Utility Rates	Partially secure/ current budget
Happy Camp Sanitary District	Indian Creek Sewer Pipeline Crossing	$617,065	$542,000	$75,065	Utility Rates	Partially secure/ current budget
Hopland Band of Pomo Indians	Nissa-kah Creek Fish Passage at Hwy 175	$853,237	$803,000	$50,237	Operating funds	NA
Humboldt Bay Municipal Water District	HBMWD-Blue Lake Fieldbrook Pipeline Support Retrofit	$1,603,580	$700,000	$903,580	Utility Rates	Secure/annually budgeted
Karuk Tribe	Camp Creek Habitat Protection-Road Decommissioning Implementation Project	$375,000	$300,000	$75,000	Operating funds	NA
Mattole Restoration Council	Mattole Integrated Watershed Management Initiative	$643,776	$300,000	$343,776	Landowners, operating funds	Grant funded/ long-standing program
Mendocino County Resource Conservation District	Mendocino Headwaters Integrated Water Quality Enhancement Project	$746,577	$462,670	$283,907	Operating funds, landowners	Landowner maintenance
Mendocino County Resource Conservation District	Mendocino Jumpstart Integrated Water Plan	$391,444	$337,330	$54,114	Operating funds	NA
Pinoleville Pomo Nation	Ackerman Creek Habitat Restoration	$226,950	$46,950	$180,000	Operating funds	NA
Redwood Forest Foundation Inc.	Sustainable Forests, Clean Water & Carbon Sequestration Demonstration Project	$328,040	$250,000	$78,040	Operating funds	NA
Sonoma County Water Agency	The Copeland Creek Watershed Detention/Recharge, Habitat Restoration, and Steelhead Refugia Project	$1,333,333	$1,000,000	$333,333	Operating funds	Secure/annually budgeted

APPLICANT	PROJECT	FUNDED CAPITAL COSTS	SOURCE OF CAPITAL FUNDING		SOURCE OF O&M FUNDING	O&M FINANCE CERTAINTY
			State Award	Local Match		
Sonoma Resource Conservation District	Russian River Arundo donax Removal and Riparian Enhancement Program	$295,000	$225,000	$70,000	Operating funds, state, federal, and local grants	grant funded / Landowner maintenance
Sonoma Resource Conservation District	Lower Russian River Water Quality Improvement Project	$416,500	$375,000	$41,500	Operating funds, grants	Grant funded
Willow Creek Community Services District	Hwy 96 Stormceptor	$135,000	$110,000	$25,000	Operating funds	Secure/annually budgeted
PROPOSITION 84 — ROUND 2						
Big Rock Community Services District	Big Rock CSD Stabilize Water Storage Tank	$1,524,421	$875,221	$649,200	Utility Rates	Partially secure/ current budget
California Land Stewardship Institute	Fish Friendly Farming and Fish Friendly Ranching Environmental Certification in the Russian, Navarro, and Gualala River Watersheds	$710,000	$190,000	$520,000	Landowners	grant funded / Landowner maintenance
California Land Stewardship Institute	Russian River Watershed Agricultural Water Conservation and Water Supply Reliability Program	$2,744,500	$523,500	$2,221,000	Landowners	Secure/annually budgeted
Gold Ridge Resource Conservation District	Gold Ridge Coastal Watersheds Enhancement Project	$837,750	$307,750	$530,000	Landowners, operating funds	grant funded / Landowner maintenance
Gualala River Watershed Council	Gualala River Sediment Reduction Program	$484,288	$259,000	$225,288	Landowners	grant funded / Landowner maintenance
Humboldt Bay Municipal Water District	Ranney Collectors 1 & 1A Lateral Replacement	$1,416,624	$666,624	$750,000	Utility Rates	Secure/annually budgeted
Karuk Tribe	Lower Mid-Klamath Habitat Protection-Road Decommissioning Implementation Project	$375,000	$300,000	$75,000	Operating funds	grant funded / NA
Mendocino County Resource Conservation District	Mendocino County Working Landscapes Riparian Demonstration Project	$266,400	$184,800	$81,600	Operating funds	grant funded / Landowner maintenance
Salyer Mutual Water Company	Larger Capacity Storage Tanks, Dedicated Main Line, Meters/ Master Meter Project	$210,000	$210,000	$0	Utility Rates	Partially secure/ current budget
Siskiyou County	Siskiyou County Septage Pond Closure	$519,700	$389,775	$129,925	Operating funds	current budget NA
Trinity County Resource Conservation District	West Weaver Creek — Channel and Floodplain Rehabilitation	$520,000	$441,500	$78,500	Landowners, operating funds	grant funded / Landowner maintenance
Westhaven Community Services District	Westhaven CSD Water Tank	$360,000	$360,000	$0	Utility Rates	Partially secure/ current budget
Yurok Tribe — Yurok Tribal Fisheries Program	Restoration of Lower Klamath River Habitats	$924,729	$421,354	$503,375	Operating funds	grant funded/ ongoing program

TABLE 49 SMALL COMMUNITY TOOLKIT ELEMENTS

TOOLS	BENEFIT TO SERVICE PROVIDERS
Cost Estimating Tools	The cost estimating tools will assist service providers in developing budget level estimates for various types and sizes of infrastructure. While not a substitute for design, this information helps service providers understand budget level costs and begin initial dialogues on funding strategies.

TOOLS	BENEFIT TO SERVICE PROVIDERS
Funding Program Summaries FAQs Capital Recovery Factor Tables	Compiled and synthesized from funding agency information and containing active links to funding program websites, this is a one-stop information shop for service providers. The capital recovery factor tables will allow service providers to translate total project costs to annual debt service needs providing a preliminary understanding of budget and rate impacts
Institutional Summaries Financing District Summaries LAFCO Requirements	Building on the work contained in the Partnership's System Needs Survey, the Institutional Summary and LAFCO summary provides an overview of public and private institutional options and the various legal and administrative steps required to form a public district. The financing district summary provides an overview of commonly used borrowing structures (COPs, assessment districts, Joint Powers Authorities etc) and the steps required to use each borrowing structure, because grants cannot fund 100% of project costs.
Consolidated Preliminary Engineering Report Template List of CEQA/NEPA Exemptions CEQA/NEPA Checklists CEQA GIS Information	Almost every funding program requires some form of a preliminary engineering report and CEQA/NEPA document to process a funding request. But the requirements aren't always aligned. The toolkit includes a proven consolidated report outline with maximum value and flexibility in developing preliminary engineering reports. The summary of CEQA/NEPA exemptions and checklists will assist service providers in tailoring projects to minimize environmental impacts saving both costs and time. The CEQA GIS layers will help purveyors understand possible constraints that could impact their projects.
Technology Overviews	The technology overview is a summary of common system issues, the types of technology used to resolves those issues and the pros and cons of each (first cost, operating costs, operator sophistication etc).

TABLE 50 ECONOMICALLY DISADVANTAGED COMMUNITY (DAC) DEMONSTRATION PROJECTS

COUNTY	APPLICANT AND ORGANIZATION TYPE	DESCRIPTION
Del Norte	Smith River CSD –Public Agency	Develop a template to explore the feasibility of adding solar energy production to small water districts.
Humboldt	Orleans CSD — Public Agency	Study of water supply capacity and storage options which will support Tribal housing.
Humboldt	Orick CSD Public Agency	Evaluate cluster wastewater systems. The feasibility study would build on past investigation into a larger wastewater project.
Mendocino	Pine Mountain Mutual Water Company — Mutual	Assistance to secure funds to purchase a new tank and repair a well. Consultant services will help put them in a better position to secure grant funds.
Siskiyou	Callahan Water District — Public Agency	Evaluate water system filtration options
Siskiyou	City of Weed	Feasibility study for wind and solar options to offset power consumption and cost.
Sonoma	Graton CSD –Public Agency	Feasibility study/cost estimation to repair aging collection system.
Sonoma	Huckleberry Mutual Water Company — Mutual	Assistance with securing financing for a filtration system and meters.
Sonoma	Kashaya Utility District — Tribal Utility	Evaluate extending water supply to adjacent land.
Trinity	Lewiston Park Mutual Water Company Mutual	Plan for an upgrade or a new water treatment plant to lift boil notice. Receive guidance about how to consolidate with neighboring system.

TABLE 51 ENERGY EFFICIENCY BLOCK GRANT PROGRAM

COMMUNITY	TOTAL FUNDS ALLOCATED	PROJECT DESCRIPTION	ANNUAL PROJECT SAVINGS	SIMPLE PAYBACK PERIOD
Humboldt County	$397,762	Energy Efficiency upgrades including motors, VFDs, HVAC, boilers and controls, chillers, lighting & occupancy sensors and ozone laundry	$162,089	5.2
Trinity County	$81,911	HVAC replacement project on Library and Jail.	-$1,234	0
Arcata	$94,637	LED Streetlights, Energy Management Systems, HVAC Improvements, lighting retrofit, refrigeration projects	$21,588	5.3
Blue Lake	$25,000	Premium efficiency booster pumps	$2,860	8.5
Eureka	$141,208	Adorni lighting retrofit, heat pump water heaters, Eureka P.D. VAV boxes, Public works controls	$17,030	10.5
Fortuna	$62,756	Street lighting	$4,039	19.4
Ferndale	$25,000	Premium efficiency booster pumps	$3,255	6.6
Rio Dell	$25,000	Replacement of air conditioning/heating and ducting	$935	44.3
Trinidad	$25,000	City Hall Insulation & furnace replacement	$0	45.9
Point Arena	$25,000	Purchase and install (1) 30 HP Premium Efficiency Motor	$872	21.3
Crescent City	$44,555	Replace the 3 existing 125HP direct drive motors with 3 Variable Frequency Drive (VFD) controlled motors.	$29,394	4.1
Etna	$25,000	Insulation of town hall and replace (1) furnace	$40,612	16.1
Totals	**$972,829**		**$281,440**	**5.3**

TABLE 52 COMMON LOCAL AGENCY FUNDING MECHANISMS

	WATER OR SEWER RATES	BENEFIT ASSESSMENTS (AKA PROPERTY BASED FEES AND STORM WATER RATES)	PARCEL TAX	AD VALOREM PROPERTY TAX	SALES TAX
Loan Security	Certificates of Participation	Assessment Bonds	Certificates of Participation	General Obligation Bonds	Certificates of Participation
Election Requirements	None	Mailed ballot with 45-day ballot period	With any general or special election	With any general or special election	Any election
Who Votes	Not required	Property Owners	Registered Voters	Registered Voters	Registered Voters
Approval Requirements	Written protests do not exceed 50%	Majority of Assessment amount	2/3 of those voting	2/3 of those voting	2/3 of those voting
Reserve Requirement	Typically less than 10%	Typically less than 10%	Typically less than 10%	Not required	Typically less than 10%
Term for Debt	Less than 40 years	Less than 40 years	Per Ballot — can be indefinite	Less than 40 years	Per Ballot — can be indefinite
Term for Operation and Maintenance	Indefinite	Per ballot — indefinite	Per ballot — indefinite	Cannot be used for maintenance	Per ballot
Additional Documentation	Rate Study	Engineers Report			

TABLE 53 SUMMARY OF FUNDING AGENCIES, MANDATES AND ELIGIBILITY

AGENCY	MANDATE	ELIGIBLE ENTITIES					
		Public Systems	Private Non Profits	Private for Profit	Federally Recognized Tribes	Non Recognized Tribes	Successful Partnering Track Record with NCIRWMP Participants
FEDERAL							
Army Corps of Engineers (Corps)	Grants for Flood Control & Water Supply*	Yes	No	No	No	No	Yes
Bureau of Indian Affairs	Funding for climate change, fish and wildlife, natural resources	No	No	No	Yes	No	Yes
Bureau of Reclamation (BuRec)	Grants for Water Supply	Yes	No	No	No	No	
Environmental Protection Agency	Funding for water quality protection, habitat enhancement,	Yes	Yes	No	Yes	No	Yes
Federal Emergency Management Agency	Funding for flood and other natural hazard mitigation	Yes	Yes	No	Yes	Not specified	
Fish and Wildlife Service	Funding for restoration and habitat protection, special status species, wildlife and sport fish,	Yes	Yes	No	Yes	No	Yes
Indian Health Service (IHS)	Grants for Tribal Support	No	No	Yes	No	No	Yes
National Oceanic and Atmospheric Administration CSC, NMFS	Funding for climate change amelioration, coastal resiliency, coastal and natural resource management, NPS pollution control, and sensitive species protection.	Yes	Yes	No	Yes	No	Yes
US Dept of Agriculture (USDA)	Grants and Loans for Rural Community Infrastructure, farm improvement programs	Yes	Yes	No	Yes	No	Yes
STATE							

AGENCY	MANDATE	ELIGIBLE ENTITIES					
		Public Systems	Private Non Profits	Private for Profit	Federally Recognized Tribes	Non Recognized Tribes	Successful Partnering Track Record with NCIRWMP Participants
Air Resources Board	Grants, incentives, and credit programs to improve air quality	Yes	Yes	Yes	Yes	Yes	Yes
California Pollution Control Financing Authority	Low cost financing to qualified waste and recycling projects and other projects to control pollution.	Yes	Yes	Yes	Yes	Yes	
California Coastal Commission	Funding for Local Coastal Program assistance, beach maintenance, coastal habitat restoration, and education	Yes	Yes	No	No	No	Yes
California Energy Commission	Funding for energy efficiency, planning and renewable energy	Yes	No	No	No	No	Yes
Coastal Conservancy	Funding for public access along the coast, natural resource protection and restoration in the coastal zone, protection of coastal agricultural land, restoration of coastal urban waterfronts, and resolution of land use conflicts.	Yes	Yes	No	No	No	Yes
Department of Food and Agriculture	Specialty Crops	Yes	Yes	Yes	Yes	Not specified	
Department of Public Health (CDPH)**	Grants and Loans for Public Health	Yes	Yes	No	No	No	Yes
Department of Pesticide Regulation	Grants for IPM	Yes	Yes	Yes	Yes	Yes	
Department of Fish and Wildlife	Funding for fish and wildlife management, habitat management, and oil spill prevention and response	Yes	Yes	No	Yes	No	Yes
Department of Water Resources	Grants for Water Supply and Flood Control	Yes	No	No	Not Directly	No	Yes
Housing & Community Development	Grants for Housing and Community Development	Yes	Yes	No	No	No	Yes
Infrastructure Bank (I-Bank)	Loans for Economic Development	Yes	No	No	No	No	
State WaterBoard	Grants and Loans for Water Quality	Yes	No	No	Yes	No	Yes
Wildlife Conservation Board Programs	Funding for habitat restoration projects and improvements to public access	Yes	Yes	Under specific cond-itions	No	No	Yes
REGIONAL AGENCIES							
North Coast Resource Partnership	Grants for Integrated Water Planning	Yes	No	No	Yes	Within an integrated project	Yes
PRIVATE ENTITIES							
California Special District Association (CSDA)	Loans to Supporting Special District Members	Yes	No	No	No	No	

AGENCY	MANDATE	ELIGIBLE ENTITIES					
		Public Systems	Private Non Profits	Private for Profit	Federally Recognized Tribes	Non Recognized Tribes	Successful Partnering Track Record with NCIRWMP Participants
Christensen Fund	Grants in support of biocultural diversity for climate change, indigenouse knowledge, and resilient landscapes in the Bay Area	No	No	No	Yes	Not specified	
David & Lucille Packard Foundation	Grants for Conservation and Science	Yes	Yes	No	Not specified	Not specified	Yes
National Fish & Wildlife Foundation	Grants to protect and restore wildlife and habitats	Yes	Yes	No	No	No	Yes
Gordon and Betty Moore Foundation	Grants for Bay Area land conservation, innovative approaches to conservation challenges	Yes	Yes	No	Not specified	Not specified	Yes
Pacific Gas & Electric Company (PG&E)	Rebates for Energy Efficiency and Renewables	Yes	Yes	Yes	Yes	Yes	Yes
Rural Community Assistance Corporation (RCAC)***	Loans for Rural Community Assistance	Yes	Yes	Yes	Yes	No	Yes
William and Flora Hewlett Foundation	Grants for conservation, climate change amelioration, energy, and SF Bay Area DACs	No	Yes	No	Not specified	Not specified	Yes

*Water Supply mandate comes through the recently approved Water Resources Development Act (WRDA)

** On July 1, 2014, CDPH's Office of Drinking Water will merge with Water Board. Plans are in place to transition funding programs at that time

***RCAC also has technical assistance contracts with USDA, CDPH and Water Boards and has an EPA grant to provide technical assistance

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX L
STAKEHOLDER ANALYSIS & INTEGRATION

APPENDIX L
STAKEHOLDER ANALYSIS & INTEGRATION

L.1 OPPORTUNITIES FOR STAKEHOLDER AND PARTNER INPUT LISTS

TABLE 54 STAKEHOLDERS & PARTICIPANTS IN NCIRWM PLANNING PROCESSES

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
NORTH COAST RESOURCE PARTNERSHIP / NORTH COAST IRWM GOVERNING BODY MEETINGS				
1/20/05	TPRC	25	Eureka	Overview of proposed planning process, communication tools, application process
3/3/05	PRP	26	Fortuna	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
4/28/05	PRP & TPRC	27	Eureka	Themes emerging locally and regionally, long-term vision, overview of projects, project review process
6/2/05	TPRC	18	Arcata	Project review & prioritization
6/8/05	PRP & TPRC	25 (3 via video conferencing)	Arcata	Project prioritization
9/7/05	PRP & TPRC	23	Fortuna	NCIRWMP Phase I submittal process, Day in the Capitol, IRWM process and strategies, proposal development and grant writing workshops and technical assistance
4/13/06	PRP	30	Redding	NCIRWMP Timeline, State Process Recap, Planning Grant Update, NCIRWMP Modifications for Step 2 Grant application, potential scenarios for budget reduction
5/11/06	TPRC	15	Redding	Step 2 requirements and scoring criteria, project review and evaluation, PRP recommendations
5/15/06	PRP	19	Redding	State process/workshops update, TPRC update, next steps for TPRC project recommendations and regional application
1/26/07	PRP & TPRC	23	Eureka	IRWM program changes and approach, planning grant update, public outreach, NCIRWMP evaluation process and lessons learned, new opportunities, Phase II discussion
3/22/07	DWR, PRP & TPRC	35	Redding	DWR IRWM efforts, Q&A with DWR, discussion of outcomes of DWR meeting, review of draft alternatives of planning process, future planning approaches
5/17/07	PRP	30	Eureka	Evaluation process report, Phase II Plan, preservation of local autonomy, process and plan for future, tribal representation
4/23/08	PRP & TPRC	28	Redding	North Coast Integration with State Programs, California Water Plan Update, Prop 84 update, DOC Statewide Watershed Program, Sub-committee formation for integrated coastal issues, implementation update, Prop 50, Round Two, Step 2 application update
1/9/09	PRP & TPRC	23	Redding	Statewide Proposition 50 & 84 Stop Work Order, Prop 84 and 1E update, potential funding strategies, protocols for decision making, Regional Sediment Master Plan, RWQCB Basin Plan Amendment: Water Recycling, mechanism for ongoing project identification
6/25/09	PRP & TPRC	25	Eureka	RAP Update; North Coast Energy Independence Initiative updates: stakeholder meetings, webpage, 'white paper', legislative updates, funding opportunities; Project identification; Regional Master Sediment Plan; PRP Decision-making Approach
2/11/10	PRP & TPRC	48	Eureka	Tribal representation; MoMU revision; Prop 50 Supplemental Funding, Prop 84 & 1E updates; North Coast Energy Independence Initiative updates: NCEECBG and NCEIP grant proposals, climate/energy technical advisors; NCIRWMP 2010 workshops & 2011 conference
6/24/10	PRP & TPRC	35	Ukiah	Tribal representation; Prop 50 Supplemental Funding, Prop 84 & 1E updates; North Coast Energy Independence Initiative updates: Biomass planning initiatives, NCEECBG award and NCEIP grant award/update, climate/energy technical advisors; NCIRWMP 2010 workshops & 2011 conference
10/28 & 29/10	TPRC	25	Eureka	Proposition 84 Round 1 requirements and scoring criteria, conflict of interest policy, project review and evaluation, prioritization, PRP recommendations
11/10/10	PRP	24	Eureka	North Coast Energy Independence, MoMU revisions, TPRC project recommendations, nominations 7 elections
7/21/11	PRP & TPRC	38	Weaverville	NCIRWMP Structure, Roles, Responsibilities, Staffing; Project budget under-runs and funding reallocation processes; Future Vision for NCIRWMP: strategy, priorities, next phase of plan; Proposed Process for Updated Project Evaluation and Ranking Process
12/15/11	Sub-committee Meeting	8	conference call	Project Evaluation: Process description, criteria refinement, documentation, conflict of interest

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
12/19/11	Executive Committee		Willits	SGC Sustainable Communities Planning Grant; Project evaluation review process; Prop 84 Guidelines/PSP Scoping Comments; NCIRWMP January 19th meeting planning, agenda refinement; NCIRWMP roles discussion, leadership planning and regional relationship maintenance; Tribal Outreach; Planning grant project management & DAC grant planning
01/19/12	PRP & TPRC	27	Ukiah	SGC Sustainable Communities Planning Grant and interview input; PRP interview summary: next phase of NCIRWM Plan; NCIRWMP Project Application, Review and Selection Process; Presentation: Russian River Watershed Association, Update on Draft Phase II MS4 permit
06/11/12	Executive Committee meeting	10	Eureka	Humboldt County Staffing Changes & Updates; NCIRWMP July Meeting, Yreka agenda review; IRWMP general timeline for future funding opportunities; Project Review and Selection Process updates; Conference discussion: themes, location; Orick project funding re-allocation — Humboldt projects; PRP/TPRC membership changes & openings
07/19/12	PRP & TPRC	40	Yreka	Approval of NCIRWMP resolution for Vice-chair Jimmy Smith; Strategic Growth Council Sustainable Communities grant; IRWM Program tentative schedule, funding opportunities & Guideline changes; NCIRWMP Project Application, Review and Selection Process; Support & Technical Assistance to Rural & Small Water and Wastewater Service Providers; NCIRWMP Proposition 84 Planning Grant, Draft outreach strategy, PRP input on staff planning activities, Conference planning; PRP Direction re. website, name, re-branding and logo refinement; presentations: Siskiyou Biomass Utilization Group: It's Mission, Projects and Accomplishments; Modoc County: Sage Steppe Restoration on USFS/ BLM Lands and Potential Biomass Solutions; Shasta Valley Resource Conservation District: Araujo and Shasta Water Association Dam Restoration Projects
10/18/12	PRP & TPRC	40	Eureka	NCIRWMP Elections;NCIRWMP Planning Sub-contracts:Proposition 84 Planning Grant & Strategic Growth Council; Tribal Outreach Coordinator RFP; Proposed Process and Criteria for Sub- contracts to counties and Tribes; Formation of ad- hoc committees; Draft NCIRWMP Plan outline; North Coast IRWMP Logo and Name; North Coast IRWMP Conference; NCIRWMP Project Application, Review and Selection Process; NCIRWMP Proposition 84, Round 2 Project Implementation grant application development
1/3/13	Executive Committee meeting	8	conference call	Planning for NCIRWMP meeting, January 17; New PRP and TPRC members; Tribal Coordinator process & selection
1/17/13	PRP & TPRC	36	Ukiah	NCIRWMP Proposition 84, Round 2 Implementation Priority Project portfolio selection; NCIRWMP Planning Sub-contracts; Proposed Process and Criteria for Sub-contracts to counties and Tribes; Formation of ad-hoc committees: Prop 84 Planning Grant, & SGC Planning Grant; Updates: Tribal Coordinator Consultant selection & process; NCIRWM Plan, Version 3 Review and Input Process; North Coast Resource Partnership logo; Project Presentation: Joseph Scriven, Mendocino County Resource Conservation District
3/22/13	Executive Committee meeting	8	conference call	North Coast IRWM Plan, Version 3; Planning for NCIRWMP April 19; Review/ refine Draft Process and Criteria for Sub-contracts to Counties and Tribes
4/12/13	Executive Committee meeting	8	conference call	Planning for NCIRWMP April 19; New TPRC member — Sean Curtis, Modoc County; Dis-band Tribal coordinator ad hoc committee
05/19/13	PRP & TPRC	34	Yreka	State Water Resource Control Board presentation; Update on SWRCB priorities; North Coast IRWM Plan, Version 3: Review and Input Process ; North Coast IRWM Plan schedule; North Coast partner and stakeholder interviews; Intent of the Plan and IRWM Program requirements; Review changes to the annotated NCIRWM Plan outline; North Coast IRWM Plan, Version 3: Content Development; PRP consideration of recommended approaches for representing diverse views/local autonomy in plan update; Review and provide input: NCIRWMP Goals and Objectives; Tribal Coordinator Update; TPRC Project Review Process De-brief; Consideration of options for prioritization of technical assistance, NCIRWMP DAC Water & Wastewater Service Provider Outreach & Support Program; Project Presentation: Modoc Newell Project; Water Plan Update/ Forum Meeting Update

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
07/18/13	PRP & TPRC	36	Weaverville	North Coast IRWM Plan, Version 3: Review and Input Process; North Coast IRWM Plan schedule review; North Coast partner and stakeholder interviews synthesis & discussion; Review changes to the annotated NCIRWM Plan outline based on Public Input; North Coast IRWM Plan, Version 3: Content Development; NCRP Planning Ad hoc Committee Report: proposal selection for planning sub-contracts to counties and Tribes; PRP consideration of recommended approaches for representing diverse views/local autonomy in plan update; Roundtable discussion: NCIRWMP Goals and Objectives; Process for prioritization of technical assistance: NCIRWMP DAC Water & Wastewater Service Provider Support Program; Strategic Planning — Innovative Financing & the Future of the NCRP; Opportunities for innovative financing: upcoming Strategic Growth Council grant; NCRP Conference: discussion and input; Tribal Coordinator Update
05/17/14	PRP & TPRC	39	Yreka	NCRP Governance: PRP Decision Making and Role/Composition of Ad Hoc Committees; PRP Decision Making Process — Policy Clarification; Review composition of existing committees; Sonoma Clean Power presentation — potential applications to the NCRP; North Coast Tribal Engagement Process; Panel presentation and discussion: Improvements to administration and invoicing of IRWM implementation project contracts; IRWM Proposition 84 2014 Drought Solicitation; New legislation and program updates; NCRP Proposition 84 2014 Drought Project Solicitation and Regional Application; North Coast IRWM Plan, Version 3: Review Process and Content Development ; North Coast IRWM Plan schedule
quarterly	Executive Committee	6–12	conference call or in-person	Plan NCRP quarterly meetings; general governance; NCIRWM Plan review & discussion
monthly	NCRP planning meetings	5–9	Rohnert Park	NCRP working team meeting
ongoing	meetings, presentation	varies	region-wide	NCRP PRP & TPRC orientation; NCIRWMP background
WORKSHOPS				
12/03	public workshop	57	Humboldt	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
11/04	public workshop	13	Del Norte	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
12/04	public workshop	9	Del Norte	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
12/04	public workshop	47	Mendocino	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
12/04	public workshop	23	Trinity	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
01/05	workshop: RRWA	67	Santa Rosa	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
02/05	public workshop (BOS)	21	Siskiyou	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
05/05	workshop: RRWA	35	Santa Rosa	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
05/05	workshop: RWQCB	83	Santa Rosa	Chapter 8, Proposition 50 IRWM Grant Program, NCIRWMP outline, Plan Review Process, Grant application submission
03/09	public workshop	19	Trinity	North Coast projects and strategies for energy independence, climate adaptation, and GHG emission reduction
3/11/10	public workshop: CBC	64	Fairfield	California Biodiversity Council: Integrated Water Management in California Panel Discussion
9/22/10	public workshop	12/26	Crescent City & Eureka	North Coast IRWMP Proposition 84 Round 1 & 1E Grant Workshop
9/23/10	public workshop	6/14	Weaverville & Yreka	North Coast IRWMP Proposition 84 Round 1 & 1E Grant Workshop
9/29/10	public workshop	28/16	Santa Rosa & Ukiah	North Coast IRWMP Proposition 84 Round 1 & 1E Grant Workshop
11/15/12	public workshop	6	Weaverville	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
11/16/12	public workshop	8	Yreka	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop
11/19/12	public workshop	8	Crescent City	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop
11/19/12	public workshop	22	Eureka	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop
11/20/12	public workshop	14	Ukiah	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop
11/20/12	public workshop	30	Santa Rosa	North Coast IRWMP Proposition 84 Round 2 Implementation Grant Workshop
2/28/14	GHD and RCAC	16	Sacramento	Water & Wastewater Service Provider Outreach & Support Program Small Community Assistance Workshop
5/6/14	public workshop	4	Weaverville	North Coast 2014 Drought Project Solicitation
5/7/14	public workshop	16	Yreka	North Coast 2014 Drought Project Solicitation
5/8/14	public workshop	22	Eureka	North Coast 2014 Drought Project Solicitation
5/9/14	public workshop	27	Santa Rosa	North Coast 2014 Drought Project Solicitation
5/9/14	public workshop	12	Ukiah	North Coast 2014 Drought Project Solicitation
TRAININGS — NCRP WATER & WASTEWATER SERVICE PROVIDER OUTREACH & SUPPORT PROGRAM				
05/23/12	Training: RCAC	9	Ukiah	Ethics/Conflict of Interest and Policies Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
05/24/12	Training: RCAC	23	Eureka	Sanitary Surveys Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
8/30/12	Training: RCAC	31	Willow Creek	Small Groundwater System Operation & Maintenance Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
9/5/12	Training: RCAC	23	Fort Bragg	Wastewater Treatment Techniques Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
9/26/12	Training: CRWA	17	Yreka	Budget/capital improvement, asset management, Leak Detection, Utility Management Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
11/7/12	Training: CRWA	19	Yreka	Sampling, Emergency Procedures, Consumer Confidence Reports, Utility Management Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
11/14/12	Training: RCAC	19	Crescent City	Safe Drinking Water Act Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers
11/15/12	Training: RCAC	25	McKinleyville	Operations Plan & Emergency Response Plans Assistance in identifying projects for future grant proposals; Opportunities to discuss individual system needs and opportunities for coordination and sharing with neighboring service providers

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
4/15/14	Training: RCAC and GHD	12	Fortuna	Resources for Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
4/16/14	Training: RCAC and GHD	17	Crescent City	Resources for Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
4/22/14	Training: RCAC and GHD	17	Healdsburg	Resources for Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
4/23/14	Training: RCAC and GHD	13	Ukiah	Resources for Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
5/7/14	Training: CRWA and GHD	7	Yreka	Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
5/8/14	Training: CRWA and GHD	7	Weaverville	Project Development, Planning and Funding Small Community Toolbox Overview and Discussion Infrastructure and project development training (including how to develop a capital improvement plan and hire a consultant) Rates training (When and Why to Increase Rates)
05/23/12	Training: RCAC	9	Ukiah	Ethics/Conflict of Interest and Policies
CONFERENCES				
11/05	conference presentation	200	San Diego	ACWA
9/07	conference presentation	240	Santa Rosa	CA Planning Commissioners
10/07	regional conference	320	Fortuna	North Coast Conference
11/07	conference presentation	85	Los Angeles	CA Water Policy Conference
05/08	conference presentation	175	San Diego	SWRCB Conference
06/9/10	conference presentation	140	Sacramento	EPA Conference
04/11	conference presentation	60	Sacramento	CARCD Conference
05/11	conference presentation			IRWM Conference: Healthy Watersheds and Vital Human Communities & Techniques for Regional Outreach
10/6/12	conference presentation	64	Sonoma County	Integrated Natural Resources Management Sonoma County Green Infrastructure Initiatives & Integration of Multiple Objectives
10/13	regional conference	168	Fortuna	North Coast Conference
3/12/14	conference presentation	80	San Diego	Watershed Forum
MEETINGS & PRESENTATIONS				
01/04	Presentation	25	Cloverdale	League of California Cities

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
08/03	outreach	varies	Sacramento	coordinated outreach to NC legislators and staff re: NCIRWMP effort
04/04	outreach	varies	Sacramento	coordinated outreach to NC legislators and staff re: NCIRWMP effort
08/05	outreach	varies	Sacramento	coordinated outreach to NC legislators and staff re: NCIRWMP effort
10/05	Presentation	67	Eureka	American Society of Civil Engineers — Redwood Empire Chapter
8/06–10/06	interviews	22	region-wide	Stakeholder and Project Propoent Evaluation of IRWMP & NCIRWMP Application Process, NCIRWMP Phase I
02/07	Presentation	23	Gualala	Sea Ranch community
07/08	meetings & presentations	33	Ukiah	Eel-Russian Commission Meetings
09/08	Meeting and presentation	27	Yreka	Siskiyou water/wastewater entities
10/09–01/10	>12 conference call meetings	5-16	region-wide	Development of North Coast Energy Independence Program (regional PACE program), California Energy Commission grant proposal. Meetings with county administrators, supervisors, treasurers/auditors.
10/09–01/10	>25 conference call meetings	3-16	region-wide	Development of North Coast Energy Efficiency & Conservation Block Grant (NCEECBG). Technical Assistance to eligible cities/counties.
10/09	Meeting	18	Santa Rosa	Sonoma County and North Coast Energy Independence Program (NCEIP) meeting
11/09	BOS Presentation	34	Yreka	Board of Supervisor presentation: NCIRWMP background, NCEIP and NCEECBG
11/09	Meeting	6	Ukiah	North Coast Energy Independence Program: Mendocino and Lake County participation
12/09	BOS presentation	22	Crescent City	Board of Supervisor presentation: NCIRWMP background, NCEIP and NCEECBG
12/09	BOS Presentation	16	Ukiah	Board of Supervisor presentation: NCIRWMP background, NCEIP and NCEECBG
12/09	meeting	8	Sacramento	DWR disadvantaged community wastewater & water supply strategy
04/10	meetings, presentation	15–40	Weitchpec, Ukiah	Tribal meetings and presentations: Tribal representation, NCRP partnership & NCIRWM Plan overview, opportunities for collaboration
4/10	presentation	35	Santa Rosa	Applied Solutions presentation re. integration and collaboration for local governments
06/10	presentation	50	Roseland, OR	Southern Oregon Clean Energy Alliance (SOCEA) presentation: NCIRWMP background, NCEIP and NCEECBG
12/10	meeting	45	Santa Rosa	NCEIP Ecology Action Meeting
12/10	BOS Presentation	65	Sonoma County	Board of Supervisor presentation: NCIRWMP background, NCEIP and accomplishments (PRP Chair)
4/18/11	Tribal Orientation	8	conference call	NCRP resentation and orientation for Tribal representatives
06/11	Roundtable Session	30	Ukiah	Mendocino Futures presentation and panel discussion
9/11–12/11	Interviews	11	North Coast	Technical Peer Review Committee formal interviews: North Coast IRWMP Project Review, Evaluation and Selection Process (see Table 55 Public Outreach & Plan Input Opportunities for participants and Appendix L.2 for summary)
9/11–12/11	Interviews	16	North Coast	Project Proponents interviews and public survey: North Coast IRWMP Project Review, Evaluation and Selection Process (see Table 55 Public Outreach & Plan Input Opportunities for participants and Appendix L.2 for summary)
12/11–2/12	Interviews	18	North Coast	Policy Review Panel formal interviews re. NCIRWMP: the future direction, opportunities and constraints of the NCIRWMP policy-level criteria for NCIRWMP project selection water management issues/conflicts facing the North Coast region and its individual communities the needs, successful projects, local knowledge, constraints and opportunities for integrating energy independence into the NCIRWMP (see Table 55 Public Outreach & Plan Input Opportunities for participants and Appendix L.2 for summary)
5/12	BOS Presentation	28	Del Norte County	Board of Supervisor presentation: NCRP background and accomplishments

DATE	TYPE	# PARTICIPANTS	LOCATION	SUBJECT
7/12	BOS Presentation	22	Modoc County	Board of Supervisor presentation: NCRP background and accomplishments
10/12	BOS Presentation	34	Mendocino County	Board of Supervisor presentation: NCRP background and accomplishments
12/12	BOS Presentation	34	Siskiyou County	Board of Supervisor presentation: NCRP background and accomplishments
9/25/12	Tribal Council presentation	30	Sherwood Valley Rancheria	NCRP PRP Tribal representative presentation: NCRP background, goals/objectives, accomplishments, Tribal participation/representation; Tribal projects
3/13/13	BOS Presentation	26	Weaverville	Board of Supervisor presentation: NCRP background and accomplishments
3/13–6/13	Interviews	42	North Coast	Professional Planner and Technical Staff interviews: Land Use and Water Planning Climate Change Vulnerability and Response Energy Efficiency and Security, Water Management NCRP processes & NCIRWMP integration (see Table 55 Public Outreach & Plan Input Opportunities for participants)
2/4/14	Water Bond Hearing	75	Eureka	NCRP PRP Chair presentation: NCRP background, goals/objectives, accomplishments, Tribal participation/representation; natural/human capitol, support for IRWM program and bond initiatives
2/14/14	SWRCB Board Meetiing	45	Sacramento	SWRCB presentation: NCRP background, goals/objectives, accomplishments, project benefits (Executive Committee)
2/14	US Forest Service meeting	30	Fortuna	NCRP PRP Tribal representative presentation: NCRP background, goals/objectives, accomplishments, Tribal participation/representation; Tribal projects
5/1/14	Regional Tribal Operations Committee	65	Santa Rosa	NCRP PRP Chair presentation: NCRP background, goals/objectives, accomplishments, Tribal participation/representation; Tribal projects
5/8/14	Eel Russian River Commission	45	Sonoma County	NCRP overview; Guiding principles; NCRP 2014 Drought Project Solicitation; Upcoming schedule for the NCRP and North Coast IRWM Plan
6/2/14	Sonoma County Water Advisory	20	Sonoma County	NCRP overview; NCRP 2014 Drought Project Solicitation; Upcoming schedule for the NCRP and North Coast IRWM Plan
monthly	ongoing NCIRWMP updates	35	Santa Rosa	Russian River Watershed Association meetings
monthly	NCRP planning meetings	5–9	Rohnert Park	NCRP /NCIRWMP planning and program management
ongoing		varies	Eureka	Humboldt water/wastewater entities
ongoing		Varies	Region-wide	RCDs
ongoing		Varies	Region-wide	NC tribal governments
ongoing	meetings, conference call	Varies	Region-wide	Environmental Justice Coalition for Water: Tribal Participation
ongoing	meetings, conference call	Varies	Region-wide	Technical assistanceand support for project proposal development
ongoing	meetings, presentation			

TABLE 55 PUBLIC OUTREACH & PLAN INPUT OPPORTUNITIES

NORTH COAST PARTNER AND STAKEHOLDER INTERVIEWS		
NAME	**TITLE/ ROLE/ORGANIZATION**	**COUNTY/TRIBAL AREA**
Policy Review Panel — NCRP Governance, Local Water Management, Energy Independence, 2011/12		
Efren Carrillo	County Supervisor, NCRP PRP	Sonoma County
Geri Byrne	County Supervisor, NCRP PRP	Modoc County
Gerry Hemmingsen	County Supervisor, NCRP PRP	Del Norte County
Grace Bennett	County Supervisor, NCRP PRP	Siskiyou County
Isa Mesa Jr.	Environmental Coordinator, NCRP PRP	Redwood Valley Rancheria
Carol Cook	Tribal Council, NCRP PRP	Sherwood Valley Rancheria

NORTH COAST PARTNER AND STAKEHOLDER INTERVIEWS		
NAME	**TITLE/ ROLE/ORGANIZATION**	**COUNTY/TRIBAL AREA**
Jimmy Smith	County Supervisor, NCRP PRP	Humboldt County
John McCowen	County Supervisor, NCRP PRP	Mendocino County
Judy Morris	County Supervisor, NCRP PRP	Trinity County
Kendall Smith	County Supervisor, NCRP PRP	Mendocino County
Leaf Hillman	Natural Resources Director, NCRP PRP	Karuk Tribe
Marcia Armstrong	County Supervisor, NCRP PRP	Siskiyou County
Roger Jaegel	County Supervisor, NCRP PRP	Trinity County
Ryan Sundberg	County Supervisor, NCRP PRP	Humboldt County
Other Leaders — NCRP Governance, Local Water Management, Energy Independence, 2011/12		
Grant Davis	General Manager, Sonoma County Water Agency	Sonoma County
Javier Silva	Environmental Director, NCRP TPRC	Sherwood Valley Rancheria
Jay Sarina	County Administrator, NCRP PRP	Del Norte County
Zack Larson	Smith River Advisory Council; NCRP TPRC member	Del Norte County
Project Proponent & Public — NCIRWMP Project Evaluation and Selection Process, 2011		
anonymous	on-line surveys — 12 total	North Coast
Lynne Rosselini	Sonoma County Water Agency	Sonoma County
Laurel Marcus	California Land Stewarship Institute	Sonoma Mendocino
David Edmunds	Pinolleville Pomo Nation	Mendocino County
Barry Jarvis	Indian Health Services	Northern Region
Dennis Slota	Mendocino County Water Agency	Mendocino County
Earl Crosby	Karuk Tribe	Karuk Tribe
Kathleen Morgan	Gualala River Watershed Association	Sonoma Mendocino
Lauren Lubowicki	Mattole Restoration Council	Humboldt County
Rebecca Crow	GHD Engineers	Humboldt County
Patty Madigan	Mendocino County RCD	Mendocino County
TPRC — NCIRWMP Project Evaluation and Selection Process, 2011		
Tom Weseloh	Caltrout	Humboldt County
Dale Roberts	Sonoma County Water Agency	Sonoma County
David Van Denover	Weaverville CSD	Trinity County
Patty Madigan	Mendocino County RCD	Mendocino County
Roland Sanford	Mendocino County Water Agency	Mendocino County
Wayne Haydon	California Geological Survey	Sonoma County
Sandra Perez	Five Counties Salmonid Restoration Program; NCRP TPRC member	Trinity County
Koiya Tuttle	Potter Valley Tribe	Mendocino County
Kendall Smith	County Supervisor, NCRP PRP	Mendocino County
Marilyn Seward	City of Etna	Siskiyou County
Kirk Girard	Planning Director	Humboldt County
Counties Departments : Land Use, Climate Change and Water Planning, 2013		
Heidi Kunstal	Building, Planning & Environmental Health	Del Norte County
John Miller	Planning & Building Department	Humboldt County
Hank Seemann	Public Works, Natural Resources Division; NCRP TPRC member	Humboldt County
Steve Dunnicliff	Planning & Building Services	Mendocino County
Dennis Slota	Mendocino County Water Agency (part of P&B Services)	Mendocino County
Dave Jensen	Environmental Health Department	Mendocino County
Tom Peters	Land Improvement	Mendocino County
Sean White, General Manager	Russian River Flood Control and Water Conservation Improvement District; NCRP TPRC member	Mendocino County

NORTH COAST PARTNER AND STAKEHOLDER INTERVIEWS		
NAME	**TITLE/ ROLE/ORGANIZATION**	**COUNTY/TRIBAL AREA**
Greg Plucker	Planning Division Planning Commission	Siskiyou County
Randy Akana	Flood Control and Water Conservation District	Siskiyou County
Ric Costales	Natural Resources Department	Siskiyou County
Scott Waite	Land Development	Siskiyou County
Richard Tinsman	Senior Planner; NCRP TPRC member	Siskiyou County
Terry Barber	Public Health/ Environmental Health	Siskiyou County
Kyla Burton, Environmental Compliance Specialist	Public Works	Siskiyou County
Jennifer Barrett	Planning	Sonoma County
Sandi Potter	Planning	Sonoma County
Pete Parkinson	Permit and Resource Management Department	Sonoma County
Suzanne Smith, ED	Transport Authority/ Regional Climate Protection Authority	Sonoma County
Christine Sosko	Environmental Health	Sonoma County
Dale Roberts	Sonoma County Water Agency; NCRP TPRC member	
Frank Lynch	Planning Department & Planning Commission	Trinity County
Rick Tippett	Transportation	Trinity County
Municipalities: Land Use, Climate Change and Water Planning, 2013		
Larry Oetker—Director	City of Arcata Community Development Department	Arcata
Eugene M. Palazzo — City Manager	City of Crescent City Planning Department	Crescent City
Eric Wier — Director	City of Crescent City Public Works Department	Crescent City
Robert Wall — Director	City of Eureka Community Development	Eureka
Mike Flockhart, Public Works Director	City of Fortuna Public Works Department	Fortuna
Carol Rische	Humboldt Bay Municipal Water District; NCRP TPRC member	Humboldt Bay
David Hull	Humboldt Community Services District	Eureka
Darrin Jenkins	City of Rohnert Park	Rohnert Park
Charley Stump, Director	City of Ukiah Planning and Community Development	Ukiah
Wes Scribner	Weaverville Community Service District	Weaverville
Resource Conservation Districts: Land Use, Climate Change and Water Planning, 2013		
Brittany Heck, ED	Gold Ridge RCD	Sebastopol
Donna Chambers, ED	Humboldt County RDC	Eureka
Janet Olave, ED	Mendocino County RCD	Ukiah
Patty Madigan	Mendocino County RCD; NCRP TPRC member	Ukiah
Earle Cummings, Director	Sotoyome RCD	Santa Rosa
Other Agencies: Land Use, Climate Change and Water Planning, 2013		
Matthew Marshall	Redwood Coast Energy Authority	Eureka /Humboldt County
Dana Boudreau	Redwood Coast Energy Authority	Eureka /Humboldt County
Zack Larson	Smith River Advisory Council; NCRP TPRC member	Del Norte County
Sandra Perez	Five Counties Salmonid Restoration Program; NCRP TPRC member	Del Norte, Humboldt, Mendocino, Siskiyou, Trinity Counties

L.2 NCIRWMP STAKEHOLDER AND PARTNER INPUT

North Coast Integrated Regional Water Management Plan (NCIRWMP)

Policy Review Panel Interview Summary — January 2012

At the July 2011 Policy Review Panel (PRP) meeting, the NCIRWM leadership requested a second formal evaluation of the IRWM process to date; the first evaluation was conducted in the fall of 2006. In addition to providing an online

survey to gather input from the region's interested stakeholders, the project team conducted interviews with the PRP, Technical Peer Review Committee (TPRC) and project proponents. Interview questions for Policy Review Panel members requested input on processes specific to the North Coast and focused on the following areas: a) the future direction, opportunities and constraints of the NCIRWMP, b) policy-level criteria for NCIRWMP project selection, c) water management issues/conflicts facing the North Coast region and its individual communities, and d) the needs, successful projects, local knowledge, constraints and opportunities for integrating energy independence into the NCIRWMP. Input received from the NCIRWMP PRP members is summarized below.

Across the board, PRP members feel that NCIRWM planning process has been immensely positive for the North Coast region, stating that this effort encourages an inclusive, "participation by all" approach, a commitment to openness and transparency, and a well organized framework committed to ongoing communication and outreach. In addition, the PRP felt that the NCIRWM provided support for local autonomy and the region's small, rural and economically disadvantaged communities, while promoting a flexible and adaptive framework that allows for review and updates to the NCIRWM Plan and its processes. The PRP also stated that the strong regional partnership has been key to the NCIRWMP's success in regional water management planning and fund development for the North Coast region. Members proposed the following improvements and/or concerns regarding the program:

- Establish regular meetings and develop a quarterly report, newsletter or presentation documenting activities between meetings
- Develop a mechanism to track/measure the NCIRWMP's success; report on the NCIRWMP's performance and documenting its achievements
- Utilize the NCIRWMP framework to identify and influence topics of mutual concern, support or potential funding opportunities at state and federal levels
- Consider economic development and renewable energy funding opportunities as a key sustainable revenue source for the North Coast region
- Work with State agencies to express concerns and improve the timing and funding allocations of IRWM grants
- Ensure that PRP members are making decisions in an open setting — refraining from discussing potential motions or actions prior to a meeting
- Explore alternative meeting options and funding opportunities to limit costs associated with travel
- Provide more information and outreach to new PRP members and their respective Boards and Tribal Councils

Vision/Future Direction/Opportunities and Constraints of the NCIRWMP

The PRP expressed widespread support in maintaining the NCIRWMP's unique regional collaboration, geographic boundaries, and support for capacity building in the region's small, rural, and economically disadvantaged communities. Many PRP members discussed the need to secure on-going funding for the NCIRWMP effort and importance of retaining the NCIRWMP's standing as a model in the State for IRWM planning, In addition, PRP members offered the following new areas of interest for consideration:

- Forge new opportunities and develop strategies for energy independence and economic development in NCIRWMP communities including, but not limited to, biomass, small hydropower, carbon sequestration, broadband, conservation, solar, geothermal and wave energy
- Focus on failing water and wastewater infrastructure needs region-wide
- Retain the integrity of the NCIRWMP's regional boundaries and, when appropriate, identify opportunities to expand the NCIRWMP partnership
- Serve has a model for the state for IRWM Tribal inclusion
- Identify opportunities to partner with State/Federal agencies
- Identify opportunities to collaborate with the NCIRWMP leadership and Tribes on the restoration and enhancement of salmon populations and their habitats
- Secure reliable funding for the NCIRWMP and its projects outside of CA bonds

- Identify opportunities to have a positive influence on the CA Water Plan and the relationship between North Coast Tribes and DWR
- Strive to establish a reasonable balance of need between water-rich and water-scarce areas in the region
- Support the regional collaboration of North Coast Tribes in their efforts to conduct assessments, create solutions to improve impaired streams and waterbodies and address TMDLs
- Develop a strong connection in the NCIRWMP between energy and water as it relates to forest health, jobs, economic development, and watershed health

Additionally, PRP members offered the following insights regarding the greatest challenges and constraints currently affecting the North Coast region:

- Region size and the related costs associated with travel and limited resources to facilitate collaboration at this scale
- Lack of universal broadband and transmission access in rural communities
- Competition for resources which result in opposition
- Large number of economically disadvantaged communities
- Lack of transmission capacity for power generation
- Environmental opposition to active forest management
- Sustainable feedstock yields on public lands to support biomass projects
- Energy regulation requirements/restrictions and costs associated with mitigation
- Alignment of goals across multiple counties and jurisdictions

PRP and TPRC Roles and Staff Support

The majority of PRP members support the current roles of the PRP and TPRC, the clear division of policy and technical decision-making, and commitment made to ensure regional inclusion and equity. Many members felt that more clearly defined roles and responsibilities of each committee would benefit the NCIRWMP program and be helpful to potential project proponents and the general public. Several members acknowledged the work the Project Selection and Review Process Ad Hoc Committee is doing to support the clarification and definition of NCIRWMP roles. A number of interviewees commented on the tremendous work the NCIRWMP's TPRC members do on a volunteer basis and proposed working to identify resources to continue to attract highly qualified experts to this committee and support their work. Two members expressed concern about the perception of counties with resources receiving additional benefits from the NCRIWMP program.

The PRP is pleased with and feels that the support staff provides to the PRP, TPRC, project proponents, agencies, and interested stakeholders on behalf of the NCIRWMP program is exemplary. PRP members would like additional staff support in the following areas:

- Providing technical assistance to project proponents
- Working with local entities to provide NCIRWMP outreach and support to interested stakeholders
- Upgrading the NCRIWMP website
- Conducting annual presentations on the NCIRWMP to Boards of Supervisors and Tribal Councils
- Conducting outreach throughout the region to include and engage all NCIRWMP stakeholders
- Allowing additional time for proposal/project review
- Tracking projects that didn't receive IRWM funding and working to identify and support applications for alternate funding opportunities
- Preparing staff recommendations for NCIRWMP meetings and ensuring understanding among PRP members that they are staff proposals only

- Supporting the Project Selection and Review Process Ad Hoc Committee's activities and work product development

Policy-Level Criteria for NCIRWMP Project Selection

Although interested in seeing a few improvements to the current process, the majority of PRP members noted that the current policy-level criteria has been fair, equitable, considers and aims to serve the needs of the region's economically disadvantaged communities, considers criteria set forth from the funding source, supports the NCIRWMP's goals and objectives and takes into account the comity and reciprocation articulated in the tenants of the NCIRWMP collaboration. The following additions were proposed:

- Refine criteria for economically disadvantaged communities and severely economically disadvantaged communities
- Set criteria to allow for better cost-share scrutiny
- Focus on infrastructure projects instead of demonstration projects
- Develop criteria that allows the TPRC to focus on projects that include innovative approaches to the NCIRWMP goals including fisheries enhancement
- Set targets/criteria for municipal vs. private landowner project preferences
- Prioritize projects that have deadlines with needs to maintain compliance (not considering only those projects that are out of compliance)
- Prioritize water quantity, not just water quality
- Revise criteria to prioritize projects that contribute to in-stream flow restoration
- Focus on water quality and wastewater projects that threaten public health
- Prioritize projects by need
- Determine priorities based on project type, including energy & economic development potential
- Set guidelines for an overall percentage of infrastructure and fisheries habitat projects that the composite suite of projects would attempt to achieve
- Target compliance projects required and regulated by SWRCB
- Allow Counties and Tribes the ability to weigh in on project priorities in their respective jurisdictions

Water Management Issues/Conflicts (Local and Regional)

The Klamath Dam issue and its potential impacts to agriculture, fisheries, water quantity, quality and cultural values was the top local and regional water management issue raised by PRP members and cited as the most pressing water conflict, polarizing North Coast communities and Tribes, in the region. PRP members also expressed concern with the increasing number rivers and streams being tapped for illegal diversions of marijuana grow operations region-wide. Several members mentioned proposed regulations for frost protection, groundwater management, stormwater and recycled water as growing concerns. As in the past, PRP members listed inadequate water and wastewater infrastructure, including failing septic systems, and fisheries issues as primary local and regional issues. Water rights and in-stream flow, County of Origin issues, lack of consensus on water conservation efforts, water shortages, large-scale vineyard conversion, and the need for alternative energy development were all mentioned as important water management issues facing local communities and the North Coast region.

Energy Independence — Needs, Projects, Models, Constraints and Opportunities

PRP members throughout the region noted the potential for biomass energy in the North Coast region and listed the following biomass-related assessment and planning needs:

- Biomass inventory on public and private lands
- Education and outreach regarding thinning, fuel reduction and biomass energy
- Formal assessments to determine what is necessary to maintain forests in their best condition

- Post fire analysis to determine how much and if fires are doing good and if so, where and how
- Assessment to gauge the potential of the conversion of boilers to pellet biomass heat, including the identification of boilers county-wide along with information regarding the age, efficacy and ability to make the conversion
- Inventory of resources and feedstock potential for biomass production including evaluating the potential for putting Forest Service Stewardship Contracts in place
- Mapping potential feedstock supply and biomass plant locations
- Inventory on sizing of potential biomass plants

Additionally, a number of PRP members felt that local and regional transmission line capacity is inadequate and the region would benefit from an assessment of the current power grid capacity and potential for upgraded transmission lines. PRP members expressed disappointment in the lawsuit that de-railed the North Coast Energy Independence Program, modeled after Sonoma County's successful SCEIP program, and expressed a continued need for energy assessments for the retrofits of residential and commercial buildings. The majority of interviewees felt that the region and local communities would benefit from a needs assessment and planning for energy independence and alternative energy potential, as well as a regional inventory of existing projects and programs. Specifically, members noted that planning and assessments would be useful in evaluating opportunities for solar, municipal electric vehicles, small hydropower, co-generation, wind, methane capture, broadband, geothermal and community choice aggregation.

The following potential local and regional energy independence projects were offered as good candidates for funding through the NCIRWMP:

- The Forestry Model Project underway by The Watershed Center
- Energy reduction project at a local Siskiyou County mill facility
- Biomass projects to create small/local energy producers and energy independence locally
- Solar and wind projects would provide significant tax credits and incentives
- Fuels to Schools Program — large-scale projects that convert school boilers to biomass heat
- Geothermal projects
- Over-the-Horizon Backskatter plant south of Newell, in Modoc County, was developed by the Defense Department and never used and would be an ideal site for conversion to an alternative energy plant (biomass, solar, etc) with high-power lines and transportation nearby
- Regional Direct Install Program
- Regional Community Choice Aggregation Program
- Broadband projects
- Fleet improvement projects — hybrid/electric, ride-sharing, tele-commuting
- Ferndale ShellWind and Bear River Wind Energy Projects
- Regional PACE program to develop financing mechanisms and programs to help homeowners and commercial properties pay for retrofits/upgrades
- Alternative energy projects in rural communities to provide energy to urban areas
- Water use efficiency projects that enhance all beneficial uses, such as off-stream and pump storage system projects

Tax incentives, a stable stream of biomass feedstock, an economical transportation radius from biomass plant sites, local competition among businesses, environmental organization concerns, the lack of a designated entity to address energy at the local level, limited funding and a lack of planning were listed as significant barriers and roadblocks for these projects. PRP members noted that with less funding available in State and Federal budgets, regional and integrated approaches such as the NCIRWMP would be very competitive. Toward this end, members noted that the regionalization of these issues, especially given tightening economics, is going to make the North Coast far more competitive and attract funding and legislative support, while maintaining

the North Coast's quality of life for its communities. Members feel that the NCIRWMP would benefit from developing a regional agenda regarding biomass development in the North Coast and have member lobbyists work cooperatively to carry that message on behalf of the NCIRWMP in Sacramento and Washington DC.

PRP members felt confident that there is unlimited potential for local and regional opportunities for the North Coast that would effectively integrate water supply/treatment, watershed health, energy independence, GHG emissions reduction and local economic development. Members noted that the capital needs in the region are paramount and that science, education, outreach and policy will help with the integration of these ideas. The following were provided as models and examples of entities that have implemented successful energy projects for the NCIRWMP to explore:

- College of the Siskiyous power generation and job creation program
- Siskiyou Biomass Utilization Group
- Sustainable Forest Action Coalition
- Southern Oregon California Renewable Energy Group
- Del Norte Economic Development Corporation
- The Regional Climate Protection Authority
- Lake County Economic Development Strategy i
- The Lakeview, Oregon South Central Oregon Economic Development District
- Mendocino College
- Real Goods in Hopland
- Sonoma County Energy Independence Program
- Sonoma County Water Agency
- Sonoma County Transportation Authority
- Sonoma County General Services Energy and Sustainability Division
- Sonoma County Permit and Resource Management Department
- Sonoma County Agricultural Preservation and Open Space District
- Climate Protection Campaign
- Solar Sonoma County Water Agency
- North Bay Climate Change Adaptation Initiative
- Resource Conservation Districts and Resource Conservation and Development Districts
- Shasta Forest Products, Yreka
- US Forest Service
- North Coast Tribal Environmental Departments
- Watershed Research and Training Center
- Regional Prescribed Fire Group
- North Coast Air Quality Management District
- Public Utilities Districts
- Redwood Coast Energy Authority
- Redwood Region Economic Development Commission
- Redwood Community Action Agency
- Schatz Energy Lab

- Humboldt State University
- Workforce Investment Boards
- USDA Natural Resources Conservation District
- Redwood Futures
- Renewable Energy Development Institute
- ICLEI — Local Governments for Sustainability
- Modoc County working group (informal)
- Independent timber, farmer and cattle industries
- Phoenix Energy
- Enterprise Oregon
- Rethink Forests

North Coast IRWMP Project Evaluation Process Survey Summary and Recommendations: Technical Peer Review Committee — 2011

a) What should the appropriate roles of the Technical Peer Review Committee (TPRC) and Policy Review Panel (PRP) be in the project review, evaluation and selection process? Are there modifications to the current roles of the TPRC and PRP that you would suggest?

General

A few TPRC interviewees felt that the roles as they are currently delineated are appropriate (5), though some of TPRC interviewees felt that the roles and boundaries needed to be better defined and made publically available (5); one interviewee suggested the development of a decision-making guide. One interviewee commented that having separate technical and decision-making committees for the NCIRWMP ensures the integrity of the process.

TPRC

A couple of interviewees stated that the composition of the TPRC should be made up of a wide range of expertise and technical background (2). One interviewee expressed concern that as volunteers it can make it difficult to attract qualified experts in some fields and another stated that selecting TPRC members on a county basis allows for the potential of politicizing the review process. All interviewed felt that the role of the TPRC in the project review, evaluation and selection process should be to review projects for their technical merit based on their professional judgment and expertise. Some felt that the TPRC should only be tasked to review the projects based on technical merit only (4); others felt that the TPRC review could also include criteria defined by the PRP (5). One interviewee recommended that the technical project review be conducted only by a group of professionals (TPRC members and/or others) representing expertise appropriate to the funding opportunity. One interviewee recommended that the TPRC be able to change their scores based on TPRC discussion and another was concerned about the PRP's ability to override the TPRC's recommendations and suggests that there should be more discussion between the PRP and TPRC.

PRP

All interviewees agreed that the role of the PRP is to set the policy and framework for the project review, evaluation and selection process and to ensure that the process is fair. As the decision-making body, the PRP composition of elected officials and council members provides credibility to the process. It was felt by many TPRC interviewees that the PRP needed to provide clearer direction about how the North Coast priorities fit into the project review and selection process (7). One interviewee recommended a second scoring process to be conducted by the PRP (1).

Recommendations:

- Develop/articulate and make public the TPRC & PRP roles in the in the project review, evaluation and selection process
- Develop a project review, evaluation and selection process guide or webpage

- Discuss and receive PRP direction concerning whether TPRC should only review projects for their technical merit or whether the TPRC review could also include criteria defined by the PRP; consider whether the PRP should score projects for non-technical criteria
- Discuss and receive PRP direction about how the NCIRWMP priorities translate into project scoring and selection criteria

b) What should the role of North Coast IRWMP staff be in the project review and evaluation process? Do you have suggestions for how staff can provide more support to the TPRC?

Staff should generally play the same role as staff plays for any government Board; staff act as gatekeepers of information and facilitate the review process (9). In addition, staff should be process minders and should make concerns known to PRP (3). A few interviewees felt that staff should play a bigger facilitation role in the project evaluation process (3); and others that felt it was important that staff should not be involved in decision-making (2). Some suggestions for an enhanced role include: defining the staff roles and making publically available (1); increased outreach and education about permitting (1); assist with the development of project selection criteria (2); provide contact information for project proponents during the review process (1); investigate and describe other project evaluation processes and recommend models that are a good fit (1). It was generally felt that staff was helpful (9).

Recommendations:

- Develop/articulate and make public the staff roles in the project review, evaluation and selection process
- Staff should continue to act as gatekeepers of information and process-minders and facilitate the review process
- Discuss and receive ad-hoc committee direction about whether staff should play a bigger facilitation role in the project evaluation meetings or whether staff should ever be involved in decision-making during the meetings
- Staff will assist with the development of project selection criteria, provide contact information for project proponents during the review process, and review other project application and evaluation processes

c) What direction do you need from the Policy Review Panel regarding the selection of projects? (ie, regional representation, DAC targets, project type, important themes for the NCIRWMP)

It was generally felt the PRP should define the framework and parameters of the project review and selection process (10); one interviewee felt that the direction should come from the funding source and solicitation. It was suggested that the PRP and TPRC should meet prior to the project solicitation to discuss and clarify the PRP direction pertaining to the project selection process (1). The TPRC provided a wide range of suggestions for PRP defined criteria/direction including: regional representation targets (3); consideration of past funding (1); refined criteria for DACs including preference for severely DAC (1); determination of whether projects actually benefit DACs (1); improved criteria for project cost-share (1); targets for a balance of project type (2); targets for specific priority projects as an incentive (1); whether projects should be scaled and the parameters for project scalability (2); criteria for project proponent/sponsor financial need (1); and whether TPRC unanimous decisions about a project should be reflected in the scoring (1). It was suggested that the PRP should be more involved in the project scoring process (1) and selection process when TPRC members are uncomfortable selecting projects along certain criteria (1).

Recommendations:

- Develop and make public a detailed description of the project review, evaluation and selection process with the input of the ad-hoc committee, PRP, TPRC and general public
- Discuss and receive PRP direction about specific project evaluation and selection criteria (see below)

d) Please rank by preference the following options for ensuring regional representation/equity and a balanced program?

3 — Average score 2.78 = General base funding percentage = 1, 2, 3, 3, 3, 1, 4, 3, 5

2 — Average score 2.44 = Minimum funding per county/Tribe = 1, 2, 1, 4, 2, 2, 3, 2, 5

4 — Average score 3.66 = Diversity & balance of project proponent type = 4, 4, 2, 5, 5, 5, 2, 4, 2

1 — Average score 2.22 = Diversity & balance of project type = 3, 2, 1, 1, 5, 1, 5, 1, 1

The TPRC interviewed provided a wide range of responses regarding their preference for regional representation and a balanced program. Some did not have a preference and thought that this should be a decision that the PRP should make or should be defined by the funding source (4). Some felt that the minimum funding and base funding options were similar and offered scoring mechanisms to achieve base/minimum funding throughout the region (4); unequal distribution of projects in quality and amount submitted presents a challenge to this approach and has the potential of risking the quality of the overall project portfolio (3). One interviewee proposes omitting Tribes when considering minimum funding per county, as they are a part of and included within each of the counties. A diversity of project types was considered important to the region as together they implement the NCIRWM Plan (4); it was suggested by one interviewee that the NCIRWM planning effort should proactively identify the project need in the region and provide technical assistance to develop projects that address that need. One interviewee felt that diversity of project proponents reflected the diversity of the region (1); while others thought that selecting projects based on diversity/balance of project type or proponent type should not be considered (2). One interviewee suggests adding an option for allowing for exceptions to promote valuable projects that do not score well.

Recommendations:

- Discuss and receive ad-hoc committee direction about which criteria need defining based on interview priorities (see option average scores above); determine whether diversity & balance of project proponent type should be considered
- Discuss and receive PRP direction about specific project evaluation and selection criteria based on input from the ad-hoc committee and interviews;
    - balance of project type and targets for specific project types to implement NCIRWMP priorities
    - regional representation; consider Tribal projects, past funding, unequal distribution of project submittal, quality of overall suite of projects
    - whether projects should be scaled and the parameters for project scalability
    - refined criteria for DACs including preference for severely DAC; determination of whether projects actually benefit DACs
    - project need and improved criteria for project cost-share

e) What are the key elements of information about a proposed project that are needed to evaluate and score a project adequately? What factors are not currently targeted by the application and scoring criteria? How detailed should this information be? Is there a particular format or layout that would be helpful to better interpret or obtain this information?

A number of TPRC interviewees commented that there was too much background and narrative information in the application and recommend including more focused questions (4). Key elements about a proposed project that are needed to evaluate a project adequately include problem statement, solution statement, scope, project description, budget, schedule, performance measures and benefits (5). Other elements include project readiness (1), environmental permitting status (4), and partnerships (2). Interviewees commented that more information is needed pertaining to existing elements including: project tasks (2); justification of benefit claims to DACs (1); and explanation for why a project cannot be completed from other funding resources (1). It was suggested that the NCIRWMP consider a new DAC definition that allowed for finer gradation that would be reflected in the project scoring (1). A number of interviewees stated that a quantification of project benefits was needed to allow the TPRC to evaluate the project cost effectiveness (4). Other factors concerning the project selection process identified by the TPRC interviewees included consideration of a holistic review of the project effectiveness, synergies and integration of the overall project portfolio (2). Other suggested including a mechanism to allow for subjective scoring bump based on TPRC professional expertise and technical opinion (2). Formatting preferences included: checkboxes, checklists and tables where possible.

Recommendations:

- Develop draft application that requests less narrative information
- Develop draft application that includes problem statement, solution statement, project description, budget, schedule, performance measures and benefits, environmental permitting status, partnerships, readiness, and detailed tasks

- Develop draft application that includes tables, examples and templates to provide a quantification of benefits to evaluate the project cost effectiveness
- Provide mechanism in the project selection process to allow for a holistic review of project effectiveness
- Provide mechanism in the project scoring process to allow for subjective decision about the project's fit based on professional expertise and technical opinion
- Develop draft application that includes checkboxes, checklists and tables where possible

f) How should project scalability be represented in the application?

A number of interviewees commented that this was a difficult part of the project selection process but it is necessary to resolve as there is rarely the opportunity to fund projects in full (6). It was suggested that an initial screening might be necessary to determine a project's scalability (2) and/or staff could provide options for scaling each project (3). All interviewees thought that the project proponent should describe how the project could be scaled for different funding scenarios (10) and some thought it was important to consider whether a project is still viable with a reduced budget (4). A number of potential scaling parameters were identified that will need to be described and prioritized by the project proponent including scaling a project by phase, by component, by sub-project, or scaling the whole project geographically or temporally. Some interviewees suggested that the easiest way to determine the scalability of a project is through a task budget that has been prioritized by the project proponent (3). Some thought that the PRP should consider whether project scalability is a scoring criterion (2).

Recommendations:

- Provide a method to incorporate scalability into the project application and review process as there is rarely the opportunity to fund projects in full
- Include in the application an opportunity for the project proponent to describe in the application how their project would be scaled for different funding scenarios; scaling parameters might include scaling a project by phase, by component, by sub-project, or scaling the whole project geographically or temporally.

g) How long should each project application take to review?

The TPRC interviewees commented that there needed to be a longer overall period of time for the review of projects (2) and provided a range of timeframes for review of each project application:

5–25 minutes (3)

30 minutes (2)

30–45 minutes (2)

1 hour (1)

8 hours total (1)

Recommendations:

- Develop a project application that will take 15–30 minutes to review.

h) Are there other data that would have been beneficial in terms of ranking (eg, spatial display of information and ranking criteria — coho priority watersheds, water supply, 303(d).) Do you have suggestions for improving the efficiency, effectiveness and equity of the technical review process?

A number of TPRC interviewees stated that the technical review process is based on TPRC expertise and local knowledge about the region and of the proposed projects (3) and recommended that the review remain focused on the NCIRWMP objectives (2). One suggestion was made for the development of a guide that describes the roles, criteria and project ranking and selection process (1). A couple of interviewees felt that there was enough information provided already (2) and many felt that maps and GIS data would be helpful (8). Other suggestions for additional data included: outstanding violations, user rates, 303d list, TMDL list, target watersheds, and project need throughout the region; more detail regarding phasing and tasks.

Recommendations:

- Develop a project review process that relies on TPRC expertise and local knowledge about the region and is focused on the NCIRWMP objectives
- Develop a guide that describes the roles, criteria and project ranking and selection process
- Provide project location maps to all and GIS data to those TPRC members that request it as part of the review process
- Develop an application that requires more detail regarding phasing and tasks

i) Are there other grant program review processes that you recommend as a good model for the NCIRWMP project review, evaluation and selection process?

A number of TPRC interviewees indicated that they did not have any recommendations for other programs that could act as a model to the NCIRWMP project review, evaluation and selection process (7). Others provided suggestions including project application and review processes from the California Energy Commission, Department of Conservation Watershed Coordinator Program, Fish and Game, Headwaters Fund, National Fish and Wildlife Foundation and other foundation grant programs (6). It was suggested that the application structure be similar to standardized grant applications, or flexible enough to allow project proponents to reuse grant applications from previous funding opportunities (1).

Recommendations:

- Staff review project application and review processes from the California Energy Commission, Department of Conservation Watershed Coordinator Program, Fish and Game, Headwaters Fund, National Fish and Wildlife Foundation and other foundation grant programs as 'due diligence' and to glean components that are a good fit

j) The PRP/TPRC currently follows the California Fair Political Practices Commission conflict of interest guidelines and recusal process. Do you have other suggestions for avoidance of conflict of interest during the review process to ensure the integrity of this commitment?

It was felt by a number of interviewees that the current NCIRWMP conflict of interest guidelines and recusal process was straightforward and was well honored by the TPRC reviewers (4). There were a number of comments that there was need for clearer and posted conflict of interest guidelines for the NCIRWMP to protect the integrity of the process (6). It was suggested that the conflict of interest guidelines should be reviewed at the beginning of each review meeting that the meeting summaries should record this agenda item and include when TPRC member recuse themselves from the discussion and the project review. Though some felt that self-regulation and common sense were adequate guides, others felt that the process would benefit from a prescribed recusal process with rigid criteria which would need to be determined by the PRP (2) and might exclude TPRC members from reviewing any projects from their county (2). It was suggested the Planning Commission Guidebook may have some relevant ideas.

Recommendations:

- Develop, document and make publically available the NCIRWMP conflict of interest and recusal guidelines
- Add the review of the NCIRWMP conflict of interest and recusal guidelines to the review meeting agenda
- Record this agenda item and include in the meeting summary when TPRC member recuse themselves from the discussion and the project review; make the meeting note publically available

k) Please provide other suggestions for improving the North Coast's project application and review process.

The interviewees provided diverse responses, some of which reinforced previous responses. Many reiterated the need for making the application and review process cleaner, better defined and documented with clearer direction from the PRP (7). It was recommended that the review process and formal review comments be provided as feedback to allow for improvement and better understanding (2); a suggestion was made that project proponents should be available by phone during the review process should questions arise (1). There was some concern expressed about ensuring that the expertise reflected in the TPRC review was balanced (3) and there were suggestions made to allow for outside expertise to weigh in on the review process or adding another level of review. Throughout the survey, interviewees commented on the need for longer TPRC review timeframes to allow for a complete review process (3). Some expressed concern about the effect of public attendance during the review process meetings and the need for stricter guidelines for project proponent input during these meetings (4), while others stated that an open forum was important to allow proposals to be vetted and to gather information related to the projects; a webinar was suggested

as a forum for project proponents to provide information about their project (2). One interviewee expressed concern about the power the Tribes may have in the process (1) while another expressed that inter-Tribal cooperation and inclusion would provide for a uniform distribution of projects (1). General comments were made about the inherent subjectivity of project prioritization and that unhappy project proponents should not drive the review process; key to the success of the NCIRWMP is a well vetted suite of projects that together are best for the region. A comment was made about the bias of the application towards well-written proposals and the effectiveness of bundling projects to score well; it was suggested that the scoring criteria should be embedded in the project application questions (3). It was suggested that the NCIRWMP should codify the project review and selection process in a decision-making guide (2).

Recommendations:

- Provide the formal review comments to the project proponent as feedback to allow for improvement and better understanding
- Suggest to the project proponents that they should be available by phone during the review process should questions arise
- Provide mechanisms in the review process to ensure that the TPRC expertise was relevant and balanced for each project solicitation/evaluation
- Provide longer time periods for the TPRC project review and PRP project selection process
- Develop and make available to the public, guidelines for public attendance and project proponent input at the project review meetings
- Develop a project application and review process that avoids, as much as possible, a bias towards well-written proposals
- Develop a project application that embeds the scoring criteria into the application questions
- Develop a project application, review and selection guide for the NCIRWMP

l) Please provide input on any positive aspects of the North Coast's process that should be retained or enhanced.

A number of interviewees commented on their appreciation of the highly qualified PRP, TPRC and staff and open and free exchange of ideas. There is support for the two-tier governance which includes technical review and policy decision making. Other positive aspects of the NCIRWMP's process are the recent inclusion of Tribes, the regional workshops, the technical assistance to project proponents, and the degree of transparency of the planning effort. There was encouragement to: maintain the focus on the big picture of implementing a well thought out plan and suite of projects that are supported by all 7 counties and regional Tribes; promote innovation and integration across disciplines. There was a suggestion to better track past projects.

Recommendations:

- Promote where appropriate the regional perspective and the importance of implementing a well thought out plan and suite of projects that are supported by all 7 counties and regional Tribes

m) What are your suggestions for future direction for the NCIRWMP effort?

A few TPRC interviewees suggested that the NCIRWM program was heading in the right direction: holistic approach to energy, water supply, water quality, ecological restoration and the water/energy nexus (3). Others commented on funding issues including future Prop 84 funding amounts and the need to continue to be mindful of other funding opportunities (3). There were a couple of comments about the large size of the region and the difficulty of travelling for meetings and a suggestion for considering the creation of sub-regions (2). Potential new objectives have been identified for the region including stormwater (1) and protection and recovery of in-stream flow (1). A comment was made that the NCIRWMP should periodically review the project implementation effectiveness in addressing regional goals (1). There were some comments made about the need for additional expertise, education and outreach when new issues and objectives are incorporated into the NCIRWM planning effort (3).

Recommendations:

- Continue to publicize and consider applying for funding opportunities outside of the IRWMP arena
- Where appropriate consider sub-regional approaches to planning

- Consider incorporating stormwater and in-stream flow into the NCIRWMP objectives
- Conduct periodic project effectiveness analysis to assess plan performance
- Provide additional expertise and educational opportunities for new program elements

n) Other information or suggestions you would like to share with us?

A couple of interviewees commented on the success and continued improvement of the NCIRWM process and offered appreciation of the Sonoma County Water Agency for its considerable and continued support. Another recognized the need for ongoing and stable funding for admin support and suggested covering this through a slice of the implementation project funding. Others commented on the need for outreach and advertising the successes of the program to county/Tribal Boards and Councils, county/Tribal departments, transportation agencies, RCDs, partner agencies and programs through newsletters, Board/Council reports, attendance/presenting at local conferences and targeted outreach to the DOC Watershed Coordinators (5).

Recommendations:

- Continue to identify funding mechanisms and opportunities for ongoing administrative and planning support
- Provide information and advertise the NCIRWMP successes through outreach, newsletters and board/council reports to county/Tribal Boards and Councils, county/Tribal departments, transportation agencies, RCDs, partner agencies and programs.
- Continue to provide presentations and other outreach activities at local conferences and meetings.
- Provide targeted outreach to DOC Watershed Coordinators

North Coast IRWMP Project Evaluation Process Survey Summaries: Priority Project Proponents — 2011

a) Please provide an estimate of how much time and funding you or your agency spent on the Proposition 84/50 project implementation grant application(s)? If possible, please break down personnel time according to pay scale or some other mechanism that allows us to quantify the effort (e.g., work performed by volunteer, consultant, salaried engineer, clerical staff). Please include any materials and supplies costs (mapping, printing, copying, FedEx).

Project proponents provided a wide range of costs associated with the NCIRWMP applications (16); the findings are below. One comment was made that level of effort and cost was dependent on the readiness of the project and reflects the wide range of costs. One comment was made that had they known how technical the Step 2 application was, they may not have submitted a Step 1 application.

- Prop 50 Step 1 = $2400–$5400; average = $2,829
- Prop 50 Step 2 = $31,800
- Prop 1E = $20,000
- Prop 84, Step 1 & 2 = $5,505–$32,180; average = $16,219
- Prop 84, Step 1 = $1,000–$7,000; average $3,312
- Prop 84, Step 2 = $4,000–$18,200; average = $11,100

b) In comparison to other grants you have submitted, how would you compare this IRWM process?

1 = more difficult than any grant submitted in the last three years — 8 responses

2 = about the same as other grants submitted in the last three years — 10 responses

3 = simpler and more straightforward than other grants submitted in the last three years — 1 response

If your answer is 1, what element or elements caused this increased difficulty?

Most of the project proponents thought that compared to other grants the NCIRWMP application was about the same as other grants submitted in the past 3 years (10), and others thought the application more difficult (8). A couple of project proponents thought that the concept proposal approach was fair (2). A number of interviewees

commented on the technical difficulty of the Step 2 application and the number of questions and attachments required (3). Though more difficult than other more focused grant applications, a couple of project proponents thought that the broader and regional perspective of the application was relevant and helpful for other funders (2). Though a few interviewees mentioned that the application was not as redundant or difficult as the SWRCB 319h program (3), others thought there was some redundancy in the Step 1 proposal (2). Challenges identified in the survey include compliance questions for Tribes, on-line mapping, the order that the application materials were requested during the Step 2 process, the MoMU signing, the time limitation to submit the application, and reduced budgets for the Step 2 process requiring the project proponent to redo their overall scope.

c) What are some mechanisms to assure that state tax dollars are well spent, but that the application is not so complex that it is a deterrent to project proponents?

A number of interviewees did not have suggestions or felt that the application was fine as it was (6) and noted that the application reflects the requirements of the funding agency solicitation (2). Others expressed the considerable need for technical assistance for small CSDs and organizations to complete the NCIRWMP and other funding applications (8). The technical requirements may be a deterrent to some small and under-served project proponents (2). Project proponent interviewees provided some suggestions for making the application less complex including: advertising the availability of technical support throughout the application process; reduce redundancy and paying project proponents for completing the project proposals.

d) Do you have any suggestions for streamlining or modifying the application to make it more efficient while still providing the required data to the State?

Some interviewees thought that the application was efficient especially given the state requirements and range of project type appropriate to the region. A number of project proponents felt that there was redundancy in the application (5). Suggestions for modifying the application process included: reordering the Step 2 application due dates; allowing the full submitted application to be reviewed on-line by the project proponent after the application has been published to ensure accuracy; provide check boxes instead of requiring narrative responses; to allow the project proponent the capability of defining the ways the proposed project could be scaled; providing different applications by project type; and providing project proponent contact information to the TPRC during the project review period. Again, technical assistance and capacity building was brought up as an important element to ensure a level playing field for small organizations; a suggestion was made to provide planning grants to project proponents to develop project design plans and/or allowing for design development as part of the project implementation.

e) Do you have suggestions for enhancing the North Coast IRWMP scoring, ranking and selection process?

There were some project proponent interviewees that did not have any suggestions for enhancing the NCIRWMP process (4), though others felt that the process needed reform to provide fairness and transparency. A number of interviewees thought that project selection criteria and evaluation process needed to be better developed based on NCIRWM Plan priorities and provided to the project proponents and general public (8); it was suggested that project scores should determine whether projects are selected for funding and that scores should include technical and non-technical criteria. A couple of interviewees suggested that the scoring results and specific feedback should be provided to the project proponents so that they can improve their applications (2). Suggestions for enhancing the North Coast IRWMP scoring, ranking and selection process included: providing higher scores for DAC projects; consideration of population when developing funding distribution criteria; only allowing project proponents to be funded once; encourage a diversity of project types and proponents, including NGOs; promote those projects that address NCIRWMP and Tribal objectives; ensure that Tribes and DACs can compete on a level playing field; consider alternative administrative oversight scenarios for different project proponents; continue to allow the public to attend the TPRC project review meetings; and consider an ongoing project inclusion process.

f) What are positive aspects of the Department of Water Resources IRWM program and application process that should be retained? Please also provide input on any positive aspects of the North Coast IRWMP process that should be retained or enhanced.

A project proponent commented on their support of the regional approach of the DWR IRWM Program. A number of interviewees expressed that they appreciated the public outreach about the North Coast region and NCIRWM Program and felt that the workshops were very helpful (5). Others remarked that the technical assistance and staff support should be retained and enhanced (7); others liked the on-line application and word version of the application (3). Additional aspects of the NCIRWMP that should be retained and

enhanced include: inclusion of smaller projects to maintain regional representation, focus on economically disadvantaged communities, and project evaluation meetings that are open and transparent.

g) To what degree did the North Coast IRWMP Proposition 84/50 application process enhance your project's readiness and viability for other or future funding opportunities:

1 = greatly enhanced the readiness/viability

2 = somewhat enhanced the readiness/viability

3 = did not enhance the readiness/viability

The majority of interviewees stated that the NCIRWMP application process enhanced the project's readiness and viability for other or future funding opportunities; greatly enhanced (5); somewhat enhanced (6). Others felt that the application process did not enhance the readiness and viability of the project (4).

h) The Policy Review Panel and Technical Peer Review Committee currently follow the California Fair Political Practices Commission (FPPC) conflict of interest guidelines and recusal process. Do you have other suggestions for avoidance of conflict of interest during the review process to ensure the integrity of this commitment?

A number of those interviewed either did not have suggestions for improving the NCIRWMP conflict of interest protocol or thought that the current process was adequate (8). Others expressed concern that the California Fair Political Practices Commission conflict of interest guidelines and recusal process covered the PRP, but not the TPRC allowing the possibility of bias in the TPRC review process (1). Another concern was voiced that the PRP 'rubber-stamped' the TPRC recommended suite of projects during the Prop 84 Round 1 project selection process (1). Suggestions for an improved process included: encouraging PRP members to meet with project proponents in their county to come up with county project priorities; developing a committee to review and develop NCIRWMP conflict of interest guidelines which would include staff from DWR (2).

i) Are there other grant program review processes that you recommend as a good model for the North Coast IRWMP project review, evaluation and selection process?

A number of those interviewed did not have any recommendations for alternate models for project review, evaluation and selection (6). Others recommended the processes from the following agencies that offer technical assistance: State Parks and Trails; Rural Community Assistance Corporation; Bureau of Reclamation. One interviewee recommended the Fish and Game review process, while another specifically did not recommend it.

j) Did you find that the web-based project application helped or hindered the application process? Please describe how.

Generally, project proponents who did not have problems with the web-based application thought it helped the application process and commented that they liked to see the mapped locations of the other proposed projects and liked being able to share the on-line application with collaborators (10), while others had problems with the final uploading of some of the check box information (1) or trouble generally (1) or did not have the expertise or internet connection speed to complete the application on-line (5).

k) What are your suggestions for future direction for the North Coast IRWMP effort?

The project proponent interviewees provided a wide range of suggestions for the future direction for the NCIRWMP. Those pertaining to process include: continued and/or increased outreach to CSDs, DACs, and Tribes (3); provide additional funding opportunities for planning; to provide more grant writing assistance and workshops; and to provide capacity building and programs to assist small and DAC water districts to meet new water management regulations and requirements. Those pertaining to important issues and planning objectives for the region include: economically effective approaches to the protection of fish including fish passage barrier removal (3); stormwater impacts to fisheries and water quality (2); sediment reduction; and an increased focus on energy-related projects and green energy opportunities to reduce GHG emissions and to boost economy

l) Is there other information or are there additional suggestions you would like to provide?

A couple of the project proponent interviewees expressed gratitude for the NCIRWMP program and the funding opportunity (2) and thought that conducting interviews to gather feedback was an effective mechanism for process improvement. Others commented on DWR's involvement: some wished that the funding and contracts would be put into place in a more timely fashion so as not to disrupt the project timelines, schedule, work plan

and budgets (3); another stated that the state requirements will demand more administrative oversight; and another suggested that DWR visit the project implementation sites to build rapport. The interviewees provided a wide range of other suggestions about the NCIRWM Planning effort including: a better description about how the Plan and implementation projects interrelate; promoting the needs of small CSDs; reviewing the composition of the PRP and TPRC to ensure that there is adequate representation for Tribes and a balance of expertise on the TPRC; better outreach about the project selection criteria and scoring process for potential project proponents as well as more information about the State requirements related to the management of projects; develop a process for addressing disputes; consider the distribution of funding based on population; provide a mechanism to include projects to the NCIRWM Plan on an on-going basis; and to consider providing technical assistance for those projects that did not get recommended for NCIRWMP funding.

Professional Planner and Technical Staff Interviews — 2013

The North Coast Partner and Stakeholder Interviews Synthesis can be found in Appendix E Relationship To Local Water & Land Use Planning. The interview questions are presented below.

I: QUESTIONS FOR LEADERS

Regional and Local Vision, Conflicts, Goals

1. What is your vision for the North Coast Region in the next 20 years? 100 years? If this is different from the vision you have for your County/area, please elaborate on your local vision.
2. What do you see as the greatest opportunities and constraints characteristic of the North Coast Region? What are those specific to your County/area?
3. What do you see as the overarching water resource and water management conflicts and/or issues in the North Coast Region? What are those specific to your County/area? (rank or indicate priority if applicable)
    a. What are the drivers of these conflicts/issues?
4. What do you see as the overarching water resource and water management goals in the North Coast Region? What are those specific to your County/area? (rank or indicate priority if applicable)

Priorities for Economically Disadvantaged Communities

5. What do you see as the priority objectives to assist economically disadvantaged communities (DACs) in your County/area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?
6. What are some ways the NCIRWMP could better involve DACs in the NCIRWM process, plan, or and/projects?

Priorities for Tribal Areas

7. What do you see as the priority water and resource management objectives for your tribal area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?
8. What are some ways the NCIRWMP could better involve tribes in the NCIRWM process, plan, and/or projects?

Priorities for Land and Water Use Planning Synchronization

9. What do you see as the priority objectives for improved land/water use planning and land/water synchronization in your County/area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?

Priorities for Addressing Climate Change

10. What do you see as the priority objectives for addressing climate change (e.g. analysis, adaptation, mitigation) for your County/area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?

Priorities for Energy Efficiency and Security

11. What do you see as the priority objectives for energy efficiency, production, transmission, security, and independence for your County/area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?

Priorities for Water Management

12. What are your objectives for improving and integrating the management of flood/storm/waste/recycled/ground/surface waters in your County/area?
    a. What are obstacles to achieving these objectives?
    b. How might these obstacles be overcome?

Local and Regional Financing Needs and Solutions

13. What do you see as the priority objectives for long-term financing of the NCIRWM Plan and implementation projects in your County/area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?
14. Why are the North Coast Region and many of its populations relatively poor? How can the NCIRWMP shift that? What are the barriers to North Coast financial improvement?
15. What are some potential sources of financing to secure the long-term future of the NCIRWM Plan and implementation projects? Do you know of any novel solutions to long-term financing of the NCIRWMP?

II: QUESTIONS FOR TRIBES/TRIBAL AREAS

1. What do you see as the priority water and resource management objectives for your tribal area?
    a. What are the obstacles to achieving these objectives?
    b. How might these obstacles be overcome?
2. What are some ways the NCIRWMP could better involve tribes in the NCIRWM process, plan, and/or projects?

III: QUESTIONS FOR LOCAL PLANNERS

Land and Water Use Planning Synchronization

1. What entities are working on land use or water planning projects in your County/area? Are there specific personnel or offices you believe we should involve in this interview process?
2. What additional planning or assessment information would be useful for achieving synchronization of land and water use planning in your County/area? What are the most significant data gaps?

Climate Change Vulnerability and Response

3. What are the local resources (human and natural) and infrastructure (built or "green") in your County/area that you feel will be vulnerable to climate change impacts in the next 50 years? 100 years?
4. Do you know of any local-scale studies or datasets that could help inform NCIRWMP climate change analyses (e.g. to identify vulnerabilities, to develop adaptation strategies)? (list/describe)
5. What entities are working on climate change-related projects in your County/area? Are there specific personnel or offices you believe we should involve in this interview process?

6. What additional climate change-related planning or assessment information would be useful for your County/area? What are the most significant data gaps?

Energy Efficiency and Security

7. What entities are working on energy-related projects in your County/area? Are there specific personnel or offices you believe we should involve in this interview process?
8. What additional energy-related planning or assessment information would be useful for your County/area? What are the most significant data gaps?
9. Are you aware of local or regional projects that can promote energy efficiency, local production (e.g. biomass), transmission, or in other ways support local energy security/independence? (list/describe)
10. Are you aware of local or regional sources for energy conservation financing? Please describe/list.

Water Management

11. Are you aware of specific opportunities in your County/area to improve integration across multiple water management strategies? To improve regional and local water security? (list/describe)
12. What entities are working on water-related projects in your County/area? Are there specific local personnel or offices you believe we should involve in this interview process?
13. What additional water-related planning or assessment information would be useful for your County/area? What are the most significant data gaps?

IV: GENERAL QUESTIONS

1. Are there questions or topics you would like to see further developed into theme-based NCIRWMP workshops? [please note there will at least be a workshop to vet the results of the CCVA "vulnerabilities"; other workshops if enough interest expressed]
2. What is the estimated cost for you to participate in the NCIRWMP process? Are these costs prohibitive to your continued/future participation?

Miscellaneous Questions

1) Are you satisfied with the overall NCIRWMP process to date? Is the process sufficiently open, participatory, and accountable?
2) Are there specific process aspects of the NCIRWMP process you would retain? That you would modify or improve?
3) Do you feel the NCIRWMP Project Review and Selection Process has been fair, equitable, and transparent?
4) Has outreach to stakeholder groups/individuals been sufficient? Are there ways you would improve the stakeholder identification/ outreach/ notification/ participation process?
5) Do you feel there has been/ will be sufficient opportunity for participant input on the NCIRWM Plan and process?
6) Do you feel there has been equitable representation of your County/area in the NCIRWMP process? If not, how would you make representation more equitable?
7) Are you aware of opportunities to improve coordination between the North Coast and adjacent regions and within the North Coast region?
8) Which data/indicators do you think would be most useful for monitoring and evaluating the success of the NCIRWM Plan? Of the NCIRWMP projects?
9) Are you aware of existing technical sources, studies, models, datasets, and/ or analyses that could be useful for ongoing Plan and project evaluation?

NCIRWMP and NCRP Conference Input — 2013

RESPONSES FROM CONFERENCE PARTICIPANTS, RECEIVED IN WRITING OCTOBER 2-4 2013

1) Where do you think the NCRP should focus its resources and funding? Why?

- Watershed health programs that address need for public clean water, jobs, and improving environmental quality and stewardship of the entire watershed.
- Resources should focus on clean drinking water.
- Habitat restoration projects should be prioritized where they enhance drinking water sources. Only a limited number of watercourses provide surface water to people living on the North Coast/ North state.
- Water and wastewater systems.
- It seems that the NCRP is doing a good job of funding important water-related projects in the North State. If there was any way that NCRP could help with the illegal draw downs of entire aquifers — primarily in Trinity and Humboldt Counties — due to illegal pot "grow," that would be much appreciated. I realize that this is an enforcement issue, but it is also a very significant water issue up here.
- Watershed landscape approaches, multiple benefit projects.
- Continue to address water infrastructure, habitat restoration, and climate change.
- Social issues such as marijuana cultivation.
- Integrated management planning to promote coordination of projects and funding opportunities; Projects which enhance both communities and environment; Small disadvantaged communities.
- Disadvantaged Communities (via CSDs and Tribes) and series of very tangible steps to enhance capability and improve project readiness.
- Funding set aside for emergency projects. There should be some funding for water and wastewater particularly when this can also be related to overall watershed health.
- Programs that can work with Tribes to restore the watershed and subsistence culture within them.
- Programs that can be combined for overall improvement of watershed health and being able to return flows when needed.
- Economic diversity and "value added" for conservation projects.
- Efficiencies and equitability of systems and structures at the sub-grantee process, esp. invoicing/ contracting.
- Pro-active approach to addressing the "value-subtracted" of marijuana cultivation on natural resources.
- Small community infrastructure — critical for community economic health and values.
- Building capacity for RCDs to bring land owners and resource projects to the table

2) In relation to economic vitality for the region, what is the most impactful action or set of actions that the NCRP could prioritize? Why?

- Improving the quality of drinking water, and enhancing the quality of water discharged by municipal water agencies, has benefits to all sectors of the economy as all sectors pay municipal water and wastewater bills.
- Enable counties to be able to use their natural resources, timber, mining, water and agriculture (cattle, farming products). We have changed practices for these activities now just let people work.
- Watershed protection, water conservation, and perhaps some sort of funding/ fee structure that would provide a revenue source from SoCal to reimburse NorCal for the water that is generated in NorCal.
- Statewide/ coupled with Federal "Stewardship Act" to incentivize good stewardship through tax and permit reforms.
- The NCRP's projects improve the quality of life on the North Coast. Continue to focus on those types of actions.

- Jobs which create more jobs. Clean, safe water.
- For those doing projects and getting funding, develop mechanisms for line-of-credit/ revolving funds given delays in reimbursement.
- Streamlining regulatory approach and/or programmatic permitting so more dollars are going to the project and the projects are done more timely and more efficiently.
- Providing training for rural residents in restoration work and sustainable energy.
- Eco-tourism related to sustainable, conservation-based North Coast enterprises.
- Work with USDA and RCDs/ Farm Bureau to promote value-added training to encourage investment and innovation.
- NCRP training programs to encourage sustainable jobs/ land use practices.
- Resolve payment issues with this funding. Streamline process for funding through NCRP.
- Clarify NCRP objectives and goals for the next 5 years. Develop a mechanism for providing ongoing funding for ecosystem services.

3) How important is it for the NCRP to address the issue of illegal cultivation of marijuana? Why?

- All programs interested in improving watershed health need to focus on incentive-based environmental stewardship of private lands.
- Marijuana is only one land-use that poses threats if done without a sustainable focus — but does not deserve to be singled out as our only threat. Local growers already operate in secrecy — we need to be able to prioritize incentives to work with local groups that can teach best management practices.
- This is important — as illegal water diversions can negate millions of dollars in restoration work.
- Major focus on how to supply medical marijuana and education.
- Hugely important — see my response to #1. This is a major issue in both Trinity and Humboldt Counties and it has to be dealt with and soon.
- Do not defund watershed, because marijuana growing. This is a problem in all watersheds and CSDs (indoor). Support watersheds that are dealing with impacts of marijuana growing and other agriculture etc.
- Extremely important — the elephant in the room that all regulatory agencies are afraid to address in terms of water diversions and impacts to fish and wildlife. Much easier to regulate the rancher/ farmer who is doing the right thing (AB2121 for example).
- It is very important due to major environmental damage, particularly to water supplies and fish. All life is affected.
- Should not be prioritized higher than other work NCRP is doing, but think it should be added to the mix. The impacts are real and often times are "undoing" the benefits of NCRP projects.
- It is important that this is brought out into the open because there is very different cultivation/ cultivators and some of them are no doubt creating significant environmental impacts and in some instances safety issues for people doing monitoring and restoration.
- It is something people need to come together to create solutions for. Bringing in other economic opportunities that promote environmental sustainability.
- New industry to move to would be an important first step in getting around this problem.
- A session on other economic opportunities that would be viable in the region would be helpful.
- I don't think the issue, pro or con, needs to be addressed, except to encourage and support responsible land-use practices, whether its pot or potatoes — Organic market gardens or medical marijuana

- Stay within the arena of where you can affect a change…support other agencies and highlight the ecosystem costs of marijuana cultivation. This issue alone could derail the NCRP.
- Very important, because domestic water supply has recently been impacted by unauthorized use.

4) Related to marijuana cultivation, how important is it for the NCRP to anticipate and plan for potential policy changes that may affect the environment and economy of the North Coast? Why?

- An incentives-based program to encourage all agriculture-based economies to use best management practices will be more effective in both an illegal and legal framework.
- County sheriffs should have been involved.
- Hugely important; on the one hand, legalizing MJ might make it an easier industry to regulate, and it also might result in the price/ value of the "product" declining, so that the Cartels might lose interest in destroying our National Forests with their large-scale "grows."
- Legalization will occur. Plan for it/ regulate it/ reword Good Stewardship — hammer bad practices.
- Advocate for change and prepare for it.
- This is also VERY important. The current impact on watersheds is unacceptable. As now conducted, this agri-business is benefitting more people out of the North Coast area than in it.
- Very important because they will have direct impacts on the watersheds either positive or negative depending on policy changes. Also policy changes county through federal need to be looked at.
- Since the impacts are already great, and the issue could "take over" the other work of the NCRP, perhaps a task force or coalition could be initiated, and the NCRP can provide a forum for "responsible growing…?"

5) Are there ways that the NCRP could more effectively communicate with and receive input from stakeholders in the region? Please list them.

- It seems that NCRP is doing a good job of "outreach." Perhaps having a representative visit schools in the region might be a good way to get the youth in this region involved in water conservation in general.
- Probably. At various RWRN workshops, speakers have suggested contacting NCRP — stating that it is a good resource. Not enough information was available to decide on when or whether to make contact. This conference has provided that input.
- Not sure, but deserves some discussion/ communication. Was disappointed to see the lack of attendance at the conference from "new" folks. Most people in attendance are actively involved in NCRP.
- I think town hall meeting with education and outreach on problems and opportunities within the region and outreach and education on reservations/ Rancherias/ with Tribes.
- Quarterly, county-based "town hall meetings" — provide inserts on mailings from the county tax bills with "we'd like to hear what your concerns are for natural resources…". Conduct a "Jr. NCTP" forum with High School and Middle School youth — to engage them in the process.
- More outreach, possibly through RCDs to private landowners.
- Direct mailing — email. Internet.

6) Do stakeholders need more technical assistance in order to apply for funding via the NCRP? If so, what type of technical assistance would be most helpful?

- Planning, how to fill out forms, help understanding regulations.
- Grant writing would be a good place to start.
- Process is lengthy and time consuming often for a small amount of funding — providing info/ direction for "economic benefits."

- Yes, especially smaller entities (disadvantaged or otherwise). Host 2-3 forums (geographically dispersed) and make easier to attend with resources there to fill out a pre-application for IRWMP projects and FEMA HMG pre-application. Resources like RCAC, RRWN, CRWA and local engineering firms could/ should be brought to attend. HBMWD would be willing to be a "convener" for one such forum in Humboldt County.
- A lot of people don't really know where to start — that's why I think outreach is key.
- Tribes and disadvantaged communities and small, rural municipalities/ communities need more outreach and support and a longer lead-time between solicitation (RFP) and deadlines quick turn around often eliminates participation.
- Yes, technical assistance with grants writing and then reporting and labor compliance.
- Matching the right funding with partner needs. Planning. CEQA requirements (reports)

7) Is the NCRP website helpful in conveying information about the region and upcoming funding opportunities? Any suggestions for improvement?

- Updates to the website are sent to folks on the email list. However, the email heading only says the website has been updated. The email heading should summarize the updates, and directly to the updated page.
- This is a wonderful service. We need someone to help identify what projects fit into what funding opportunities.
- Yes. It is great, and I can't think of any needed improvements.
- Be more visible
- Yes, but only for those who know of its existence. Once again outreach on a grass roots level.
- It's great! Especially regarding other funding opportunities, conferences, workshops, etc. Easy to use and navigate — maybe consider starting a Facebook page in the future?
- I don't use it much.
- I had to search with some failure to Google NCRP website.

8) What are the greatest public health risks in the region and how should the NCRP address them?

- Lack of employment — NCRP focus on providing local jobs and local contracts is a great inclusion — the funding mechanisms need to be conducive to maintaining local jobs through regular and reliable payments.
- Rank projects as to need and emergency.
- The illegal draw down of entire aquifers — and other Environmental Degradation — caused by illegal marijuana "grows"…or even the "legal" ones as well.
- Water supply. More funding for groundwater recharge, storage and forebearance.
- Contaminated water sources due to illegal activities and ignorance.
- I think this really varies within the region.
- Tribes and other small water systems need more assistance with clean drinking water supply and storage. Wastewater infrastructure, failing septic systems. Algae blooms from nutrient loading — e.g. blue green algae.
- Failing infrastructure and small community services districts.
- Contamination of watershed.

9) What are the greatest public safety risks in the region related to flooding? What can the NCRP do to address these?

- Probably inappropriate historic land use practices — such as floodplain drainage, levee building, river re-routing, over use of aquifers for either agriculture or development, etc.
- Loss of livestock; danger to rescue personnel. River dredging and levees in Humboldt County could be useful. It would be good to implement an integrated approach to manage and mitigate flooding with habitat restoration and encourage water/ wastewater service providers to plan infrastructure to support river and stream management practices.
- Work on restoring wetlands and restore riparian zones, use sensible planning. I think climate change really needs to be looked at closely in the various ways this can contribute to it and how we can better plan to adapt and mitigate.
- People trying to drive through or across flood waters causes the most fatalities — need education outreach. Rather than conventional "flood control" support wetland protection and flood plain re-establishment, riparian buffers — zoning, planning, and building reform.

10) What are the opportunities for aligning forest/watershed health with economic vitality and local jobs?

- We need to have a market for forest products — we have willing landowners, extensive second growth forests that need to be managed (thinned) to increase flow in our rivers — but no market or infrastructure to sell products.
- Thinning and forest management go hand in hand. One tree uses 100 gallons of water per day — if the forests were managed properly just think of the water that would be released into the water system.
- Obviously, there are many possibilities for job growth in the North State Region, particularly in terms of resource conservation, water use and distribution, and watershed management.
- Forest thinning, erosion control, infiltration improvements, and road storm-proofing create jobs and economic vitality while protecting water
- Integrate these projects with other local projects so that ALL considerations are addressed.
- There are definitely opportunities here.
- Use local labor when possible, use it as an opportunity to retrain people and give them a new set of job skills.
- Value added wood products; fire wood production vs. herbicidal treatment of hard woods; looking more at ecosystem services and carbon sequestration, discourage forest conversion; small, local mills, biomass/ bio-char; eco-tourism/ conservation easements.
- Increase capacity for outreach to land owners and assist them with coming to the table and providing funding for ecosystem services. Help them form collectives.
- Biomass opportunities — recreation.

11) What is the relationship between functional built infrastructure (eg, water supply/ wastewater systems, roads, broadband, energy transmission) and functional "green infrastructure" (eg, working lands, ecosystems, natural areas)? Are their particular areas where the NCRP could meet goals for both "green" and "grey" infrastructure?

- Supporting rural programs that allow/ facilitate landowners to store water in tanks during heavy rainfall so that they are pumping less in the drought times.
- Yes, the NCRP should prioritize green infrastructure that will enhance the function of the built environment. As noted by numerous speakers, quality green infrastructure can minimize the need to expand the built environment.
- Use the studies that have already been developed not do new ones. Don't change regulations we have enough.
- Too big of a question for me to attempt to answer here. Not my area of expertise or knowledge or experience. An important question, however…

- Yes — see City of Trinidad's Trinidad Bay Watershed Council — CA Department of Public Health Source Water Protection Project.
- Goals for both need to be integrated. Waste water facilities need to be above reasonable flood levels and contribute to the eco-system.
- Definitely relationship. "Grey" is not as much in vogue as it used to be, but when "grey" does not work well, it often times affects "green." "Green" projects can complement or lessen the need for traditional "grey." The NCRP has done a great job supporting and funding both and highlighting the link. Keep it up!
- Built infrastructure is really dependent upon the green infrastructure and too often this dependence and relationship is forgotten or disregarded. They should be looked at in terms of what is going to work with green infrastructure and what will mitigate or have the least damage.
- The interface is community, and localizing through community, including inputs and outputs. Energy and food independence — low cost public transportation, affordable housing — closing the loop on solid waste, waste stream reduction are all "grey-green" topics for NCRP to consider for the future.
- Many of the older infrastructure entities in the North Coast are facilitated by limited (economic) challenges. Assistance to help achieve common goals will help accomplish common interests.

12) What is constraining the North Coast region economically? Please list the constraints and any ideas for addressing them.

- Lack of market to sell sustainably harvested/ cultivated natural resources.
- A lack of direction and or leadership in terms of stimulating local economies via appropriate use of our many natural resources up here in the North State.
- Re-investment. After 150 years of resource extraction we need ongoing investment.
- Lack of marketing its assets for both business and tourism. Marijuana legalization/ regulation/ taxation.
- Preservationists posing as environmentalists. Over regulation.
- Depressed "traditional" industries. Growth in new industries/ businesses, but has not replaced what was lost. Transportation issues. Many "replacement" jobs arte low wage and little or no benefits. Dollars always constrained!
- There is very little legal or sustainable industry or job retraining. There is too much dependence on marijuana. It needs fresh ideas and industry.
- Access — geographically remote. Weather- 9 months of grey weather and rain. Education system is underfunded. Land prices and cost of living are not supported by the pay-scale/ cost of living. Large numbers of unsheltered/ transient population that puts pressure on our public systems.
- "Redwood curtain" and illegal activities. This kind of diverse group can leverage a small voice…
- Transportation: goods/ people especially air transportation.

13) If you could describe the ideal North Coast region in 20 years — what would it look like? What would be different and what would be the same?

- The North Coast region would be more self-sufficient.
- A diversity of farms and ranches would provide a greater share of food consumed by locals and others living in Northern California. The landscapes would also resemble their natural condition.
- No more illegal "grows," healthier forests, appropriate and controlled growth, healthier rivers, streams and watersheds, combined groups working together to solve and re-solve issues that pertain to this large, resource-rich region. (utopian vision perhaps, but this NCRP conference has inspired me to think that such a vision might be attainable)
- Better integration of efforts, Stewardship Act, financial incentives for stewardship.

- All water delivery systems would be efficient and environmentally sound, supplying safe, clean water. Rivers would be dredged when needed. Legal employment would be available so our youth could stay here.
- Schools are well-funded; kids get wholesome locally grown food — higher education and healthcare and are free and fully funded. Watersheds are the geo-political boundaries. No one is unsheltered, low income housing is interspersed, not concentrated. Community gardens and forests abound. Water is conserved and incentivized. Residents get a tax break for supporting locally grown food, building products, and bio-fuels. Intergenerational activities — music, art, sports, are encouraged. It becomes more economically feasible for land owners to conserve rather than exploit natural resources. Kids come home from college and find jobs and start families. The work week is 4 days — 5th day is a day of service. People help each other, are welcoming to strangers — there is no such thing as an illegal immigrant — borders are open. We study and support biocultural/ multicultural society. We celebrate and value the natural environment.
- Thriving environmentally, socially and economically with a healthy community that attracts folks to enjoy, support our natural resources and working landscapes.
- Natural resources in balance with economic opportunities.

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX M
NCRP GOVERNING DOCUMENTS

Attachment

Memorandum of Mutual Understandings
Integrated Regional Water Management Plan
November 11, 2010

1. PURPOSE

The purpose of this Memorandum is to establish the mutual understandings of North Coast area agencies, tribes and stakeholders with respect to their joint efforts towards an ongoing, adaptive North Coast Integrated Regional Water Management Plan (IRWMP) that will increase regional coordination, collaboration and communication and help in obtaining funding for water-related projects, watershed protection and enhancement, energy programs and projects, and climate change initiatives and increase regional economic vitality.

2. GOALS

The goals of the IRWMP are:

2.1. To develop a comprehensive plan to facilitate regional cooperation in providing water supply reliability, water recycling, water conservation, water quality improvement, storm water capture and management, flood management, watershed protection and enhancement, wetlands enhancement and creation, and environmental and habitat protection and improvement.

2.2. To foster coordination, collaboration and communication between North Coast agencies, tribes and stakeholders responsible for water-related and climate/energy issues and interested stakeholders, to achieve greater efficiencies, enhance public services, and build public support for vital projects.

2.3. To improve regional competitiveness for State and Federal grant funding.

3. DEFINITIONS

3.1. Integrated Regional Water Management Plan: The plan envisioned by state legislators, state resource agencies and local governments and stakeholders in the North Coast Region that integrates the projects and management plans of all water-related agencies, tribes and stakeholders in the North Coast Region, in order to foster coordination, collaboration and communication among those entities and to assist decision-makers in awarding grants and other funding. The plan will address water supply, water quality, wastewater, stormwater/flood control, watershed planning and aquatic habitat protection and restoration as well as economic development, assistance to disadvantaged communities, climate change mitigation and adaptation and energy independence.

3.2. Agency: A public entity, be it a special district, city or other governmental entity, responsible for providing one or more services in the areas of water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, aquatic habitat protection, restoration, climate change mitigation and/or adaptation and local economic development.

3.3. Service Function: A water or climate-related individual service function provided by an agency or tribe, i.e. water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, aquatic habitat protection or restoration, or energy programs

3.4. Project: An integrated, multi-benefit implementation activity in need of funding that addresses: water supply, water quality, wastewater, stormwater/flood control, watershed planning or aquatic habitat protection and restoration, local economic development, climate mitigation or adaptation and energy independence

3.5. Management Plan: An agency's, tribe's, or organization's plan, based in part on the land-use plans within the entity's jurisdiction, that addresses how that entity will provide service in the future in one or more of the following service functions: water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning, climate change mitigation/adaptation, or aquatic habitat protection or restoration.

3.6. Integration: Assembling into one document the water-related management strategies, projects and plans in the North Coast Region. The plan will identify water management and climate mitigation/adaptation strategies and priority projects for the region and demonstrate how these strategies and priority projects work together to provide reliable water supply, protect or improve water quality, provide watershed protection and planning, mitigate the effects of climate change, assist the region in adapting to climate change, provide local economic development – especially to disadvantaged communities - or provide environmental restoration and fisheries protection. Projects and plans would be categorized, and the regional benefits of linkages and interrelationships between multiple water and climate change management strategies, projects and plans of separate service functions would be identified, e.g. wastewater treatment and water recycling, stormwater/flood management, climate mitigation/adaptation or habitat restoration.

3.7. North Coast IRWMP Policy Review Panel (PRP). The governing and decision making body for the North Coast IRWMP, described in Section 5.4. The PRP reviews and approves plans and applications for grants or other types of financial assistance on behalf of the NCIRWMP and makes policy decisions on behalf of the NCIRWMP.

3.8. North Coast IRWMP Technical Peer Review Committee (TPRC). The panel is comprised of up to two technical representatives from each North Coast County and three tribal representatives. The TPRC representatives from each North Coast County will be appointed by the PRP members from each County. The tribal representatives on

the TPRC will be selected through the Tribal Representation Process attached hereto as Exhibit A. The TPRC is advisory to the PRP and evaluates and makes recommendations based on technical and scientific data. They will support staff in compiling and integrating projects and management plans of the North Coast region. Review committee members will define the process of compilation and integration including format, schedules, and ground rules to ensure process consistency and uniformity.

4. IRWMP PROJECT PARTICIPANTS

4.1 Local Public Agencies. Public agencies, which have developed projects and management plans, and are devoting staff to the process, will contribute to the development of the NCIRWMP both via in-kind staff support and in some cases direct financial support. These agencies will be signatories to this Memorandum of Mutual Understandings. As authorized by the NCIRWMP Policy Review Panel, a local public agency may act as a contracting entity on behalf of the NCIRWMP.

4.2. Tribes. Tribes, which have developed projects and management plans, are responsible to their respective constituents and members, and are devoting staff to the process, will contribute to the development of the NCIRWMP both via in-kind staff support and in some cases direct financial support. These tribes will be signatories to this Memorandum of Mutual Understandings.

4.3 Contributing entities. Other entities (including, but not limited to, business and environmental groups, and landowner organizations) are considered valuable contributors to the process. Contributing entities will be kept informed via the NCIRWMP website, will continue to be invited and encouraged to participate in all meetings and workshops, and may be signatories to this Memorandum of Mutual Understandings.

4.4. State and Federal Agencies. Such agencies may include the Department of Water Resources, the State Water Resources Control Board, the North Coast Regional Water Quality Control Board, the California State Coastal Conservancy, Department of Fish and Game, National Oceanic and Atmospheric Administration, Environmental Protection Agency, Natural Resources Conservation Service, Department of Conservation, California Energy Commission, and Department of Energy. Such agencies will be invited to participate in a variety of ways, including but not limited to, providing input into the NCIRWMP planning process, and updating the PRP and staff on relevant legislative, policy, regulatory and funding initiatives and opportunities. If they cannot participate in work meetings, staff and representatives of the PRP and TPRC will keep them advised of project and plan progress and seek guidance as needed.

5. MUTUAL UNDERSTANDINGS

5.1. Need for a North Coast IRWMP

5.1.1. The North Coast IRWMP process is intended to foster increased coordination, collaboration and communication between North Coast agencies, tribes and interested stakeholders that may result in more effectively managed resources, cost efficiencies and better service to the public.

5.1.2. Also, representatives of state resource agencies and state legislators have suggested that qualification of some state grants and other funding criteria will require development and implementation of Integrated Regional Water Management Plans.

5.2. Subject matter scope of the IRWMP. The IRWMP will include, but may not necessarily be limited to, water supply, water quality, wastewater, recycled water, water conservation, stormwater/flood control, watershed planning and aquatic habitat protection and restoration, climate mitigation and adaptation, local economic development or energy independence programs. It is acknowledged that the management plans of each individual public agency or tribe are based, in part, on the land-use plans within an agency's or tribe's jurisdiction. Therefore, the NCIRWMP will by design incorporate the land-use plans and assumptions intrinsic to the respective service functions of these local agencies

5.3. Geographic scope of the IRWMP. The North Coast Region for this Memorandum is defined as the seven North Coast counties – Modoc, Del Norte, Siskiyou, Humboldt, Trinity, Mendocino, and Sonoma. These counties lie within the North Coast Hydrologic Region, even though some areas of some counties and individual agencies may lay outside the North Coast hydrologic region. Where it demonstrably supports the purpose of the NCIRWMP, as determined by the NCIRWMP Policy Review Panel, collaborations may extend beyond the NCIRWMP regional boundary into other counties and/or states. In the case of energy independence endeavors, boundaries may encompass full counties.

5.4. Approach to developing the IRWMP

5.4.1. The first phase of the NCIRWMP formed the PRP and TPRC, developed a NCIRWMP website for stakeholder communication and data sharing, developed the North Coast IRWM plan, identified water management strategies for the region and the integrated priority projects that demonstrate how these strategies work together to provide reliable water supply, protect or improve water quality, provide watershed protection and planning, and provide environmental restoration and fisheries protection. Opportunities to identify regional benefits and linkages between multiple water management strategies among projects and plans of separate service functions were identified

5.4.2 Future phases of the NCIRWMP are expected to expand upon and further integrate existing strategies, add new regional strategies (including but not limited to climate mitigation and adaptation and energy independence) continue and enhance stakeholder outreach and inclusion, and coordinate and collaborate – where applicable – beyond the boundaries of the North Coast IRWMP with other regional, statewide and

national efforts that are relevant to NCIRWMP goals and objectives.

5.4.3 Policy Review Panel. The North Coast IRWMP Policy Review Panel shall consist of two representatives from each of the seven Counties (Modoc, Del Norte, Siskiyou, Humboldt, Trinity, Mendocino, and Sonoma) plus three tribal representatives selected by the North Coast tribes according to the "Tribal Representation Process" attached hereto as Exhibit A. Such County representatives shall be designees of the Board of Supervisors of the County. Each County shall also designate two alternates who have expertise in water, wastewater, land-use, or energy planning, and are familiar with the North Coast IRWMP process, and who may be members of the Technical Peer Review Committee. Each tribal representative may have one alternate who would be selected according to the Tribal Representation Process (Exhibit A), and who may be a member of the Technical Peer Review Committee. In the event that the elected or tribal representatives are unavailable for a particular meeting, the alternates may participate on their behalf. All meetings of the Policy Review Panel will be subject to and carried out in accordance with the provisions of the Ralph M. Brown Act. All PRP members acknowledge and agree that the PRP is subject to the Ralph M. Brown Act. Panel members may participate in panel meetings via teleconferencing, consistent with the requirements of the Brown Act.

5.5. Decision-making. Decision-making will be conducted by the North Coast IRWMP Policy Review Panel. The panel shall seek to arrive at a consensus if the need for a decision arises. If the panel cannot reach consensus, decisions shall be made as follows:

5.5.1. Quorum. Representatives or alternates constituting one-half or more of the total number of representatives on the Policy Review Panel shall constitute a quorum for purposes of transacting business or arriving at a decision.

5.2.2. One vote per representative. Each representative (or alternate, if a representative is not present) shall have one vote.

5.2.3. Majority vote. If a quorum is present, the affirmative vote of a majority of members of the Policy Review Panel present at a meeting is required to, and is sufficient to, approve any item of business or make any necessary decision.

5.6. Approval of the NCIRWMP. Review and approval of the final North Coast Integrated Regional Water Management Plan will occur by voting of the NCIRWMP Policy Review Panel, with input from the NCIRWMP Technical Peer Review Committee, North Coast region stakeholders and NCIRWMP staff. The NCIRWMP will also be brought before each North Coast County's Board of Supervisors for consideration and adoption. Tribes will approve the NCIRWMP according to the Tribal Representation Process.

5.7. Non-binding nature; termination and withdrawal. Execution of this Memorandum and participation in this IRWMP effort are legally nonbinding, and in no way impair an

agency or tribe from continuing its own planning or undertaking its own, separate efforts to secure project funding from any source. An agency or tribe may withdraw from this Memorandum and participation in the NCIRWMP at any time by notifying the NCIRWMP contracting entity in writing. Nothing in this Memorandum is intended to give the NCIRWMP or its Policy Review Panel any decision-making authority over matters within the jurisdiction of any signatory County, agency, or tribe.

5.8. Personnel and financial resources. It is expected that agencies, tribes, and organizations will contribute the personnel and financial resources necessary to develop the NCIRWMP.

5.9. Reports and communications. Staff and the Policy Review Panel and Technical Peer Review Committee will regularly report on their progress to the agencies, tribes, and stakeholders participating in the NCIRWMP process and the associations or organizations to which they belong that are involved in the NCIRWMP process.

6. Entirety of Memorandum of Mutual Understandings. This Memorandum of Mutual Understandings (MOMU) shall constitute the entire MOMU between the parties relating to the Integrated Regional Water Management Plan and shall supersede all prior MOMUs concerning the same subject matter.

7. SIGNATORIES TO THE MEMORANDUM OF MUTUAL UNDERSTANDINGS
We, the undersigned representatives of our respective agencies or tribes, acknowledge the above as our understanding of how the North Coast Integrated Regional Water Management Plan will be developed and maintained over time.

_____	_____
Signature	Date
_____	_____
Printed Name	Agency / Tribe
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More signature blocks as required

Exhibit A - Tribal Representation Process

November 2010

In response to a proposal endorsed by 20 tribes, the Policy Review Panel (PRP) of the North Coast Integrated Regional Water Management Plan (NCIRWMP) voted to establish three seats on the PRP and three seats on the Technical Peer Review Committee (TPRC) for tribal representatives.

The tribes of the North Coast region devised the following process to select representatives and approve the NCIRWMP. This process can be modified upon a unanimous vote of the three acting tribal PRP representatives. Modifications to this document will not require approval of signatories to the MOMU and will not be treated as a modification of the MOMU.

Nomination & Voting:

The North Coast IRWMP funding region is divided into three districts – Northern, Central and Southern – for the purpose of selecting tribal representatives to fill the PRP and TPRC seats. Tribes within each district may select one PRP representative and one TPRC representative. Each representative may have one alternate. Tribes within each district may use one of the following two options to select their representatives.

Option 1:

When there is a vacancy for a tribal PRP or tribal TPRC seat in a given district, each tribe within the district will be given 31 days to select one nominee to fill the seat. The maximum number of vacancies for a given district would be two in the event that the tribal PRP and TPRC seats become vacant.

Each tribe may appoint one voting delegate. Each voting delegate will retain her/his status unless (s)he is removed or replaced by the tribe that appointed her/him.

At the end of the 31 day period allotted to nominate representatives, each voting delegate will be given ten days to cast one vote for each vacant seat in their district.

The PRP and TPRC nominees who receive the largest number of votes become the representative for that district. The PRP and TPRC nominees who receive the second largest number of votes may become an alternate representative for that district if they choose to do so. If not, then the representative with the third largest number of votes may choose to be the alternate representative for that district. Districts are not required to select alternate representatives.

Option 2:

When there is a vacancy for a tribal PRP or tribal TPRC seat in a given district, each tribe within the district will be given 31 days to select one nominee to fill the seat. The

maximum number of vacancies for a given district would be two in the event that the tribal PRP and TPRC seats become vacant.

Each tribe may appoint one voting delegate. Each voting delegate will retain her/his status unless (s)he is removed or replaced by the tribe that appointed her/him.

The majority of voting delegates within a region can meet in person and/or by conference call and choose their district's representative(s), and alternate representative(s) if any, by consensus. All voting delegates within the respective region must be notified at least two (2) weeks in advance of this meeting. Voting delegates who cannot participate in this meeting must be contacted and consent to the decision(s) reached at the meeting. If a consensus cannot be reached, Option 1 must be utilized.

Approval of the NCIRWMP:

NCIRWMP review and approval will occur by voting of the three tribal PRP members with input from tribal TPRC representatives and tribal voting delegates.

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX N
CLIMATE CHANGE VULNERABILITY ASSESSMENT

APPENDIX N
CLIMATE CHANGE VULNERABILITY ASSESSMENT

N.1 PROCESS TO DETERMINE POTENTIAL VULNERABILITIES

Approach to Climate Change Vulnerability Assessment

The assessment process and results will provide North Coast water resource managers with a clearer understanding of the combined relative sensitivity and adaptability North Coast sectors to potential future climate impacts. Detail and precision of this assessment is designed to match the information available as well as the likely resources available for these types of assessments in this Region. Because many climate change impacts involve complex system responses to projected climate changes, detailed studies often involving numeric models of other systems (hydrologic, ecologic, vegetation, fire) that use climate projections as inputs are often used to determine and quantify impacts. These modeling studies — combined with regional climate projection data and region-specific information relevant to the sectors defined such as topography, land-use, crop values, water supply source, water quality issues, etc. — formed the core of knowledge for identifying impacts and determining sensitivity and adaptive capacity which combine to specify vulnerability[1].

The development of the CCVA per DWR recommended processes (below) has been supplemented by information provided during NCRP interviews with local professional water and/or land planners. Interviews reveal an array of concerns related to specific local climate vulnerabilities (Figure E4 "Climate Change Vulnerabilities"). Interviewee-identified data gaps related to climate change and climate uncertainty (Figure E6 "Data Gaps: Climate Change"). As it is directly related to climate change mitigation and energy independence, data gaps related to energy efficiency are also provided (Figure E5 "Data Gaps: Energy Efficiency").

Overview of Steps to Develop North Coast CCVA

The NCIRWMP framework for determination of North Coast regional vulnerability to climate change includes the following steps (discussed in turn):

1) Identify a suite of sectors comprising regional water-related systems (built/ economic and natural/ ecosystem);
2) Use available data, scenarios, and models to create projections of regional climatic and hydrologic variables (by applying GHG emission scenarios and publically available data);
3) Analyze projected variables to determine likely regional impacts of climate and hydrology on the sectors
4) Determine sensitivity and adaptive capacity of sectors to projected changes in climatic/ hydrologic variables; and
5) Co-analyze sensitivity and adaptive capacity to determine and rank overall vulnerability of each sector.

Per recommendations of the DWR's 2012 IRWM Guidelines, the USEPA/ DWR's "Climate Change Handbook for Regional Water Planning" (2011), and others, the next steps for developing this preliminary CCVA into fuller Climate Analysis (per) include vetting the preliminary list of vulnerability rankings with the NCRP and other stakeholders; identifying priority sectors for further analysis; develop local strategies to reduce sensitivity and/or increase adaptive capacity of these priority sectors; and conducting ongoing refinement of CCVA and climate analyses (e.g. using new downscaled data sufficient to provide high-resolution information) to inform local planning and implementation.

1 Other resources relevant to local climate change assessment as part of IRWM planning include: an academic report about how various IRWM regions are addressing climate vulnerability http://www.acwa.com/news/climate-change/new-report-examines-climate-change-and-irwm-regions; a case study from Sonoma County Water Agency www.water.ca.gov/climatechange/docs/Front%20Matter-Final.pdf; a Vulnerability Assessment from East Bay Municipal Utility District http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=498020; and the "Tribal Communities Climate Change Vulnerability Matrix" currently in development with DWR at erin.chappell@water.ca.gov

Determinations of sensitivity, adaptive capacity, and vulnerability necessarily contain a degree of subjectivity based on the availability of relevant literature, understanding of cause and effect processes relating future climatic conditions to the current and future state of the systems involved. However, a relative scale from high to low along with a consistently applied process should provide reasonable scoring precision and accuracy. The steps taken to complete the vulnerability assessment are described briefly and in general terms in the sections below.

STEP 1) Identify a suite of "sectors" comprising regional water-related systems

A regional characterization had been created in the form of the Phase 1 NCIRMWP (NCIRWMP 2007), which provides the physical, and water resource context for defining sectors and assessing impacts to specific components of each sector. The NCIRWMP includes descriptions of the physical and biological characteristics, sensitive habitats, special designations, and current water management issues; (e.g. Section 5 "North Coast Region Description" and Section 6 "Local and Regional Water-Related Issues"). The North Coast CCVA considered all these attributes in the vulnerability assessment, via definition of a list of sectors for analysis, that together subsume these descriptions to represent the Region's preparedness for potential climate change effects.

Sectors have been defined in this assessment to readily align with existing resource management frameworks so that the information can be most efficiently integrated with statewide planning processes, as necessary and appropriate. Assessment of sectors herein includes consideration of the current status of the sector, how it changes over time, and what drives those changes. Sectors sometimes are closely related or may directly or indirectly feedback on one another. As outlined in Table 56 ("Sectors Assessed for Climate Change Vulnerability"), the sectors can be grouped into two broad systems: Natural/Ecological (with sectors representing "green" infrastructure/resources and ecosystem function) and Built/Human/ Economic (with sectors representing "gray" infrastructure/resources and economic viability).

The list of sectors chosen for this preliminary vulnerability assessment is intended to be representative of the suite of North Coast attributes that support its waters, habitats, communities, and economies. A number of sources were referenced during CCVA planning to ensure the NCIRWMP list of sectors is representative, compatible, and meaningful[2].

TABLE 56 SECTORS ASSESSED FOR VULNERABILITY TO CLIMATE CHANGE

SYSTEM	SECTOR	DESCRIPTION
Natural/ Ecological	Forests	Forests are areas of the region with high densities of trees, which make up the largest type of land cover of the region by area. This sector includes consideration of the natural ecosystems that compose the forest environment.
	Rangelands	Rangelands are natural landscapes in the form of grasslands, shrublands, woodland, and wetlands, and in this context also include pasture lands (which are grasslands that also function as open spaces and working landscapes). This sector includes consideration of the natural ecosystems that compose the different rangeland types.
	Riparian	The riparian zone or riparian area is the interface between land and a river or stream. They are important natural biofilters, protecting aquatic environments from excessive sedimentation, pollutants, and erosion and provide shelter for aquatic animals and they shade the stream which regulates water temperatures. This sector includes consideration of the ecosystems that compose the riparian zone, with special consideration to cold water fish species. Several of the streams and rivers throughout region are federally designated 'Wild and Scenic' rivers.
	Coastal	The coastal zone can be defined by the area of interaction of land and sea processes. This sector includes systems such as coastal lagoons, the intertidal zone, near shore currents, sea cliffs, and developed areas along the coast. It includes Critical Coastal Areas, Areas of Special Biological Significance, State Water Quality Protection Areas, and Water Management Areas across the North Coast Region.

2 Guidance for development of list of sectors provided by: "Climate Change Handbook for Regional Water Planning" (USEPA, DWR 2011)"California Adaptation Planning Guide: Defining Regional and Local Impacts" (CalEMA, CNRA, FEMA 2012); "Adapting to Climate Change: A Planning Guide for State Coastal Managers" (NOAA 2010); and "Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments" (Climate Impacts Group, Univ WA, et al. 2007).

SYSTEM	SECTOR	DESCRIPTION
Built/ Human / Economic	Forestry	Forestry includes the management, use, and conservation of forest for human benefit. This sector includes natural resource management and economic activities related to the forest environment.
	Urban	Urban areas of the region are characterized by higher population and structure density and extensive impervious surface coverage. This sector includes consideration of impacts on property, infrastructure, and development.
	Fisheries	Fish harvesting from the ocean and rivers is an important economic activity on the region. This sector includes consideration how ecological impacts may affect the activities or economics of fish harvesting in the region.
	Water supply/ demand	Water supply is physical and programmatic infrastructure that exists in the region to meet residential, industrial, and agricultural water demands. This sector includes consideration of impacts on water supply sources, storage, and conveyance; and changes in patterns of needs based on seasonal temperatures and land-use.
	Energy capacity/ demand	Energy capacity refers to the amount of energy that power plants are able to generate to meet the needs of customers. This sector includes consideration of climate change impacts on energy sources such as hydropower and changes to overall demands and timing.
	Recreation	Abundant natural landscapes and waterways in the region provide excellent aquatic recreation opportunities. This sector includes consideration of how impacts may limit those opportunities for direct experience in the regions coastal ocean, rivers, and wetlands as well as appreciation of wildlife that depend on these resources.

STEP 2) Use available data, models, and scenarios to create projections of regional climatic/ hydrologic variables

Available data were used to determine the direction and degree of change for regional climatic and hydrologic variables. Projected changes to climatic variables, and related responses in hydrologic variables, are presented in Table 57 and Table 58 (below) for the Region's counties and WMAs, respectively.

Climate Models

Climate science and associated models have historically been focused on large spatial scales, but have been more recently been applied to estimating future climatic conditions and expected hydrologic responses at regional and local scales (e.g. county, basin/WMA; Thorne et al. 2012a). There are numerous widely applied global climate models, each with variations in representation of the physical and chemical processes and interactions that drive climate patterns. Therefore, climate scientists often use multiple models (rather than a single model) to evaluate potential future climate patterns and trends, since there is a large amount of uncertainty in the ability to model complex and dynamic systems such as climate. In this CCVA, projections of both climate and hydrologic changes have been derived from a number of different sources that have been published in the scientific literature (e.g. those cited in Table 63 ("Climate Change Vulnerability Assessment of the North Coast Region"). Analyses incorporate two global climate models: the Parallel Climate Model (PCM) and the Geophysical Fluid Dynamics Laboratory (GDFL) Model. Climate projections have been regionally downscaled by independent studies to better represent future conditions in California and specific regions within the state including the North Coast using bias correction and special downscaling (BCSD) for a suite of several models and emissions scenarios made available by the California Energy Commission were downloaded for this assessment (available at www.caladapt.org) which are reported in Maurer et al., 2002.

Emission Scenarios

All projections of future climate, hydrology, and sea level by global climate models are very sensitive to future carbon and greenhouse gas emissions scenarios, which produce a range of projected change. Emissions scenarios are plausible descriptions, without likelihoods, of the future states of the world and are used to estimate future greenhouse gas emissions. They vary based on assumptions about the nature of population growth and economic development in the future and the resultant estimated rates of fossil fuel and greenhouse gas (GHG) emissions. The two most commonly used emissions scenarios are the A2 and B1 scenarios, which provide a reasonable range of potential future emissions. A2 assumes a continued exponential increase in GHG emissions over the next 100-yrs, with some reduction relative to current rates. B1 assumes a significant global reduction in GHG emissions from industrialized and developing nations with the peak in global carbon emission reached in the middle of 21st century and then declining back to carbon emission rates of the 1970s. For the majority of references cited in this synthesis, the A2 and B1 emissions scenarios are used to bracket the high and low projections. Climatic model outputs are expressed in summary metrics that represent an overall shift in certain climate variables over decadal time scales (e.g., mean annual precipitation), changes in spatial patterns (e.g., temperature gradients), or 'extreme event' changes (e.g., magnitude, frequency, and return intervals).

TABLE 57 PROJECTED CHANGES TO CLIMATE & HYDROLOGY OF NORTH COAST COUNTIES

CLIMATIC & HYDROLOGIC VARIABLES	DEL NORTE	GLENN	HUMBOLDT	LAKE	MARIN	MENDOCINO	MODOC	SISKIYOU	SONOMA	TRINITY	REGION
Actual evapotranspiration	-0.24	+0.52	-0.09	-1.03	-1.69	-1.45	+0.16	+0.54	-2.00	+1.42	+3.42
Climatic Water Deficit	+4.64	+5.50	+4.76	+5.76	+5.61	+5.74	+7.60	+6.95	+6.31	+6.20	-0.11
Excess water	-12.57	-12.64	-10.99	-8.54	-3.68	-8.71	-3.02	-7.88	-5.98	-12.41	-6.43
Fire Risk	+0.05	+0.07	+0.05	+0.07	+0.05	+0.06	-0.02	+0.03	+0.06	+0.07	+0.01
Maximum July Temperature	+11.22	+10.39	+9.86	+9.78	+4.30	+9.39	+11.17	+11.88	+6.62	+10.12	+3.50
Minimum January Temp	+5.25	+5.91	+5.18	+5.62	+6.69	+5.88	+6.76	+5.27	+6.56	+5.43	-1.13
Potential Evapotranspiration	+3.34	+3.82	+3.15	+3.90	+3.33	+3.47	+3.78	+3.49	+3.73	+3.46	-0.27
Recharge	-5.57	-0.21	-6.41	-1.87	-0.98	-4.82	-1.18	-3.09	-2.27	-7.03	-4.76
Runoff	-6.43	-12.16	-4.08	-7.70	-3.90	-4.29	-0.13	-2.35	-4.77	-3.77	+1.00
Snowfall	-3.56	-4.61	-4.62	-0.85	-0.09	-1.82	-3.14	-7.94	-0.20	-11.08	-10.88
Snowmelt	-3.05	-3.67	-4.06	-0.57	-0.03	-1.44	-2.23	-6.81	-0.10	-9.69	-9.59
Snowpack	-3.46	-6.62	-8.87	-0.65	0.00	-1.28	-9.00	-25.23	0.00	-25.31	-25.31
Soil water storage	-5.86	-3.25	-14.56	-4.64	-8.33	-9.70	-2.86	-6.03	-11.00	-5.72	+5.28
Sublimation	-0.51	-0.95	-0.56	-0.29	-0.06	-0.39	-0.84	-1.10	-0.10	-1.33	-1.23
Total precipitation	-13.11	-13.06	-11.37	-11.54	-7.14	-11.29	-2.49	-6.45	-9.61	-11.03	-1.42

Source: United States Geological Survey, California Energy Commission after Thorne et al. 2012a

TABLE 58 PROJECTED CHANGES TO CLIMATE & HYDROLOGY OF NORTH COAST WMAS

CLIMATIC & HYDROLOGIC VARIABLES	EEL	HUMBOLDT	KLAMATH	N. COAST RIVERS	RUSSIAN/ BODEGA	TRINITY	REGION
Actual evapotranspiration	-0.31	+0.39	+0.43	-1.36	-2.07	+1.34	+3.41
Climatic Water Deficit	+5.45	+4.74	+6.78	+5.58	+6.16	+5.95	-0.21
Excess water	-11.19	-11.30	-7.54	-9.18	-5.55	-11.91	-6.36
Fire Risk	+0.07	+0.04	+0.02	+0.06	+0.06	+0.07	+0.01
Maximum July Temp	+9.59	+9.01	+11.68	+10.28	+6.67	+10.28	+3.61
Minimum January Temp	+5.59	+5.07	+5.53	+5.62	+6.38	+5.34	-1.04
Potential Evapotranspiration	+3.49	+3.08	+3.49	+3.51	+3.50	+3.34	-0.16
Recharge	-5.61	-7.91	-3.07	-5.15	-2.38	-6.33	-3.95
Runoff	-5.51	-2.62	-2.22	-4.39	-4.18	-3.93	+0.25
Snowfall	-4.44	-5.72	-6.86	-1.42	-0.26	-10.89	-10.63
Snowmelt	-3.75	-5.05	-5.81	-1.19	-0.13	-9.53	-9.40
Snowpack	-6.96	-12.25	-20.48	-2.34	-0.01	-24.60	-24.59
Soil water storage	-11.21	-19.90	-5.41	-8.60	-11.13	-5.45	+5.68
Sublimation	-0.70	-0.64	-1.01	-0.24	-0.13	-1.29	-1.16
Total precipitation	-12.39	-10.95	-6.31	-11.46	-9.25	-10.58	-1.33

Source: United States Geological Survey, California Energy Commission after Thorne et al. 2012

Incorporating Uncertainty

Because climate model outputs have a range of uncertainty and agreement among individual studies, this CCVA provides a measure of "confidence" associated with each of the climate/hydrology projections considered herein (Table 63 "Climate Change Vulnerability Assessment of the North Coast Region). Confidence in the

final "vulnerability" rankings (and priorities identified thereby) is limited by the quality and availability of region-specific data and peer-reviewed literature that were used to score the elements of vulnerability (as described below, vulnerability is a combination of each sector's "sensitivity" and "adaptive capacity." It must be noted that these determinations for both sensitivity and adaptive capacity are somewhat subjective; the credibility of results herein and strength of the CCVA conclusions is supported by the step-wise development process that includes definition of rankings (High, Moderate, Low) and the systematic application of matrices to produce a consistent assessment of the entire (and varied) Region. Table 59 ("Definitions for Climate Change Projection Confidence Ratings") defines the confidence ratings used for the CCVA.

TABLE 59 DEFINITIONS FOR CLIMATE CHANGE PROJECTION CONFIDENCE RATINGS

CONFIDENCE RANKING	DEFINITION
High	General agreement of modeling studies has created consensus in the scientific literature. Available information is directly relevant and applicable to local systems.
Moderate	Scientifically supported but consensus is not present due to lack of information, moderate differences between studies, or limitations for drawing general conclusions from limited scientific information. Accessibility or application of information to local systems may be somewhat limited.
Low	Limited information or conflicting results between studies, model outputs, or research findings. Accessibility or application of information to local systems is very limited.

STEP 3) Analyze projected variables to determine likely regional impacts of climate and hydrology on the sectors

A suite of 48 potential impacts to sectors resulting from changes in climatic and hydrologic variables in North Coast Region were identified using the most credible and recently local and regional scientific literature and publically available datasets. Impacts are evidenced and documented as changes to the state, function, or structure of natural and human systems in the North Coast Region that are thought to be linked to climate (directly) and/or hydrology (indirectly). Such changes have already been detected at global to local scales and are expected to continue (Moser et al. 2009), albeit in largely unpredictable ways. The potential climate-associated impacts listed in Table are not comprehensive, but instead focus on responses related to the health of watershed and aquatic systems in the North Coast Region for which there is a developed body of scientific information. Whenever possible, supporting information has been collated specific to the North Coast Region (or even to the county-level), and in other cases inference is drawn from anticipated impacts throughout the state and for neighboring regions.

STEP 4) Determine sensitivity and adaptive capacity of sectors to projected changes in climatic/ hydrologic variables

Sensitivity

For each impact identified, the sensitivity of sectors to projected impacts was determined via examination of the scientific literature, analysis of climate change projection data, and other sources specific to California or within the North Coast IRWM Region boundary. "Sensitivity" is the degree to which system components within each sector (e.g., wildfire regimes, salmonid populations, or stormwater conveyance) respond to climatic/hydrologic conditions (e.g., temperature and precipitation), including to potential system impacts (e.g., stream temperature increases or snowmelt timing changes). If the sector or sector component is likely to be affected by future climatic conditions then it is considered sensitive (on a relative scale). Table 60 ("Definitions for Sensitivity to Climate Change Impacts") presents the definitions of the relative sensitivity scale. Questions considered when determining the relative degree of sensitivity include:

- What is the degree of exposure to climate change? For example, coastal areas are more exposed to sea level rise related impacts compared to inland areas.
- Would the existing stressors in the system and future climatic conditions exacerbate these stressors? For example, the degree of urban encroachment on forests may be a stressor that promotes greater frequency of wildfire ignitions.
- Is the existing balance of resource demand and supply such that climate may increase demand and/or reduce supply for water-related resources?

TABLE 60 DEFINITIONS FOR SENSITIVITY TO CLIMATE CHANGE IMPACTS

SENSITIVITY	DEFINITION
High	System components are expected to respond measurably to an impact based on historical observations or modeling studies.
Moderate	The response of system components to an impact has not necessarily been measured, but based on our understanding system function there are likely to be direct or indirect responses.
Low	System components do not respond measurably to impacts and based on understanding of system function there are not likely to be direct or indirect responses.

Adaptive Capacity

For each impact identified, the adaptive capacity of sectors was determined via literature review and data analysis. Projected climate/ hydrologic data sources are state or Region-specific. "Adaptive capacity" is the inherent natural ability of a sector or sector component to accommodate an impact that results from projected climate or hydrologic changes. For natural systems, the CCVA assesses the intrinsic ability of system components to adapt without any human intervention such as policy or management action changes. For assessment of human/built/ economic sectors, adaptive capacity assessment may include consideration of the timeframe and level of effort or cost associated with management actions to increase resiliency to a climate change impact. Table 61 ("Definitions for Adaptive Capacity to Climate Change Impacts") presents the definitions of the relative adaptive capacity scale. In determining how adaptable a sector is to altered climatic/ hydrologic regime, the following questions are considered:

- What are current level of stressors and flexibility to respond to future stressors? Can or has the system adapted to historic climatic changes or inclement conditions?
- Are there limiting factors that restrict the system's ability to adapt? For example, sub-alpine species' ability to adjust to future climate can be limited by elevation if they currently exist at the top of the existing elevations.
- Are there any barriers to the system's abilities to accommodate adjustments (legal, physical, biological) in response to future climate?
- How do timescales of adaptation rate compare to the rate of climate changes?
- Are there efforts currently underway that would increase adaptability from human/built/economic sectors?

TABLE 61 DEFINITIONS FOR ADAPTIVE CAPACITY TO CLIMATE CHANGE IMPACTS

ADAPTIVE CAPACITY	DEFINITION
High	System components are expected to accommodate climate changes and expected impacts in ways that avoid negative consequences.
Moderate	The system has some capacity to adjust, and the degree of negative consequences will depend on the magnitude of individual and cumulative impacts.
Low	The system has little or no capacity to accommodate expected impacts so that negative impacts cannot be avoided.

STEP 5) Co-analyze sensitivity with adaptive capacity to determine and rank overall vulnerability of each sector

In the context of this CCVA, "vulnerability" is the susceptibility of a sector to possible detrimental impacts due to changed climate. The vulnerability of systems to specific climate change impacts is determined for this assessment by combining the sensitivity and adaptive capacity ratings in the manner outlined in the matrix below (Table 62 "Matrix to Determine Climate Change Vulnerability"). Sectors that have high sensitivity to climate changes and a low capacity to adapt are considered to be most highly vulnerable to climate change impacts. As sensitivity decreases the weighting of the adaptive capability is preserved, such that even a system component that is considered not sensitive to climate change but has a low ability to adapt is considered moderately vulnerable. The column labeled 'Comments' in Table 63 ("Climate Change Vulnerability Assessment of the North Coast Region") briefly documents specific elements of each sector's sensitivity and adaptive capacity that lead to the final determination of vulnerability. The elements that were considered include physical exposure to the impact, existing stressors, observed or modeled responses, and barriers to adaptation strategies and actions.

TABLE 62 MATRIX TO DETERMINE CLIMATE CHANGE VULNERABILITY

	SENSITIVITY			
ADAPTIVE CAPACITY	**RANK**	High	Moderate	Low
	High	Moderate	Low	Low
	Moderate	High	Moderate	Low
	Low	High	High	Moderate

N.2 SECTORS ASSESSED FOR VULNERABILITY TO CLIMATE CHANGE

Checklist for Developing the List of Potentially Vulnerable Sectors

DWR developed the following checklist to guide preliminary development of a climate change vulnerability assessment framework; the checklist represents a "minimum" effort at climate assessment per DWR IRWM Guidelines (DWR 2012). It will continue to serve as a discussion tool and to help identify data gaps, for questions that cannot be answered at this time. In the following list, ***bold italics*** indicate the question was considered of particular relevance (or was answered in the affirmative) during determination of vulnerability of the North Coast Region sectors.

I. DWR Checklist Sector: Water Demand

NCIRWMP CCVA Sector(s): Water Supply/ Demand

- Are there major industries that require cooling/process water in your planning region?
- Does water use vary by more than 50% seasonally in parts of your region?
- ✔ ***Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?***
- ✔ ***Do groundwater supplies in your region lack resiliency after drought events?***
- Are water use curtailment measures effective in your region?
- ✔ ***Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?***

II. DWR Checklist Sector: Water Supply

NCIRWMP CCVA Sector(s): Water Supply/ Demand

- ✔ ***Does a portion of the water supply in your region come from snowmelt?***
- ✔ ***Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?***
- ✔ ***Would your region have difficulty in storing carryover supply surpluses from year to year?***
- Has your region faced a drought in the past during which it failed to meet local water demands?
- Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?

III. DWR Checklist Sector: Water Quality

NCIRWMP CCVA Sector(s): Riparian, Fisheries, Recreation, Water Supply/Demand

- ✔ ***Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?***
- Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?

- ✔ ***Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?***
- ✔ ***Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?***
- Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?

IV. DWR Checklist Sector: Sea Level Rise

NCIRWMP CCVA Sector(s): Coastal, Urban, Agriculture

- ✔ ***Has coastal erosion already been observed in your region?***
- ✔ ***Are there coastal structures, such as levees or breakwaters, in your region?***
- ✔ ***Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?***
- ✔ ***Are there climate-sensitive low-lying coastal habitats in your region?***
- Are there areas in your region that currently flood during extreme high tides or storm surges?
- ✔ ***Is there land subsidence in the coastal areas of your region?***
- Does part of your region lie within the Sacramento-San Joaquin Drainage District?
- ✔ ***Does aging critical flood protection infrastructure exist in your region?***
- Have flood control facilities (such as impoundment structures) been insufficient in the past?
- Are wildfires a concern in parts of your region?

V. DWR Checklist Sector: Ecosystem and Habitat Vulnerability

NCIRWMP CCVA Sector(s): Forest, Rangeland, Riparian, Coastal, Forestry, Fisheries

- ✔ ***Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?***
- ✔ ***Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?***
- ✔ ***Do climate-sensitive fauna or flora populations live in your region?***
- ✔ ***Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?***
- ✔ ***Does the region rely on aquatic or water-dependent habitats for recreation or other economic***
- ✔ ***Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?***
- ✔ ***Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?***
- ✔ ***Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change (http://www.itsgettinghotoutthere.org)?***
- ✔ ***Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region?***
- Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?

VII. DWR Checklist Sector: Hydropower

NCIRWMP CCVA Sector(s): Energy Demand/ Capacity

- ✔ ***Is hydropower a source of electricity in your region?***
- ✔ ***Are energy needs in your region expected to increase in the future?***
- If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?

N.3 PROJECTED CHANGES TO CLIMATIC & HYDROLOGIC CONDITIONS

Climatic & Hydrologic Variables for the Region, Basins, and Counties

Projected changes in climate (Table 57) and hydrologic (Table 58) variables are adapted from USGS 2012 at California Climate Commons and Thorne et al. 2012a. The GFDL A2 scenario was used to generate projected values. Variables are defined at http://climate.calcommons.org/dataset/10 and listed in Section 6.2.7 ("Distribution and Magnitude of Climatic & Hydrologic Changes").

N.4 PRELIMINARY RESULTS OF CLIMATE CHANGE VULNERABILITY ASSESSMENT

This appendix presents full and summarized results of the Climate Change Vulnerability Assessment (CCVA) that is being conducted for the NCIRWMP. Where appropriate, formal assessment results are supplemented with results from interviews conducted with a diversity of local professional planners throughout the Region. Refinements will be ongoing.

N.4.1 FINDINGS FROM VULNERABILITY ASSESSMENT

Via analyses of the climatic and hydrologic variables described previously, vulnerability (=sensitivity X adaptive capacity) to 48 inter-related impacts was assessed. Table 45 lists these impacts by sector and provides supporting evidence from the recent peer-reviewed scientific literature, a confidence rating, and a recommended (preliminary) vulnerability rating for each sector X impact combination. Vulnerability to projected climatic/hydrologic conditions ranges throughout Region sectors (as well as spatially) from High to Low. Results suggest that the Region's natural/ecological systems (particularly riparian, coastal, and forest systems) are more vulnerable than its built/human/economic systems; however, of the latter, vulnerabilities exist: in fisheries, forestry, infrastructure (e.g. water provision/treatment, flood management), and recreation. Conversely, agricultural sectors, including rangelands, may respond somewhat favorably to projected climate change "impacts." For example, longer growing season and increased forage can be beneficial; however, complicating co-factors (e.g. reduced surface flows, increased drought frequency) may reduce the expression of these theoretical benefits.

The list below summarizes preliminary findings for "vulnerability" of North Coast sectors. Full results follow (Table 45). Note that in the list below, **bold** indicates a sector is leaning strongly toward an end of the spectrum. Refinement of the preliminary results in will ultimately allow the NCRP to direct North Coast resources toward implementation projects that directly or indirectly address regional climate change goals and objectives (while providing additional local benefits).

- *Natural/ Ecological Systems*
  - Riparian: High
  - Coastal: Moderate-High
  - Forests: Moderate-High
  - Rangelands: Moderate
- *Built/ Human/Economic Systems*
  - Agriculture: Moderate-High
  - Fisheries: Moderate-High

- Forestry: Moderate-High
- Recreation: Moderate-High
- Urban/ Infrastructure: Moderate-High
- Water Supply & Demand: Low-Moderate
- Energy Capacity & Demand: Low

N.4.2 FINDINGS FROM TARGETED INTERVIEWS

Interviews[3] conducted in 2013 indicate uncertainty among local planning professionals about forecasting regional vulnerability to climate. The issue is exacerbated by data gaps related to sea level rise (28% identified), climate modeling (18%), and planning (15%); Figure E6 "Data Gaps: Climate Change".

The NCRP includes allowances for improved energy efficiency in its approach to climate change mitigation. Figure E5 ("Data Gaps: Energy Efficiency") indicates data gaps that may hinder progress toward local and regional energy efficiency and independence. Energy-related data gaps identified by respondents primarily concerned renewable energy (35% identified), historic and projected energy consumption (18%), and energy grid transmission capacity and disaster readiness (17%).

Interviews suggest that "climate change" *per se* is not a major concern shared by professional planners in the Region (5% identified; Figure E3 "Data Gaps: Local Planning"). However, of those who did express concern for vulnerabilities to climate change (Figure E7 "Climate Change Vulnerabilities"), the majority of responses were related to sea level rise (28%), followed by flooding, fires, and agriculture (11% each).

TABLE 63 CLIMATE CHANGE VULNERABILITY ASSESSMENT (CCVA), NORTH COAST REGION

*"Drivers Of Change" are listed for each impact to which they are most directly connected: Average maximum air temperatures (AMT), Air temperature variability (ATV), Annual precipitation totals (APT), Precipitation variability (PV), Sea Level (SL), Droughts (D), Potential evapotranspiration (PET), Groundwater recharge (GWR), Potential evapotranspiration (PET), Annual runoff (AR), Runoff variability (RV), Snow Pack (SP), Flooding (F).

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Forest	AMT ATV PV D PET	Increased wildfire frequency, extent, and intensity	Fried et al. 2004 FRAP, 2010; Flannigan et al., 2000 Westerling et al. 2006 Westerling and Bryant , 2008 Lenihan et al., 2008	High	Moderate	High	High	Forests are extensive throughout the region indicating high exposure to this impact. Current stressors include encroachment at the urban –wildland interface. Forests will adapt to shifting wildfire regimes over the long term but may not do so quickly enough to avoid harm ecosystems.
Forest	AMT ATV PV D PET	Shift from conifer dominance to mixed evergreen hardwood species	FRAP, 2010 Lenihan et al., 2006 PRBO, 2011 Lenihan et al., 2008 Barr et al. 2010	High	Low	High	High	The majority of forests in the North Coast region are conifer dominated, indicating high exposure. Modeling studies generally show that forest composition will shift to mixed evergreen hardwoods rather than adaptation of the conifers indicating low adaptive capacity to this impact.

3 NCRP Partner and Stakeholder Interview Synthesis 2013. Counties, municipalities, Resource Conservation Districts, and non-profits were represented in the interviews. (71 professional planners contacted; 41 interviewed by December 2013.) http://www.northcoastirwmp.net/docs.php?oid=1000009380&ogid=1000002207. See also Appendix L "Stakeholder Analysis & Integration."

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Forest	AMT ATV PV D PET	Shift in forest species ranges towards higher elevations, loss of subalpine habitat	Lenihan et al., 2006 PRBO, 2011	Moderate	Low	High	High	Primarily mountainous portions of the region will be affected. Habitat fragmentation may limit adaptation in some areas as will the highest elevations that occur in the region. This impact may affect several rare, threatened, or endangered species that live in the region's forests.
Forest	AMT ATV PV D PET	Increased tree mortality due to combined effects to insects, disease and drought	Hansen and Weltzin, 2000 Shugart, 2003 Barr et al., 2010	High	Moderate	High	High	Forests are extensive throughout the region indicating high exposure. Forests will adapt to changes over the long term but may not do so quickly enough to avoid harm to ecosystems.
Forest	AMT ATV PV D PET	Reduction of coastal redwood forest habitat	Flint and Flint, 2012	High	Low	High	Moderate	Large portions of the region provide redwood habitat that exists in a very narrow zone of climate tolerance indicating high exposure. Simulation studies indicate dramatic contractions in the geographic envelope that will support redwood forest in simulation studies indicating low adaptive capacity. Severity of the reduction in suitable habitat is dependent on CO2 emissions scenario, which adds uncertainty to this impact.
Forest	AMT ATV PV D PET	Vegetation production increases and timing changes	FRAP, 2010 Shugart, 2003 Hansen and Weltzin, 2000	Moderate	Moderate	Moderate	Low	Forests are extensive throughout the region indicating high exposure. Complex interactions of enhanced CO2, temperature increases, and hydrologic changes contribute to uncertainty of changes.
Rangeland	AMT ATV PV D PET	Conversion of scrublands and woodland to grasslands	FRAP, 2010 Pierson et al., 2008	Moderate	Moderate	Moderate	Low	Scrublands and woodlands are a smaller portion of the region compared to forests indicating moderate exposure. Modeling studies indicate conversion may occur in some areas rather than adaptation. Limited information and contributes to low confidence for this impact. Complex interactions of enhanced CO_2, temperature increases, and hydrologic changes contribute to uncertainty of changes.
Rangeland	AMT ATV PV D PET	Increased stress on drought intolerant plant species and inundation by invasive grasses	Cayan et al., 2006 Thorne, et al., 2012a	Moderate	Moderate	Moderate	Moderate	Drought tolerant invasive species will have a competitive advantage during summer months in the future. No specific modeling evidence for the region was identified but this impact is directly tied to future temperatures contributing to moderate confidence. Complex interactions of enhanced CO_2, temperature increases, and hydrologic changes contribute to uncertainty of changes.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Rangeland	AMT ATV PV D PET	Vegetation production increases and timing changes	FRAP, 2010 Shaw et al., 2009 Chaplin-Kramer, 2012 Cornwall et al., 2012 Ekstrom and Moser, 2012	Moderate	Moderate	Moderate	Low	Rangelands are a smaller portion of the region compared to forests indicating moderate exposure. Complex interactions of enhanced CO_2, temperature increases, and hydrologic changes contribute to uncertainty of changes.
Riparian	AMT ATV D RV SP GWR	Reduced aquatic habitat extent and quality with reduced summer base flows, stream temperature increases, and increased pollutant concentrations.	Moyle et al., 2012a Moyle et al., 2012b Ekstrom and Moser, 2012 PRBO, 2011 NMFS, 2012 Medellín-Azuara et al., 2008 Barr et al., 2010 NCIRWMP, 2007	High	Low	High	High	The North Coast region has the highest amount of high priority riparian zones in the state: locations where high value water supply coincides with other threats which are areas that should be prioritized for restoration. Riparian areas provide habitat for several rare, threatened, or endangered species. Smith River and tributaries, Klamath River and tributaries, Scott River, Salmon River, Trinity River, Eel River, and Van Duzen River are all federally designated Wild and Scenic Rivers. These factors indicate high exposure. Surplus moisture delivered in winter is not expected to provide a sufficient buffer to avoid summer low flow reductions indicating low adaptive capacity. Water bodies that drain approximately fifty-nine percent of the area in the North Coast Region are listed as impaired due to sediment under Section 303(d) of the Clean Water Act.
Riparian	AMT ATV	Increased thermal stress on cold water fish, amphibian, and invertebrate species and a shift in thermal spawning conditions to earlier in the year	Porinchu et al., 2010 Melack et al., 1997 Parker et al., 2008 PRBO, 2011 Barr et al., 2010 NCIRWMP, 2007	High	Low	High	High	Salmonids live within a narrow water temperature range directly correlated to air temperatures, outside of which survival is affected. Current stressors include riparian degradation with loss of shade cover and reduced baseflow which will limit adaptive capacity in the future. Several rare, threatened and endangered species may be negatively impacted such as the Northern Red Legged Frog.
Riparian	RV F	Increased landslides and sediment loading to streams following wildfires and high intensity rainfall events	FRAP, 2010 NCIRWMP, 2007	High	Low	High	Moderate	Large proportions of the region's watersheds are forested and thus exposed to this impact that results from wildfire regime shifts. Some of the most sensitive beneficial uses are currently impacted by sediment. Those uses are associated with the migration, spawning, reproduction, and early development of coldwater fish such as coho salmon and steelhead trout. Uncertainty in rainfall projections contributes to lack reduced confidence in this impact.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Riparian	AMT ATV D RV SP GWR	Decreased native fish habitat distribution and population declines	Knapp et al., 2001, Pope et al., 2009 Moyle et al., 2012a Moyle et al., 2012b Ekstrom and Moser, 2012 NCIRWMP, 2007	High	Low	High	Moderate	Populations of these fish currently are low and habitat conditions generally are poor; these circumstances are likely to deteriorate further with projected climate change. Coho salmon have experienced a significant decline in the past 40 to 50 years. Coho salmon abundance, including hatchery stocks, has declined at least 70% since the 1960s, and is currently 6 to 15% of its abundance during the 1940s. Current stressors include riparian degradation, sediment delivery from logging roads, dams and other hydro modifications. These stressors can affect the migration, spawning, reproduction, and early development of coldwater fish such as coho salmon and steelhead trout. Dependence of salmonids populations on ocean dynamics adds to uncertainty to this impact.
Coastal	SL	Increased coastal erosion	Cayan et al., 2008a Cayan, et al., 2009 Bromirski et al., 2005 Laird, 2013	High	Low	High	Moderate	A substantial portion of the region lies adjacent to a coastline, indicating exposure to erosion increases with sea level rise. In the absence of coastal armoring, there is very little natural adaptive capacity that can mitigate beach erosion or seacliff retreat. No specific estimates of increased coastal erosion rates were identified for the region.
Coastal	SL	Landward migration of intertidal marine species with sea level rise	Cayan et al., 2008a Laird, 2013	High	Moderate	High	High	If the coastal plains are not developed, landward migration of intertidal species with sea level is possible. The regions beaches are rugged and mountains or steep hills often extend to the shoreline. In several areas there are limited low-lying areas where intertidal marine species can migrate. Additionally many of the coastal low lying areas such as Humboldt Bay and Crescent City have been urbanized thus limiting adaptive capacity near these locations.
Coastal	SL	Reduced extent of tidal marshlands and other wetlands	PRBO, 2011 Langley et al., 2009 Stralberg et al., 2011 Ekstrom and Moser, 2012 Laird, 2013	High	Moderate	High	High	Tidal marshlands throughout the region provide essential habitat for fish, amphibians and migratory sea birds in addition to buffering developed areas from flooding indicating exposure to this impact. Where landward migration of tidal marshlands in not possible due to local topography or urbanization, tidal marshlands will disappear.
Coastal	AMT RV D SL	Shifts in sea bird species migration patterns	PRBO, 2011	High	Moderate	High	Low	The region is home to several species of seabirds that use coastal wetlands of the region for breeding, foraging and resting indicating exposure to this impact. Earlier onset of summer, habitat and food availability changes will affect migration patterns. Complex interactions of seasonal temperature changes with dynamics of the California current (also subject to climate impacts) contribute uncertainty of the severity of changes.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Coastal	SL	Increased frequency and spatial extent of flooding of coastal lowlands	PRBO, 2011 Bromirski et al., 2012	High	Low	High	High	Since a large portion of the region is coastline including several developed areas there is substantial to exposure to the increase of sea level driven flooding risks.
Coastal	-	Reduction in shell forming ability of mollusks due to higher ocean pH	Michaelidis et al., 2005 Shirayama & Thornton 2005 Kleypas et al., 1999 Riebesell et al., 2000 Feely et al., 2004 Harley et al., 2006	High	Low	High	High	Shellfish are abundant in the region and there is substantial evidence to indicate that they will not be able to adapt to ocean chemistry changes quickly enough to avoid negative effects on species populations.
Coastal	AMT ATV	Changes to the timing and intensity of coastal upwelling	Cayan, et al., 2009 Bromirski et al., 2012 Pisias et al., 2001 Snyder et al., 2003	Moderate	Moderate	Moderate	Low	Proximity of the region to coastal currents indicates exposure to this impact. Increasing temperatures will stratify ocean waters, while the current dynamics and winds will promote upwelling. These two forces work counter to one another contributing uncertainty to the timing and severity of changes to the California Current dynamics.
Forestry	AMT ATV PV D PET	Increased tree mortality due to combined effects to insects, disease and drought	Hansen and Weltzin, 2000 Shugart, 2003 Barr et al., 2010	High	Moderate	High	Moderate	A large portion of the region's area is subject to forest management indicating exposure to this impact. Timber harvest is a current stressor that may exacerbate consequences of this impact. Complex interactions of enhanced CO2, temperature increases, and hydrologic shifts contribute to uncertainty of changes.
Forestry	AMT ATV PV D PET	Reduced conifer timber harvest	Hannah et al., 2011	High	High	Moderate	Moderate	Timber is in the top 2 grossing agricultural industries in 5 of 7 of the North Coast Counties indicating exposure to this impact. Current stressors include wildfires, human encroachment into forests, insects and disease. Timber harvest practices can be altered to mitigate changes indicating high adaptive capacity.
Forestry	AMT ATV PV D PET	Increased costs of fuels management and fire suppression	Joyce et al., 2008	High	Moderate	High	Moderate	Increasing wildfire risks and human encroachment to forests exposes the forest management to increased costs to manage ignitions and damage from fires. Enhanced practices resulting from new research may reduce costs and increase adaptive capacity.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Agriculture	AMT ATV PV D PET	Crop type changes and geographic pattern shifts	Moser et al., 2009 Jackson et al., 2012a Thorne, et al., 2012a Ekstrom and Moser, 2012 Jackson et al., 2012b Diffenbaugh et al., 2011 Jones et al., 2010 Barr et al., 2010	High	Moderate	High	High	Climate is likely to become unsuitable for high value crops such as grapes, fruits and nuts indicating exposure to this impact. Zones of suitability for fruits and nuts will be reduced with rising temperatures, especially wine grapes. New or modified farming techniques may mitigate the need to change growing locations to some degree.
Agriculture	AMT ATV PV D PET	Enhanced forage production but reduced forage reliability during drought years	Shaw et al., 2009; Chaplin-Kramer, 2012 Cornwall et al., 2012 Ekstrom and Moser, 2012	Moderate	Low	High	Low	Cattle ranching are one of the top 5 grossing agriculture industries in 6 of the 7 North Coast counties that depend on reliable forage production indicating exposure to this impact. Complex interactions of enhanced CO_2, temperature increases, and hydrologic changes contribute to uncertainty of changes.
Agriculture	AMT	Longer growing season with shift towards longer summers	Thorne, et al., 2012	High	High	Moderate	High	While many crops in the region are affected by this impact, growers can adjust to changes simply by planting earlier in the season.
Agriculture	AMT ATV PV D PET	Increased wine grape yields but reduced quality	Chaplin-Kramer, 2012 Ekstrom and Moser, 2012 Jones et al., 2010 Diffenbaugh et al., 2011 Jones et al., 2010	High	Moderate	High	High	Climate changes will alter the economics of wine producing regions. Willamette valley in Oregon may become like Napa is today. Exposure to this impact is based on economic importance of these crops. Growers can adapt with grape breeding, but climate that will be as warm as Napa will be in 2050 would be a table grape region today rather than some of the varieties that the Napa region is currently known for.
Agriculture	AMT PET	Increased irrigation water demand during summer	Jackson et al., 2012a Thorne et al., 2012a Jackson et al., 2012b	High	High	Moderate	High	Hotter, longer summers will mean that that most crops will require more water indicating exposure to this impact. Current water demands for crops and ecosystem services are the key existing stressors that will be exacerbated with projected climate changes. Conservation practices or crop type changes contribute to adaptive capacity.
Agriculture	SL RV	Increased risk of field damage from flooding in coastal low lying areas	Laird, 2013 Cayan et al., 2008a	Moderate	Moderate	Moderate	Moderate	The greatest increase in the risk of damage due to floods is in coastal low lying areas. Only 2% of land is dedicated to agriculture and urban land uses. Land use maps indicate that much of the agriculture in the region occurs in coastal lowland areas such as Arcata and Crescent City with some degree of exposure to flood damage, but is a small percent of land use in the region. Flooding damage will also be dependent on rainfall pattern changes which are less certain than sea level rise

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Urban	SL RV	Increased risk of property and infrastructure damage from flooding	Moritz and Stephens, 2008 Jones and Goodrich, 2008 Laird, 2013	Moderate	Moderate	Moderate	Moderate	Low lying communities in the region are anticipated to suffer an increase in acreage flooded by 2100 by approximately 17-18%. Relative to other California coastal areas this is a moderate increase, when compared to more populous coastal areas of the state which have projected inundation increases of ranging from 30-46%
Urban	AMT ATV PV D PET	Increased risk of property and infrastructure damage from wildfires	Thorne et al., 2012b Moritz and Stephens, 2008 Jones and Goodrich, 2008	High	Moderate	High	Moderate	Population increase in the future will mean further pressure for development to encroach into forests and greater damage to property with increasing wildfire occurrence and extent risks. Land-use planning policies are a means of increasing adaptive capacity to climate change and altered fire regimes to mitigate risks of property damage.
Urban	SL RV	Increased erosion risk for coastal development	Cayan et al., 2008a Cayan, et al., 2009 Bromirski et al., 2005 Laird, 2013	High	Low	High	Moderate	The region contains about 400 miles of shoreline all of which are at risk to erosion with projected sea level rise. The major developed areas on the coast in the North Coast region include Santa Rosa, Arcata, and Crescent City which are all exposed to this impact. However, much of the coastline is sparsely populated and undeveloped relative to other coastal regions of the state.
Urban	RV	Increased winter stormwater conveyance requirements	Jones and Goodrich, 2008 Cayan et al., 2009	Moderate	Moderate	Moderate	Low	The possibility of more frequent intense rainfall events may require greater capacity requirements for urban infrastructure. Adaptation actions such as retrofitting culverts, bridges, and storm drains would be a high cost endeavor is required. Uncertainty surrounding rainfall projections contributes to low confidence.
Urban	AMT ATV PV D PET SL RV	Greater constraints on land-use and new development	Moritz and Stephens, 2008 Jones and Goodrich, 2008	Moderate	Moderate	Moderate	Low	Increasing population creates greater development pressure on ecosystems at the urban-wildland interface. Increased flooding and wildfire risks may crate the need to place constraints on development to avoid unnecessary risks to life and property.
Water supply/ demand	SP	Reduced spring snowpack water supply storage	Cayan et al., 2009 FRAP, 2010 Anderson, 2008 Mote et al., 2005 Hayhoe et al., 2004	Low	Low	Moderate	High	Reduced snowpack is expected but majority of watersheds in the region are rain fed. While a snowpack loss of 73 to 90% (estimated in the PCM model in the Sierras) may stress aquatic ecosystems with lower base flows in summer months, much water supply in the region is met with groundwater sources and groundwater fed springs.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Water supply/ demand	GWR RV D AMT SP	Increased risk of water conflicts between urban, agriculture, and ecosystems	Barr et al., 2010 PRBO, 2011 Elkind et al., 2012 NC RWQCB, 2011	High	High	Moderate	High	Major water supply projects in the region include the U.S. Bureau of Reclamation Klamath Project, the U.S. Army Corps of Engineers Russian River Project, the Humboldt Bay Municipal Water District Ruth Reservoir, and the U.S. Bureau of Reclamation Trinity Lake Reservoir. The Klamath Project has been extremely controversial because to maintain adequate instream fishery flow to ensure the survival of endangered salmonid populations, coordination between many jurisdictions is necessary. Water to farms has at times been cut off to prevent harm to the fisheries, resulting in extreme controversy, and in some cases, violence. Currently, surplus surface water is exported out of the region for use elsewhere in the state, but reduced snowpack storage may tax existing resources are require changes to satisfy all existing water supply needs in the region.
Water supply/ demand	GWR RV D AMT SP	Increased dependence on groundwater supply in summer months	NC RWQCB, 2011 Ekstrom and Moser, 2012	High	High	Moderate	Moderate	Most basins within the region depend on groundwater or groundwater fed springs indicating exposure to this impact. Current resources are adequate to meet current and projected needs indicating resilience to changes and a high adaptive capacity.
Water supply/ demand	GWR SL	Increased seawater intrusion to coastal groundwater aquifers	PRBO, 2011 NC RWQCB, 2011	Low	Moderate	Low	Moderate	Rising sea level will increase the potential for seawater intrusion indicating exposure to this impact for coastal communities. Given the adequate groundwater basin recharge that occurs, saltwater intrusion is not generally a problem in North Coast groundwater basins.
Energy demand/ capacity	AMT ATV	Increased summer energy demand during heat waves	Hanuk and Lund 2008 FRAP, 2010 Barr et al., 2010 NCIRWMP, 2007	Low	High	Low	High	The Iron Gate Reservoir in Siskiyou County provides energy for a hydroelectric facility owned by Pacific Power and Light Company. Future electricity demand will rise due to increased population and needs for home cooling, refrigeration, water (which requires energy to transport), and power supplies for an ever-increasing number of small electronics. At the same time, efficiency and reliability of power transmission and delivery is likely to decline as power lines are stressed with higher ambient temperatures and increased risk from wildfires. As a result, more brownouts and blackouts are expected. Much of the region's climate is moderated by its proximity to the ocean, reducing seasonal temperature variation. Energy conservation and energy efficient development will be responses to mitigate increased demand.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Energy demand/ capacity	SP	Reduced hydropower energy generation capacity in spring/summer	Madani and Lund, 2010 Vicuna et al., (2008) FRAP, 2010 Ekstrom and Moser, 2012 Spears et al., 2012 NC RWQCB, 2011 Barr et al., 2010	Low	Moderate	Low	Low	While hydropower is used in the region indicating exposure to this impact, it is not generated at high elevation dams. While lake levels may be reduced in summer months, the projected reductions in snowpack would primarily affect hydropower generation at higher altitudes.
Fisheries	AMT ATV	Shift in marine productivity patterns as a result of nutrient upwelling changes	Snyder et al., 2003	High	Low	High	Low	Fishing is an important industry in the region with economic exposure to climate induced changes of ocean dynamics and chemistry. Complex interactions of seasonal temperature changes with dynamics of the California current, and productivity changes that may occur in other fisheries contribute uncertainty of the severity of the economic impacts.
Fisheries	AMT ATV D RV SP GWR	Decreased terrestrial cold water fish yields associated with inland habitat degradation	Knapp et al., 2001 Pope et al., 2009 Moyle et al., 2012a Moyle et al., 2012b NMFS, 2012 Barr et al., 2010 Medellín-Azuara et al., 2008	High	Low	High	Low	Increased erosion is likely to impact the spawning of native fish such as lamprey, suckers, salmon, and trout that build their nests in areas of clean rocks and gravels. Greater levels of fine-sediment input will increase nutrient concentrations in aquatic systems and contribute to algae blooms. Current stressors on fish population will limit adaptive capacity in the future.
Fisheries	SL	Landward migration of salmonid rearing habitats	Cayan et al., 2008a Laird, 2013	High	High	Moderate	High	Rearing habitats will migrate landward with sea level rise. As long as there are not barriers near the coast to migration, rearing habitats should be able to shift upstream from their current locations.
Fisheries	-	Reduced oyster and clam farm productivity due to ocean chemistry changes	Michaelidis et al., 2005 Shirayama & Thornton 2005 Kleypas et al., 1999 Riebesell et al., 2000 Feely et al., 2004 Harley et al., 2006	High	Moderate	High	Low	Interference with the shell building ability of mollusks will expose oyster and clam farms to greater mortality in the future. Farms will may identify new or modify existing practice to adapt their businesses and remain viable.

SECTOR	DRIVER* OF CHANGE	EXPECTED IMPACTS	SUPPORTING EVIDENCE	SENSITIVITY	ADAPTIVE CAPACITY	OVERALL VULNERABILITY	CONFIDENCE RATING	COMMENTS
Recreation	RV SP GWR D	Shortened river rafting, boating, and sport fishing season and quality	Morris and Walls, 2009 Cayan et al. 2009	High	Moderate	High	Moderate	Recreation activities that depend on summer river flows and good water quality are exposed to impacts as summer low flows are reduced in rivers due to longer, hotter summers and less snowmelt. There is very little opportunity for adjustment of these activities other than altering dam release patterns upstream.
Recreation	RV SP GWR D	Shortened backcountry skiing season	Morris and Walls, 2009 Cayan et al., 2009 Goodstein and Matson, 2004	Moderate	Low	High	High	Opportunities for snow-dependent recreation will be reduced along with the snowpack decline. There is very little opportunity for adjustment of these activities with less snow pack available.
Recreation	RV SP GWR D	Reductions in hunting and wildlife viewing opportunities	Morris and Walls, 2009 Cayan et al., 2009	Moderate	Moderate	Moderate	Low	Hunting and wildlife viewing opportunities are dependent on healthy animal populations and associated habitats. Potential habitat degradation in the future exposes this recreation opportunity to impacts from changing climate and hydrologic conditions. New wild areas may become more suitable or made more accessible in response to changing conditions. The extent of limitations is uncertain since they depend on a host of complex system responses to changed climate conditions as well as human behavior patterns.
Recreation	RV SP GWR D	Reduced wildland recreation opportunities and viewshed quality	Morris and Walls, 2009 Cayan et al., 2009	Moderate	Moderate	Moderate	Low	Wetland, riparian, and mountain areas that support recreational fisheries and unique bird populations in the region exposed to climate change impacts such as sea level rise and longer, drier summers. New wild areas may become more suitable or made more accessible in response to changing conditions. The extent of limitations is uncertain since they depend on a host of complex system responses to changed climate conditions as well as human behavior patterns.

N.5 STRATEGIES TO REDUCE CLIMATE-RELATED VULNERABILITIES

Next steps[4] in North Coast Climate Change Analysis, per DWR IRWM Guidelines, are:

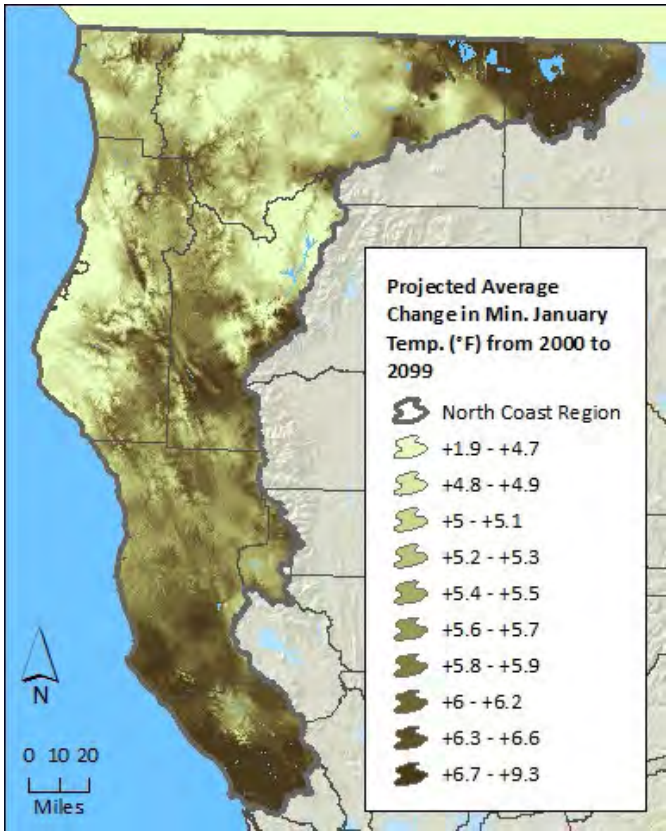
- Continue to refine list of vulnerabilities and prioritize list as feasible, based on NCRP and local stakeholder input
- Identify potential adaptation actions/ strategies for highly vulnerable components (sectors, geographic areas, other attributes) of the North Coast Region [*available late 2014*]
- Develop with the NCRP of a more formal process to explicitly incorporate specific climate change considerations into ongoing NCIRWM planning processes, project prioritization, and plan evaluation.

4 Proposed for further development during 2014/2015 by NCRP PRP, TPRC, ad hoc committees, project proponents, and other stakeholders with assistance from agency and other personnel with expertise in the field of Strategy Development as related to climate vulnerability in the North Coast Region.

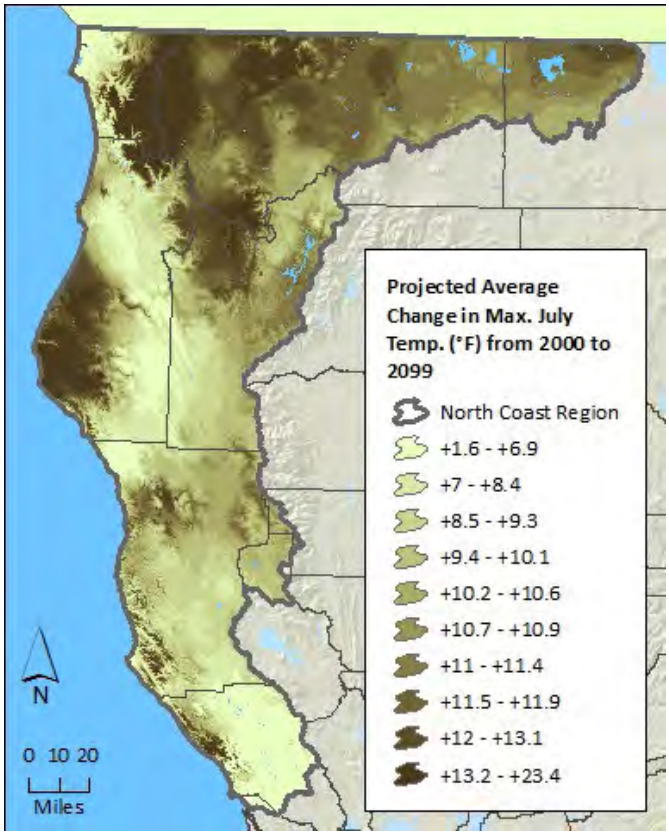
- Improve resolution of CCVA analyses. Refinement of this CCVA should include development of a comprehensive climate change adaptation/ mitigation plan that can be implemented strategically to suit the priorities of local stakeholders throughout the Region.
- Provide more precise (ideally quantitative) estimates of impacts and vulnerabilities in different areas, future analyses should incorporate climatic and hydrologic datasets, which provide high-resolution data for assessment results that accurately represent the wide range of anticipated climate change effects in areas of interest (e.g. counties, communities, basins, WMAs/watersheds, etc.).
- Identify and coordinate with existing and developing climate vulnerability studies that may already be occurring in the Region. For example, North Coast Tribes have developed a "Tribal Communities Climate Change Vulnerability Matrix" [5]that is compatible with the preliminary climate change vulnerability assessment developed by the NCRP.

N.6 SPATIAL DISTRIBUTION OF PROJECTED HYDROLOGIC & CLIMATIC CHANGES

A suite of 23 high-resolution maps were developed in association with the data analysis presented in Tables 57 and 58. The maps (N1-N23, below) may allow planners to better visualize past, current, and future conditions at the local level. Data for the climate maps are adapted from USGS 2012 and Thorne et al. 2012a. The definitions of each assessed variable are provided by the California Climate Commons6. Table 79 "Technical Sources, Resources, & Tools" compiles the map data sources.

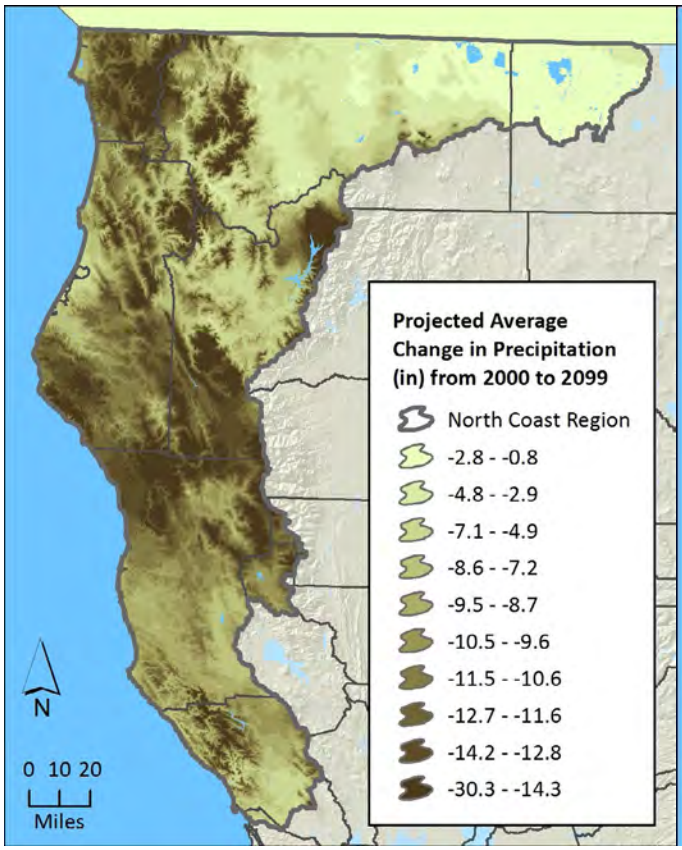


Map N1

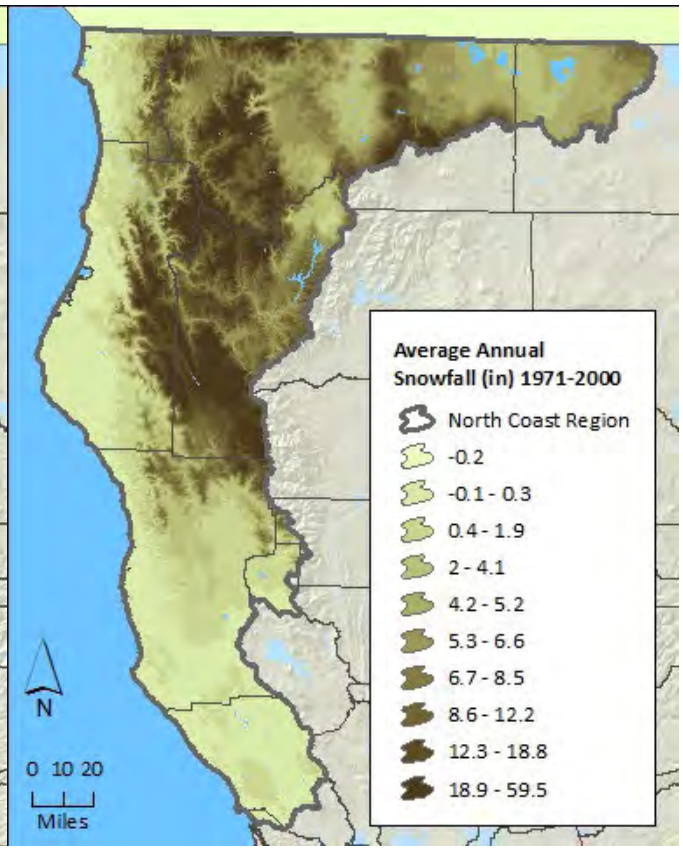


Map N2

5 For more information on the Tribal climate change assessment (August 2013 Draft), contact Department of Water Resources erin.chappell@water.ca.gov
6 California Basin Characterization Model (BCM) downscaled climate and hydrology http://climate.calcommons.org/dataset/10



Map N3



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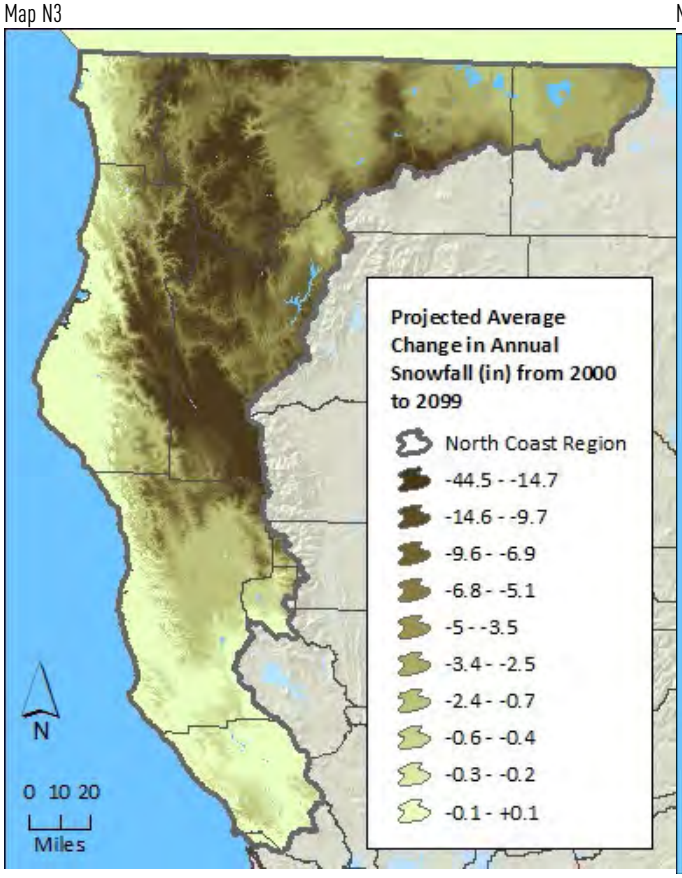

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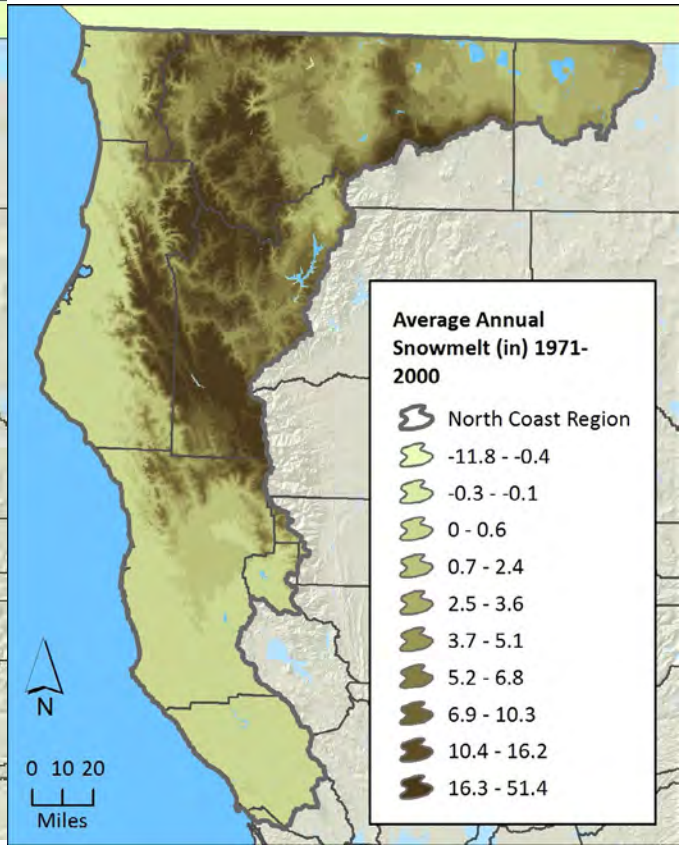

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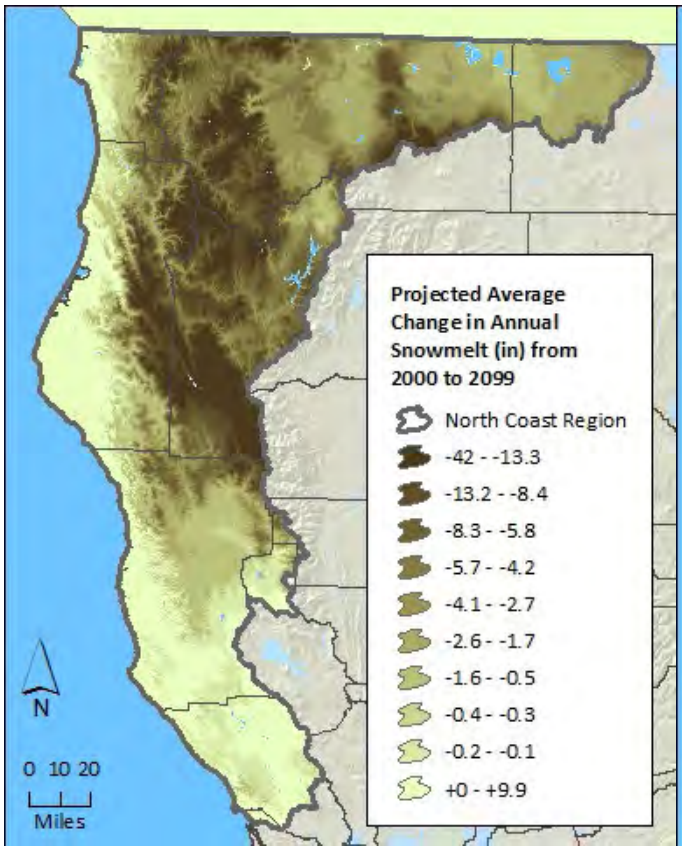

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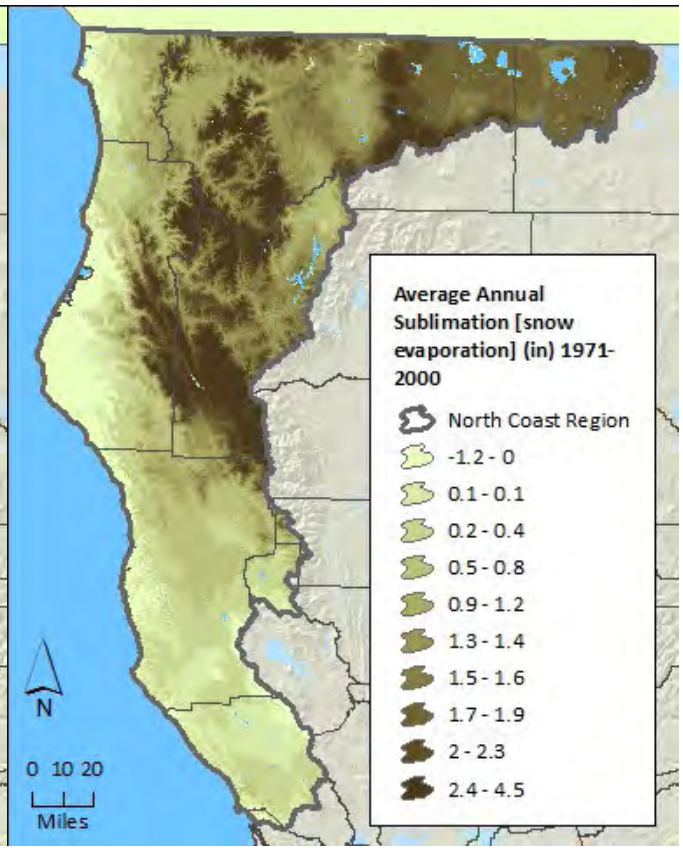

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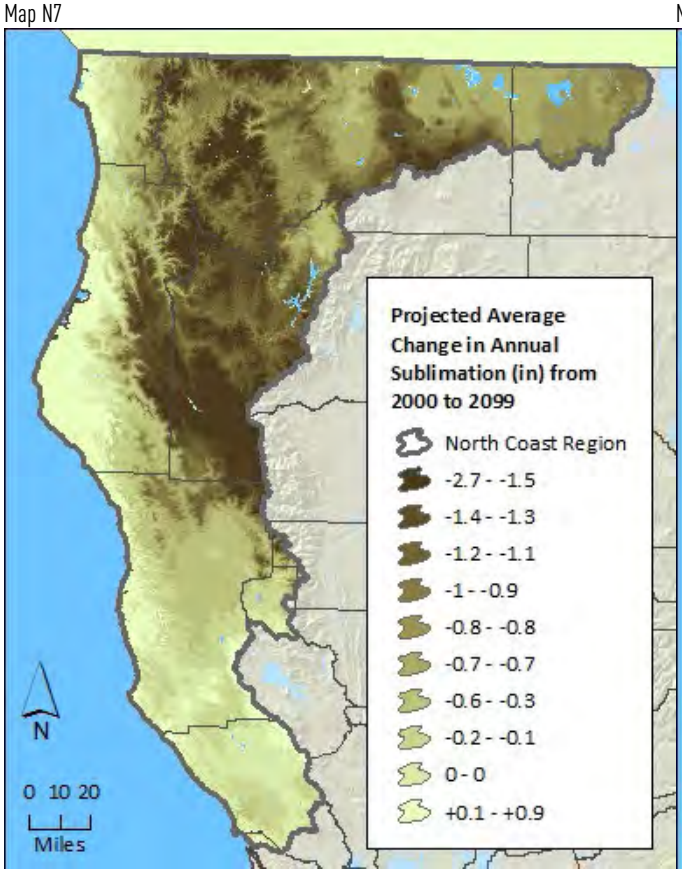

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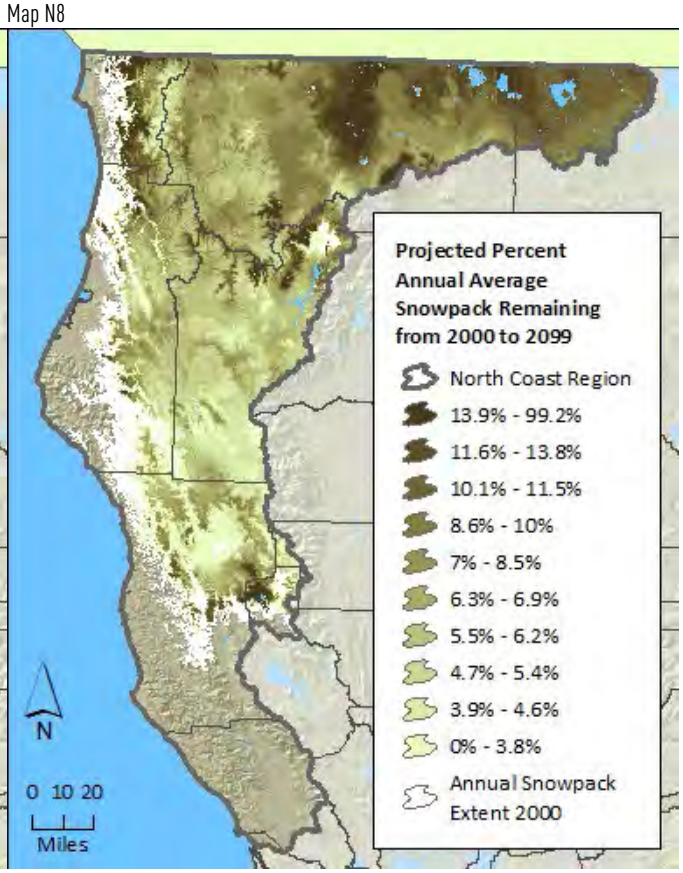

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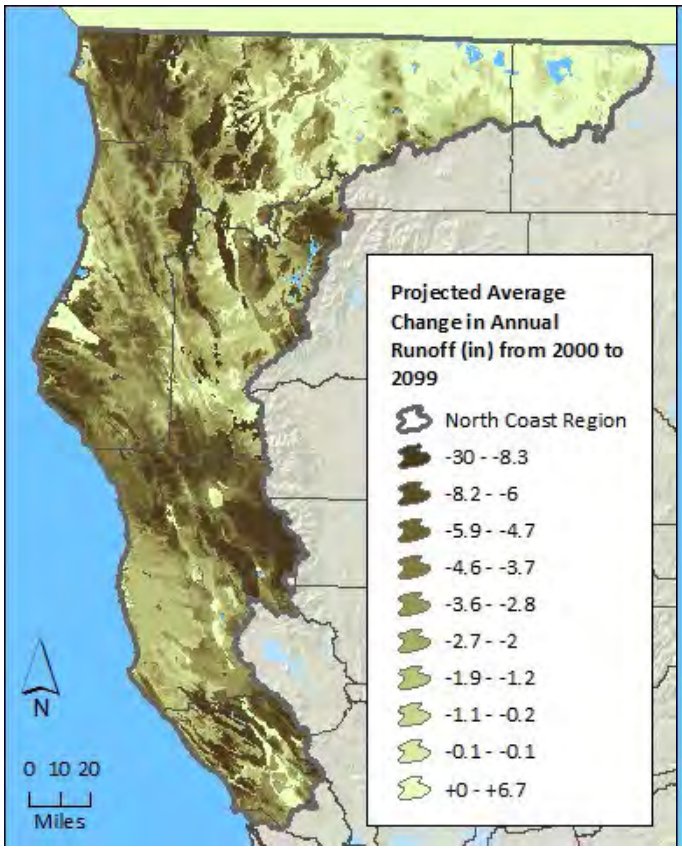

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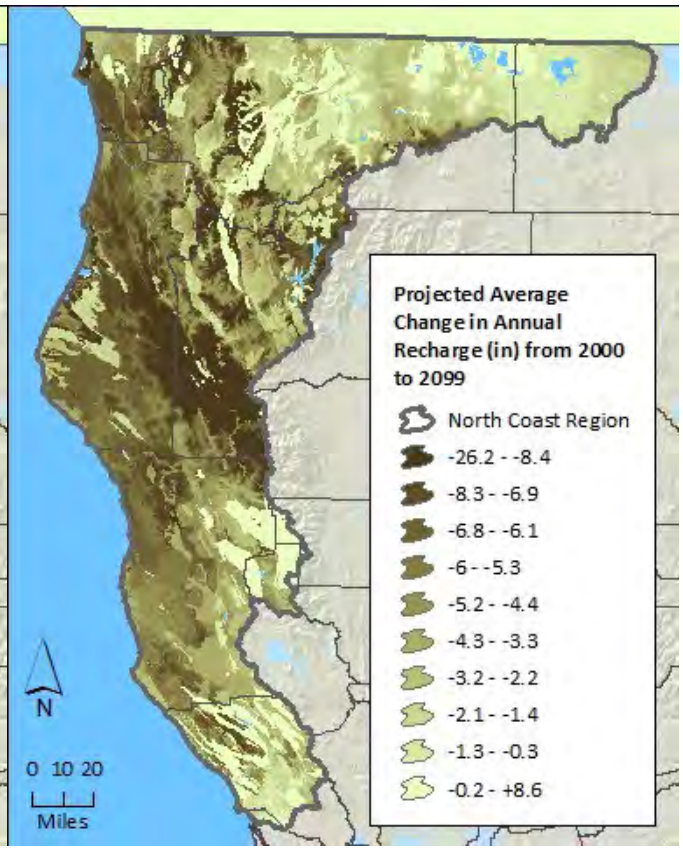

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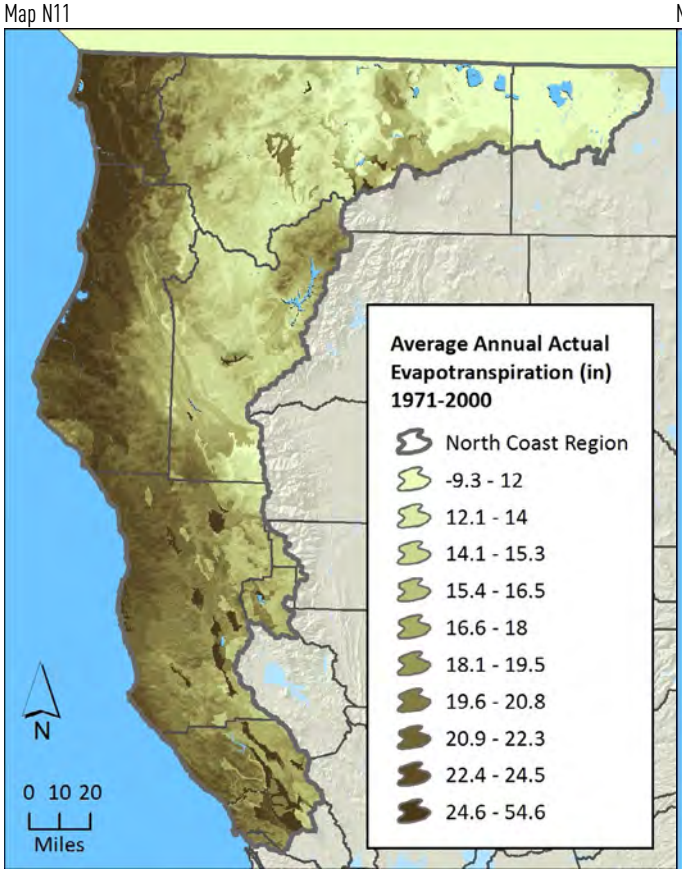

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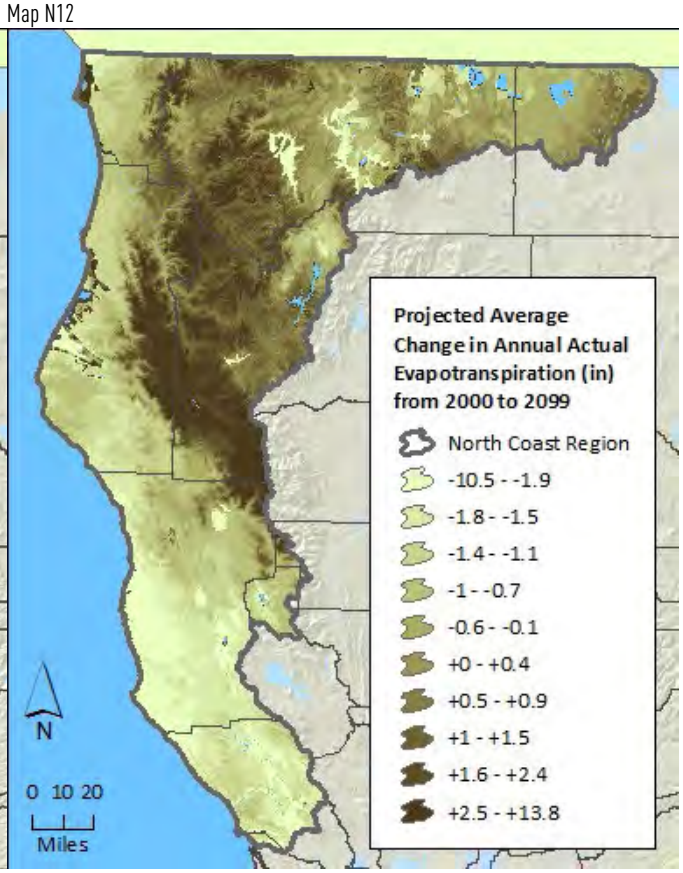

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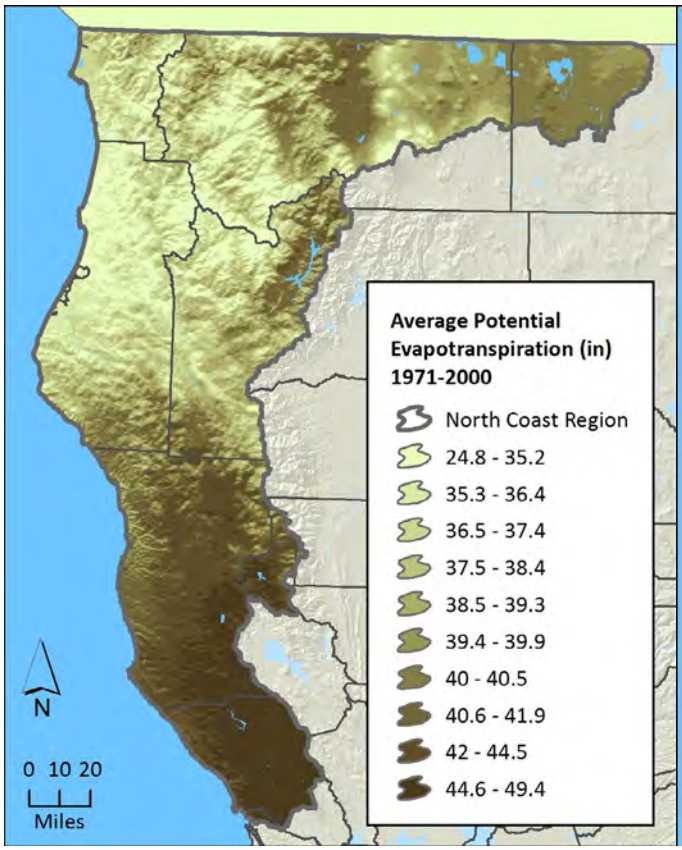

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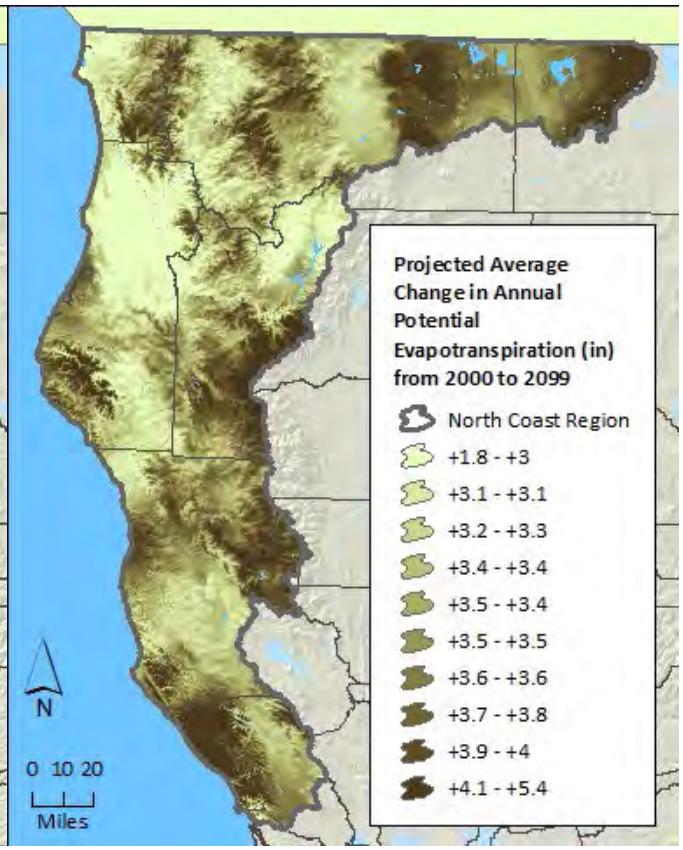

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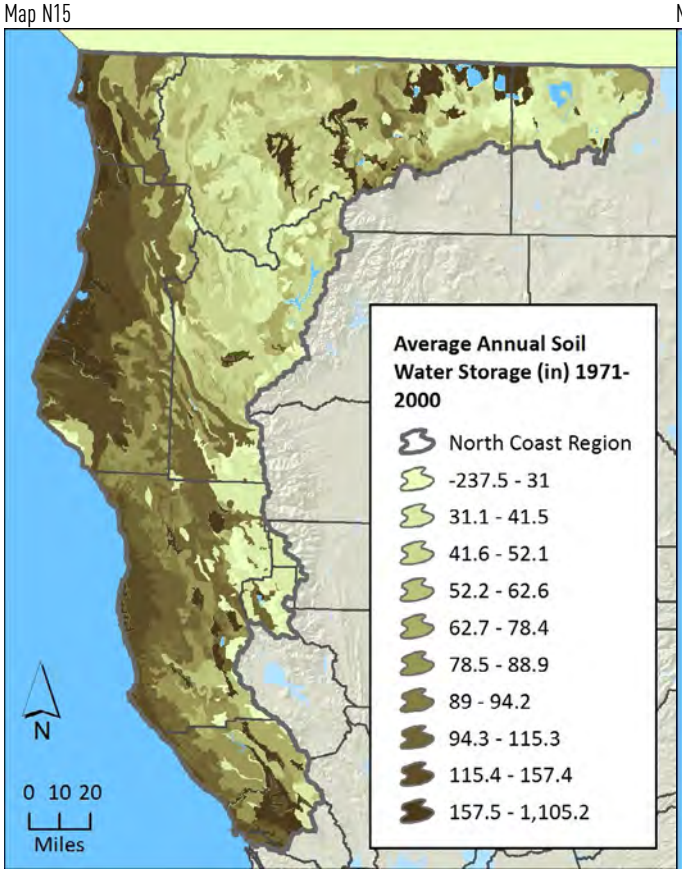

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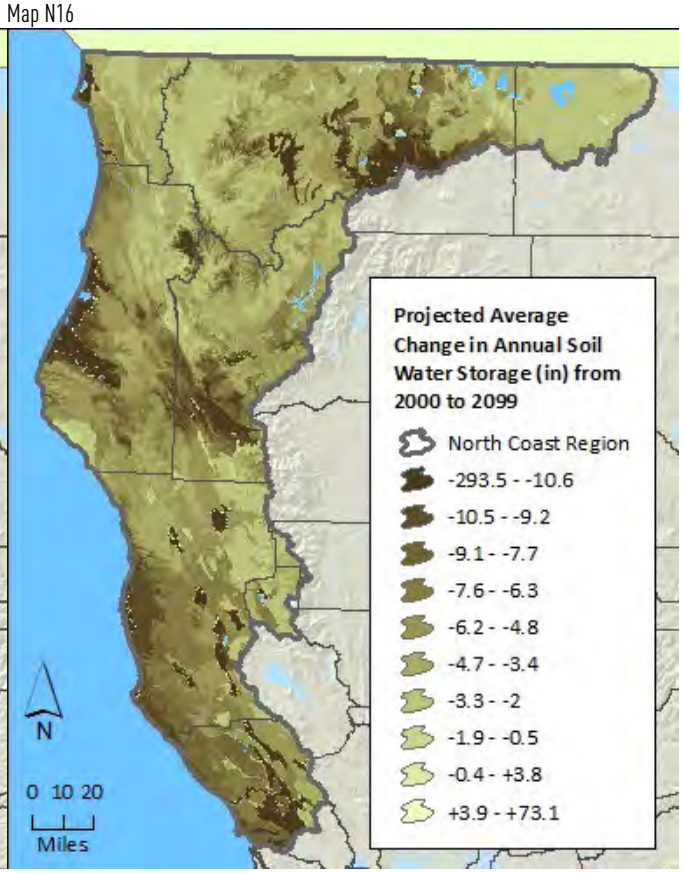

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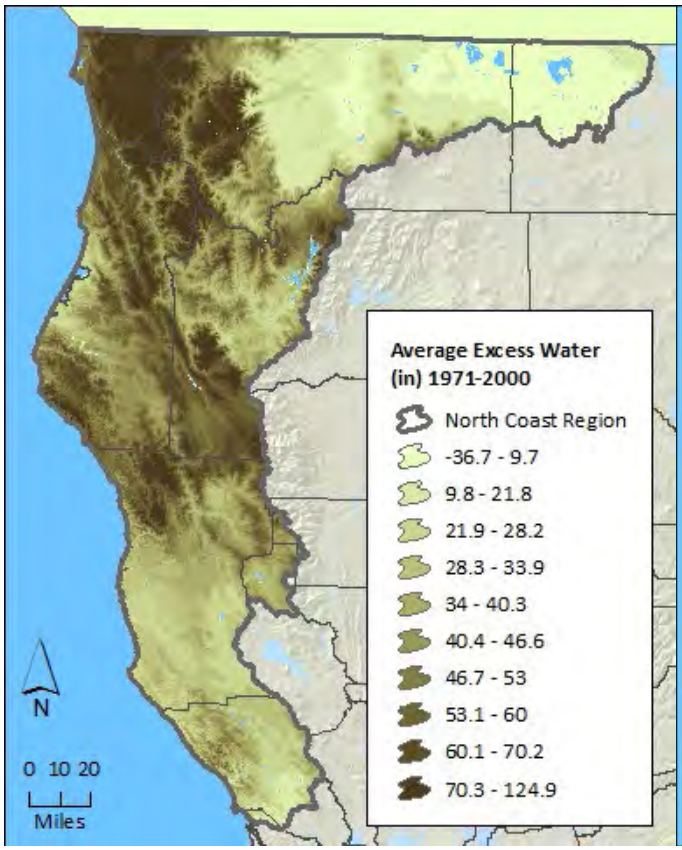

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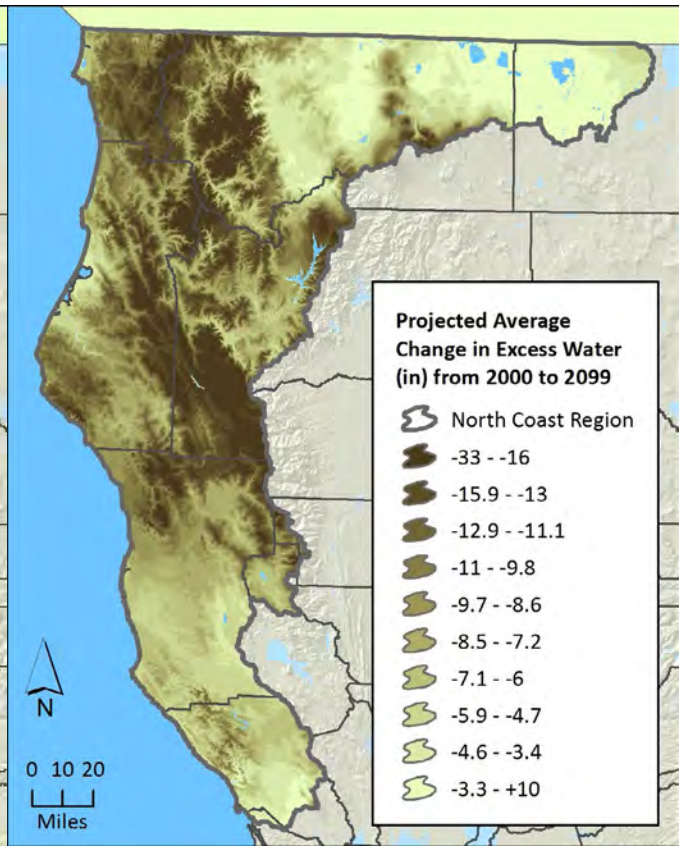

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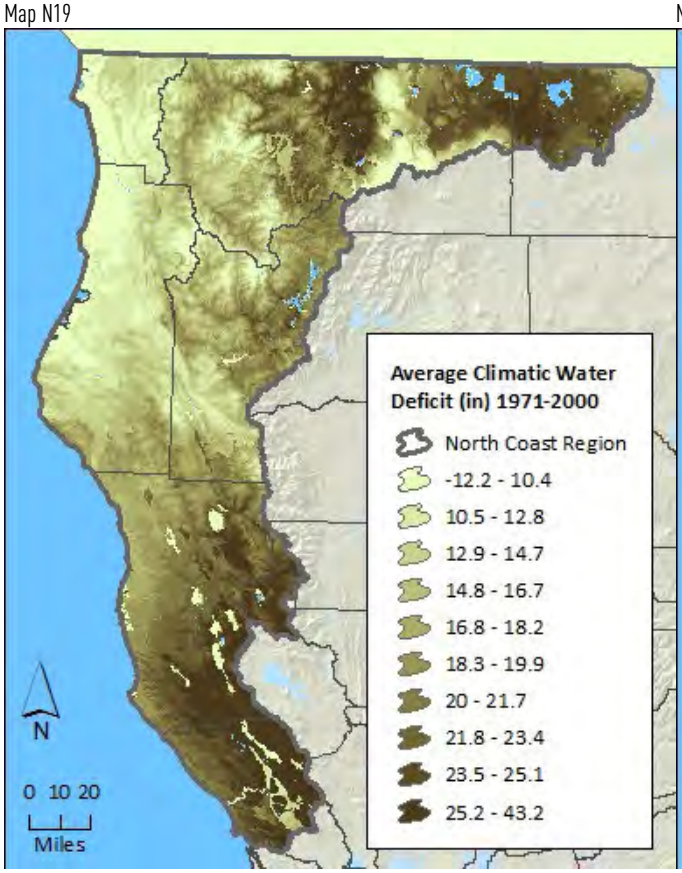

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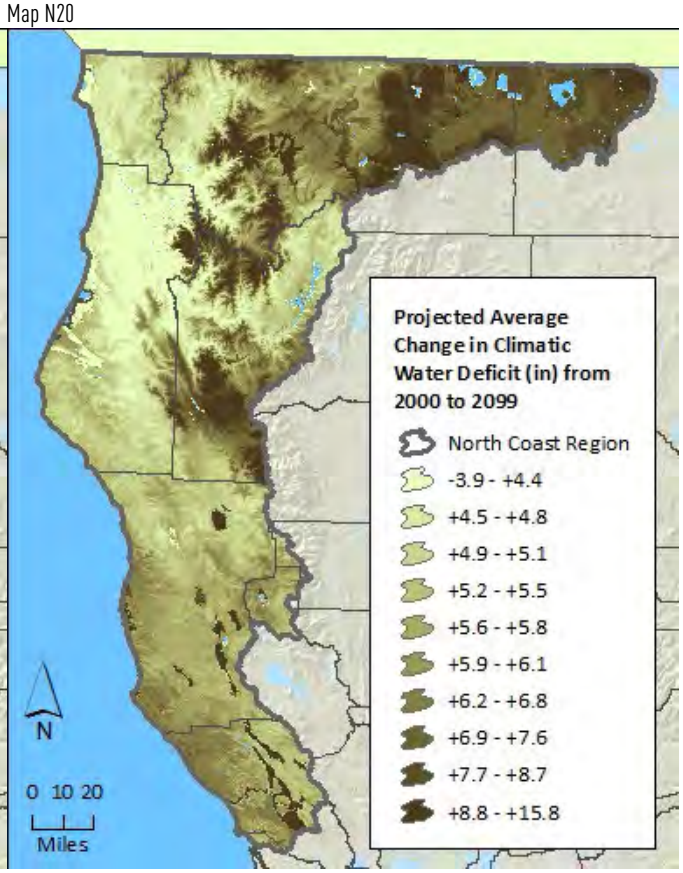

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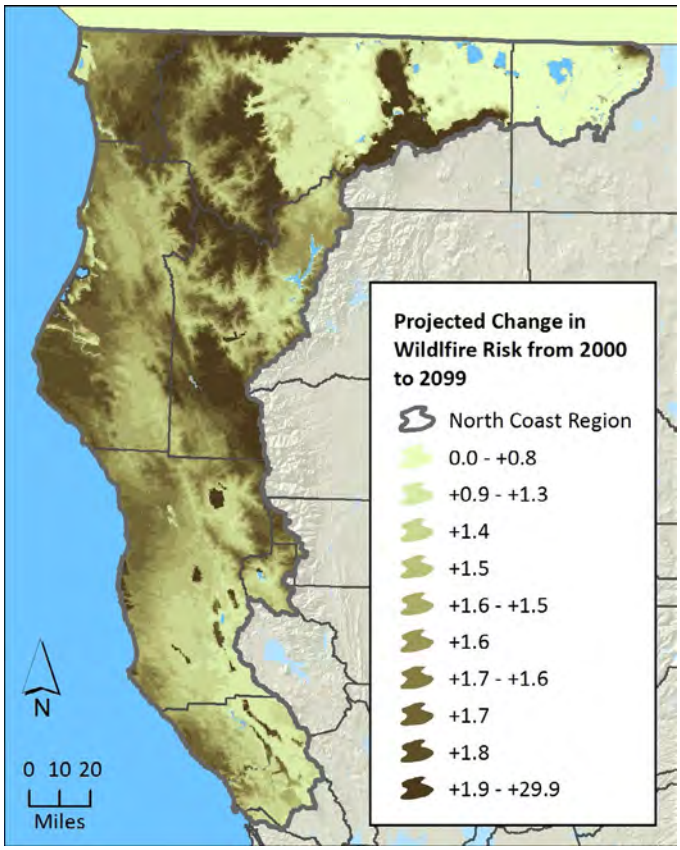
Projected Change in Wildlfire Risk from 2000 to 2099
North Coast Region
0.0 - +0.8
+0.9 - +1.3
+1.4
+1.5
+1.6 - +1.5
+1.6
+1.7 - +1.6
+1.7
+1.8
+1.9 - +29.9
N
0 10 20
Miles

Map N23

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX O
REPORTS COMMISSIONED FOR THE NCIRWMP

APPENDIX 0
REPORTS COMMISSIONED FOR THE NCIRWMP

Since its inception in 2005, the NCIRWMP has generated supplemental reports to inform NCRP decision-makers and stakeholders and to support the NCIRWM Plan and processes. Reports are commissioned at the request of and with approval from the PRP and TPRC and are generally produced by professional consultants, with the participation of NCRP staff and with advisory input from the PRP and TPRC. The reports produced or in development for the NCIRWMP (as of summer 2014) can be found at the NCIRWMP website1. Reports include:

- Biomass Energy in the North Coast Region: Report, The Watershed Center, 2011
- Climate Change Vulnerability Assessment for the North Coast IRWMP, 2NDNature, 2013
- Climate Change and Agriculture in the North Coast, Rose Roberts, 2009
- NCIRWMP Energy Independence, Emissions Reduction, Job Creation, and Climate Adaptation Initiative, NCRP, 2011
- NCIRWMP Regional Strategy for Small Disadvantaged Water and Wastewater Providers, Humboldt County, 2013
- Northwest California Sustainable Energy and Water Conservation Outreach, Five County Salmonid Conservation Program, 2010
- North Coast Floodwater and Stormwater Management Plan, NCRP, 2014
- North Coast Land Use and Regional Planning Report: Partners and Planners Interviews Synthesis, 2013
- A Review of Economic and Financial Issues for the NCIRWMP, NCRP, 2009

1 Searchable NCIRWMP website at http://www.northcoastirwmp.net/docs.php?ogid=1000002572.

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX P
FACTSHEETS: NORTH COAST WMAs, TRIBES, & COUNTIES

APPENDIX P
FACTSHEETS: NORTH COAST WMAS, TRIBES, & COUNTIES

P.1 PROFILE OF WATERSHED MANAGEMENT AREAS

Following are descriptions of each Watershed Management Area (WMA, as defined by the SWRCB WMI); see Map 8 ("Watershed Management Areas"). Where possible, the WMA profiles describe of a range of surface and groundwater conditions and examples of some water-related issues that have been identified by local stakeholders. Tables that summarize select Region attributes at the WMA (basin) level follow these descriptions.

Klamath Watershed Management Area

The Klamath WMA (Map 9) has been divided into three sub-basins: Lower Klamath, Middle Klamath and the Upper Klamath and includes the hydrologic basins of the Klamath, Lower Klamath, Salmon River, Middle Klamath, Scott River, Shasta River, Upper Klamath, Butte Valley and Lost River. The Klamath River and its estuary are designated as a Critical Coastal Area.

The Lower Klamath sub-watershed includes the Klamath River and its tributaries downstream from the Scott River, excluding the Trinity River. It covers 2,564 square miles and includes the Salmon and Blue Rivers and the Klamath River delta/estuary (NCRWQCB 2005). This sub-watershed contains mountainous terrain that has historically supported the silvicultural economy of the small communities along the Lower Klamath River. Limited mining activities also occurred in the Region historically. Salmon fishing has been important in the Region since the occupation by the Karuk and Yurok Tribes, which have their ancestral communities along the River. Today, recreational fishing joins traditional fishing as an important part of the area's economic and social structure.

The Middle Klamath basin encompasses the portion of the Klamath River and tributaries between the confluence of the Klamath and Scott Rivers and Iron Gate Dam including the mainstem of the Klamath River and the Shasta and Scott River watersheds. The basin covers 2,850 square miles (NCRWQCB 2005). Both the Shasta and Scott Rivers receive water from precipitation and snowmelt. The small towns in the watershed, including Etna, Fort Jones, and Callahan, have historically had a silvicultural and agricultural economic base. In the 1800's, the alluvial plains were mined extensively and more recently, channeling for flood control has altered the morphological characteristics of these systems. Yreka and Weed contain the largest populations in this sub-watershed.

The Upper Klamath basin encompasses the area upstream of the Iron Gate Dam. Only a small part of this area is located in California. The primary sub-watershed in California is the Lost River watershed, which covers approximately 1,689 square miles and includes the Clear Lake Reservoir (NCRWQCB 2005). The area around Clear Lake is characterized by high desert streams and is sparsely settled. Land uses in the California portion of the basin are primarily crop agriculture, grazing, and lands administered for the National Wildlife Refuge. The basin is subject to many complex jurisdictional issues associated with water delivery and utilization of water infrastructure facilities including issues related to irrigation, hydropower, endangered species, Tribal rights and lake level management demands for the Upper Klamath Lake. In addition, the Irongate fish hatchery has an NPDES permit, which has a stipulated minimum flow requirement.

Trinity River Watershed Management Area

The Trinity River WMA (Map 10) drains an area of approximately 2,900 square miles of mountainous terrain. The Trinity River is the largest tributary to the Klamath River; from its headwaters in the Klamath and Coast ranges, the river flows 172 miles south and west through Trinity County, then north through Humboldt County and the Hoopa Valley and Yurok Indian reservations to its confluence with the Klamath River (NCRWQCB 2005). Much of the WMA is prone to seismically induced landslides, especially during winter months when soils are saturated. Additionally, inner valley gorges are considered highly unstable. Groundwater resources are relatively plentiful throughout the WMA, but are not well defined. Annual precipitation averages 57 inches/year with a low of 37 inches in Weaverville and Hayfork and a higher rainfall of 75 inches in Trinity Center and 85 inches in the Hoopa Mountains. There are occasional summer thunderstorms that produce extensive runoff and may start wild fires.

The Trinity River watershed is primarily rural with human populations centered near Trinity Center, Weaverville, Lewiston, Hayfork and Hyampom. Timber harvest has traditionally been a large factor in the economy on both federal and private land. The US Forest Service (USFS) and the Bureau

of Land Management (BLM) manage approximately 80 percent of the land in the Trinity WMA; of the remaining 20 percent, about half are industrial timberlands (NCRWQCB 2005).

In the early 1950s two major water-development features were installed above river-mile 112 and the community of Lewiston. This "Trinity River Diversion (TRD)" consists of Lewiston Dam and its reservoir and related facilities and Trinity Dam and its reservoir (known as Trinity Lake). The TRD project diverts a majority of the upper-basin's water yield at Lewiston for power generation and to support the US Bureau of Reclamation's (USBR) Central Valley Project (CVP). The hydrologic changes produced by the TRD project have altered stream-channel conditions and instream habitat for many miles below Lewiston. Trinity River downstream of the TRD provides habitat not only for anadromous salmonids and other native species, but also the non-native brown trout (*Salmo trutta*).

Water quality in the basin ranges from the high quality, pristine waters that emerge from the Trinity Alps wilderness to various degrees of impairment in the mainstem and southern tributaries which are caused in part by human activity. Timber harvest, road construction, and associated activities are recognized as sources of sedimentation and high summer water temperatures. Mining for gold, both currently and historically, is also a source of impairment. Recreational instream dredging causes sedimentation, especially in the mainstem and canyon areas, and legacy effects from historic gold mining include acid mine drainage and mercury pollution.

Humboldt Bay Watershed Management Area

The Humboldt Bay WMA (Map 11) encompasses waterbodies that drain to the Pacific Ocean from Humboldt Bay north to Redwood Creek. The major river systems in the WMA are the Mad River and Redwood Creek; other waterbodies include Humboldt Bay and Mad River Slough, and coastal lagoons (Big, Stone, and Freshwater Lagoons) and streams (Elk and Little Rivers and Freshwater, Jacoby, and Maple Creeks). In the east, the terrain is elevated hillslope with coastal plain occurring in the west. Precipitation ranges from 32 to 98 inches annually. Redwood Creek, the Kelpbeds at Trinidad Head, and the Mad River are the Critical Coastal Areas that occur in this WMA (NCRWQCB, 2005). The streams support production of anadromous salmonids, including steelhead and cutthroat trout, coho and Chinook salmon.

Mad River

The Mad River watershed has a long history of timber harvest on both USFS and private land. Gravel mining occurs in the lower portions of the watershed. Private landowners conduct grazing and limited agriculture in the flat areas around the bay. Humboldt Bay is an important commercial and recreational shellfish growing and harvest area and provides the largest port between San Francisco and Coos Bay, Oregon. Urbanized areas include Trinidad, McKinleyville, Arcata, and Eureka and rural residential areas are scattered throughout the WMA. The majority of the population lives in the Humboldt Bay area cities of Arcata and Eureka.

The Mad River is CWA section 303(d) listed for sediment and temperature impacts. The primary issues for water quality are forestry related, with urbanization and associated industrial and public nonpoint sources. The drinking water for most of the Humboldt Bay area is supplied by Ranney Collectors in Mad River with other coastal streams providing drinking water for other communities. Mad River is continuously supplied with water via releases from the Ruth Reservoir (with 48,030 acre-foot storage capacity), although these supplies are dependent on adequate precipitation and flows through the season. The Eureka waterfront was the site of several industrial operations that left the soil and groundwater contaminated with heavy metals, petroleum products, and pentachlorophenols (PCPs). The waterfront is now undergoing redevelopment and decontamination efforts.

Redwood Creek

Redwood Creek flows into the Pacific Ocean near the town of Orick and is located about 35 miles north of Eureka. Redwood Creek drains a 285-mi2 area and is about 67 miles long. The watershed is located entirely within Humboldt County.

Redwood Creek is a basin of mixed ownership and contains a rich blend of industrial and non-industrial timberlands, coastal and upland agricultural lands, state and federal national parks, other federal properties, and the unincorporated town of Orick. Redwood Creek supports three federally listed as threatened salmonids species as well as the non-listed coastal cutthroat trout (*0. clarki*) and resident fish species (RNSP 1997). The watershed also provides domestic water supplies to rural communities and recreational opportunities. At the coast, Redwood Creek discharges into a designated Water Quality Protection Area (formerly known as Areas of Special Biological Significance) (SWRCB 2001, SWRCB 2003) and a Critical Coastal Area (CCC 2003).

Redwood Creek is a model watershed where government agencies, private landowners, non-profit organizations and the local communities are cooperating to restore and protect water quality and the associated aquatic and riparian resources, and provide economic opportunity to the Orick community. The watershed has a rich history of scientific studies that spans decades and well-established cooperation between groups with seemly conflicting interests. The watershed is home to pioneering work in watershed restoration and erosion control.

The watershed is a mixed ownership of private (56 percent) and public (44 percent) lands. More than 90 percent of the private lands are managed for timber production and ranching by eight private landowners. The upper two-thirds of the watershed contain vast expanses of timber and ranch lands managed primarily by seven landowners. Timberlands have been maintained in large unbroken tracts of lands, which have slowed rural residential development in upland areas (RNSP 2001). Located along the coast, the small town of Orick is the only municipality in the watershed and has a population of about 315 people (HC 2003). Orick is located in the valley, relatively isolated from other north coast communities and qualifies as a "disadvantaged community." The Orick valley contains the coastal floodplain of Redwood Creek and is one of only two groundwater basins identified in the watershed (DWR 2003). Orick is located in the valley. Orick is the major socioeconomic center in the watershed. It is located along U.S. Highway 101 and is the southern gateway to Redwood National and State Parks.

Redwood National Park and Prairie Creek Redwoods State Park are located in the lower part of the Redwood Creek basin. This sub basin has been extensively researched and is considered a "reference watershed" that displays nearly pristine conditions, and is home to significant old growth stands of coast redwood. In 1982 the park received international recognition when it was designated as both a World Heritage Site and International Biosphere Reserve. The protection of streamside redwoods along Redwood Creek was a central issue for the establishment and expansion of Redwood National Park and is linked to upstream watershed conditions.

Eel River Watershed Management Area

The Eel River WMA (Map 12) encompasses roughly 3,684 square miles (NCRWQCB, 2005). The Eel River and its tributaries comprise the third largest river system in California, and the largest river system draining to Humboldt County's coast. The main tributaries to the Eel River are the Van Duzen River, the Bear River, Yager, Larabee, Bull and Salmon Creeks. Lake Pillsbury is located near the headwaters of the mainstem Eel. The upper watershed is mountainous and soils are steep and highly erodible. The Eel River is designated as a Critical Coastal Area.

In the west, the river meanders on a coastal plain and is joined by the Salt River. Several dairies are located on the coastal plain, as well as several small towns. Other communities in the watershed include Scotia, Garberville, Laytonville, and Willits. In many of the alluvial valleys, surface and groundwater are closely connected, thus surface water withdrawals have a substantial effect on local groundwater supplies. A Northwestern railroad line following along the Eel River has fallen into disrepair due to numerous landslides and accidents. Recently, reviving the railroad has been discussed, but the costs may outweigh the benefits (NCRWQCB 2005). The rail line has negatively impacted water quality. The Eel River WMA is a well-known recreation destination with numerous state and private campgrounds along its length; beneficial uses include both water contact and non-contact uses such as swimming and boating. The river also supports a large recreational fishing industry; it is the third largest producer of salmon and steelhead in the State of California (NCRWQCB 2005). Due to the erodible soils, steep terrain, and land use history, there is significant concern for the viability of this anadromous fishery resource.

North Coast Rivers Watershed Management Area

The North Coast rivers not included in other WMAs are included in this grouping (Map 13). The major watersheds south of the Oregon border include the Smith River, Bear River, Mattole River, Ten Mile River, Noyo River, Big River, Albion River, Navarro River, Greenwood, Elk and Alder Creeks, Garcia River and Gualala River (NCRWQCB, 2005). The twelve Critical Coastal Areas in the North Coast WMA are the Mattole River, King Range National Conservation Area, Pudding Creek, Noyo River, the Pygmy Forest Ecological Staircase, Big River, Albion River, Navarro River, Garcia River, the Kelpbeds at Saunders Reef, Del Mar Landing Ecological Reserve, and Gerstle Cove.

Mattole River

The headwaters of the Mattole River begin in Mendocino County, and it flows north 62 river miles, through steep, forested lands in Humboldt County and into the ocean ten miles south of Cape Mendocino. Tributaries to the Mattole River include Mill, Squaw, Bear, Thompson, Honeydew, and Bridge Creeks. The watershed encompasses approximately 304 square miles and is subject to varying rainfall; near the coast, the river receives about 50

inches per year while near the headwaters, about 115 inches of rain fall per year. The largest communities are Petrolia, Honeydew and Whitethorn, but the 2000-person population is scattered throughout the watershed. Small landowners — those with less than 450 acres — own about 43 percent of the watershed, the Bureau of Land Management (BLM) owns about 12 percent, and commercial timber companies own most of the remaining land. Silviculture and ranching are the predominant businesses; water quality problems are those associated with timber harvest, road building, forest conversion, and overgrazing. Fish species known to inhabit the Mattole River include coho, Chinook, steelhead, rainbow trout (Oncorhynchus mykiss), and brook lamprey (Ichthyomyzon fossor); other species include the southern torrent salamander (Rhyacotriton variegatus) and tailed frog (Ascaphus truei).

Ten Mile River

The Ten Mile River watershed covers approximately 120 square miles (NCRWQCB 2005). It is about eight miles north of the City of Fort Bragg and shares ridges with Pudding Creek and the North Fork of the Noyo River to the south and Wages Creek and the South Fork of the Eel River to the north. Elevations range between sea level and 3,205 feet (NCRWQCB 2005). Near the coast, the terrain is comprised of an estuary and a broad river floodplain with more rugged mountainous topography in the eastern portion of the watershed. Most of the basin, except the northeast grasslands, coastal plain, and estuary, is characterized by narrow drainages bordered by steep to moderately steep slopes. The watershed has abundant rainfall and cool temperatures during the winter with dry, warm summers interspersed with breezes and coastal fog. Precipitation in the western part of the watershed is about 70 inches per year while about 40 inches per year occurs in the eastern part of the watershed (NCRWQCB 2005).

The watershed is entirely privately owned. Hawthorne Timber Company, LLC, which is managed by Campbell Timberland Management, LLC, owns about 85 percent of the watershed. Three small non-industrial timber owners and a few residences make up the remainder of the ownership. The watershed has a long history of timber harvest.

The cold water fishery that supports coho, Chinook, and steelhead is the primary — and most sensitive — beneficial use in the watershed. Protection of these species is considered to protect any of the other beneficial uses identified in the watershed that could be impaired due to water quality (NCRWQCB 2005).

Noyo River

The Noyo River watershed encompasses the 113 square mile coastal drainage system immediately west of the City of Willits, flowing into the Pacific Ocean at the City of Fort Bragg. The climate consists of moderate temperatures — an annual average of 53 degrees F — and an average annual rainfall of 40–65 inches.

Silviculture is the primary land use within the watershed. Approximately 50 percent of the watershed is owned by two commercial silviculture operations: the Mendocino Redwood Company and Hawthorne Timber Company (managed by Campbell Timberland Management). The Jackson Demonstration State Forest (administered by the California Department of Forestry and Fire Protection) encompasses about 19 percent of the watershed. Critical Coastal Areas in the vicinity of the watershed include Pudding Creek, Noyo River, and the Pygmy Forest Ecological Staircase (NCRWQCB 2005). Minor land uses in the basin include ranching and recreation. The mouth of the Noyo River contains a marina and fish processing facilities in support of the local commercial fishing industry. The Noyo is the primary drinking water source for the City of Fort Bragg and also provides habitat for steelhead, coho, and Chinook. It is listed as impaired by sediment, due in part to timber harvest, grazing, and related human activities.

Big River

The Big River watershed drains about 181 square miles (NCRWQCB 2005). The watershed drains from east to west, and shares ridges with the Noyo River watershed to the north, the Eel River watershed to the east, and the Little, Albion and Navarro Rivers watersheds to the south. The Big River estuary is located immediately south of the town of Mendocino. The climate is characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers with coastal fog. Mean annual precipitation is approximately 40 inches near the western part of the watershed and about 51 inches at Willits to the east (NCRWQCB 2005). The Big River is designated a Critical Coastal Area.

The predominant current and historic land use is silviculture with less area used for ranching. The largest community is the Town of Mendocino. Together, the five largest property owners –four private timber companies and Jackson State Demonstration Forest — own 83 percent of the watershed. Thirty-one property owners own another 14 percent of the land (parcels from 160 to 3,760 acres), and private residences make up the rest of the land use (NCRWQCB 2005).

In 2002, most of the Big River Estuary, and some associated upland areas were added to the California State Park System. The Big River Parcel consists of 7,334 acres, which, when added to the surrounding

State Park system, creates a 74,000-acre wildlife corridor linking coastal and inland habitats into the largest piece of connected public land contained entirely within Mendocino County (NCRWQCB 2005).

Coho, steelhead, and Chinook currently inhabit the Big River watershed, but population numbers are low compared to historic levels. The estuary and lower river provide critical habitat for spawning, rearing, and staging for adult, juvenile, and smolting salmonids.

Albion River

The Albion River watershed drains approximately 43 square miles (NCRWQCB 2005). It drains primarily from east to west, and shares ridges with the Big River watershed to the north and northeast and the Navarro River watershed to the south and southeast. The Albion River estuary is located near the town of Albion, about 16 miles south of the City of Fort Bragg. Elevations range from sea level to 1,566 feet and the watershed is dominated by relatively flat marine terraces that extend several miles inland and are incised by gorges carved by the major river channels and streams (NCRWQCB 2005). The climate in the watershed is characterized by a pattern of low intensity rainfall in the winter and cool, dry summers with coastal fog. Mean annual precipitation is about 40 inches near the western margin of the watershed and about 50 to 55 inches to the east at Willits (NCRWQCB 2005). The main tributaries of the Albion River include Railroad Gulch, Pleasant Valley Creek, Duck Pond Gulch, South Fork Albion River, Tom Bell Creek, North Fork Albion River, and Marsh Creek. The Albion River estuary has been designated as a Critical Coastal Area.

Over half of the watershed (54%) is owned by Mendocino Redwood Company. Smaller industrial timberland ownerships, some ranches, and numerous smaller parcels that are mostly residences comprise the other half (NCRWQCB 2005). The predominant historic and current land use is silviculture, with some agricultural and recreational uses. The Albion River estuary, which remains open to the sea year round, is used as a commercial and sport fishing harbor for small boats. The river and estuary have historically served as habitat for coho, chinook, and steelhead. Beneficial uses associated with the coldwater fishery are the most sensitive of the beneficial uses in the watershed; protection of these beneficial uses is thought to serve to protect other beneficial uses harmed by excessive sediment.

Navarro River

The Navarro River watershed encompasses approximately 315 square miles. The Navarro River flows through the coastal range, Anderson Valley, and into the Pacific Ocean. The Navarro River watershed is the largest coastal basin in Mendocino County. Rainfall averages about 40 inches per year at Philo and mostly occurs between December and March (NCRWQCB 2005). The Navarro River is a designated Critical Coastal Area.

Land-uses in the watershed include silviculture (70%), rangeland (25%), and agriculture (5%) with a small percentage devoted to rural residential development (NCRWQCB 2005). Timber production, ranching and other agricultural activities are historic activities that continue to the present day, while the fishery has decreased. Anderson Valley today supports orchards and a growing viticulture industry.

Greenwood Creek

The Greenwood Creek watershed encompasses approximately 25 square miles and is located on the southern Mendocino Coast with Greenwood Ridge as its northern border, Clift Ridge as its southern border, and Signal Ridge as its eastern border. Greenwood Creek is a Class I coastal stream and provides habitat for steelhead and coho (NCRWQCB 2005).

Land use in the watershed is primarily for timber production, viticulture, fruit orchards, residential and some cattle ranching. Most of the watershed is privately owned; Mendocino Redwood Company holds about 60 percent as Timber Production Zone (TPZ) land, and approximately 50 smaller landowners own the rest of the land within the watershed (NCRWQCB 2005). The only public land in or adjacent to Greenwood Creek is Greenwood State Beach, which contains the Greenwood Creek estuary, and a small parcel owned by the Elk County Water District.

Garcia River

The Garcia River watershed encompasses approximately 114 square miles in southwestern Mendocino County (NCRWQCB 2005). The river forms an estuary that extends from the ocean to the confluence of Hathaway Creek. The floodplains of the lower portion of the watershed are primarily cropland. The watershed contains the Garcia River and the Kelpbeds at Saunders Reef Critical Coastal Areas.

The primary historic land uses include silviculture, dairy ranching, and gravel mining; these have not changed during the past two decades. Timber harvesting remains the dominant land use activity, but

hillside vineyard development is becoming a concern for production of sediment as land is increasingly converted to new vineyards. The entire watershed is privately owned by multiple owners (NCRWQCB 2005). The river and estuary provide habitat for salmonids and identified beneficial uses include commercial and sport fishing. The Garcia River has been listed as impaired due to sediment.

Gualala River

The Gualala River watershed encompasses about 300 square miles; the Gualala River flows from Mendocino to Sonoma County in a north-south direction, reaching the ocean at the town of Gualala. The watershed contains mostly mountainous terrain; tributaries flow through steep valleys with narrow floors that contain erodible soil. Most of the annual precipitation occurs between October and April, with the greatest amounts in January. Rainfall averages about 38 inches per year at the coast and up to 100 inches per year on the inland peaks (NCRWQCB 2005).

The primary historic land uses are silviculture, orchards, and ranching with timber harvest still an important industry. Timber companies own about one-third of the watershed; Gualala Redwoods Inc. is the largest commercial owner, holding about 30,000 acres (NCRWQCB 2005). Orchards and ranching are on the decline while the watershed has seen an increase in hillside vineyard development, which threatens to continue to impair water quality with respect to sediment delivery. The Gualala River provides the primary source of drinking water for the towns of Sea Ranch and Gualala. The watershed supports an anadromous fishery that includes coho salmon.

Russian/Bodega Watershed Management Area

The Russian/Bodega WMA (Map 14) includes the Russian River and Bodega hydrologic units including the Bodega Harbor, Salmon Creek, Americano Creek, and Stemple Creek watersheds.

Russian River Hydrologic Unit

The Russian River hydrologic unit (HU) encompasses 1,485 square miles in Mendocino and Sonoma counties. It is bounded by the coast ranges to the east and west. The mainstem is 110 miles long and flows from north of Ukiah southward through Redwood Valley to its confluence with Mark West Creek, where it turns west, passes through the coast range, and empties into the Pacific Ocean (NCRWQCB 2005). The summer climate is moist and cool near the coast with temperatures increasing in the valley areas, which are isolated from the cooling coastal influence. During winter, average rainfall ranges from 30-80 inches, depending on locale.

The reservoirs that provide flood protection and water supply storage include Lake Sonoma (Warm Springs Dam) on Dry Creek west of Healdsburg and Lake Mendocino (Coyote Valley Dam) on the East Fork Russian River near Ukiah. A diversion from the Eel River via the Potter Valley Project for the purpose of power production provides considerable benefit to the overall water storage in Lake Mendocino. The Russian River hydrologic unit supplies drinking water for more than 600,000 people in Sonoma and northern Marin counties. It also provides water for agricultural, municipal, and industrial purposes.

Bodega Hydrologic Unit

The Bodega HU contains streams with headwaters in the Coast Range that enter the Pacific Ocean south of the Russian River. Salmon, Americano, and Stemple Creeks and their associated estuaries are the main waterbodies in this HU. The terrain is relatively steep and erodible and is sensitive to disturbance. Cooler temperatures and relatively high winter rainfall due to coastal influences typify the climate of the Bodega HU. Because of the Mediterranean climate, summertime flows are often non-existent in Americano and Stemple Creeks, while Salmon Creek flow is low but sustained. Each of these watersheds have estuary area, however, the Estero Americano (Americano Creek) and the Estero de San Antonio (Stemple Creek) are prized for their resemblance to fjords and the enhanced resource values associated with isolated estuarine environments. Both of these estuaries as well as the Bodega Marine Life Refuge are designated Critical Coastal Areas.

TABLE 64 LAND OWNER TYPES OF NORTH COAST WMAS

WMA NAME	LAND OWNER	ACRES
Eel Watershed Management Area	Private Other	1,567,965.96
	City	251.53
	County	247.95
	Federal	711,027.69
	Non Profit	1,091.79
	Special District	107.12
	State	75,370.61
Humboldt Watershed Management Area	Private Other	492,869.19
	City	1,548.39
	County	518.80
	Federal	203,748.23
	Non Profit	35.26
	Special District	443.02
	State	19,647.80
Klamath Watershed Management Area	Private Other	1,603,741.62
	City	461.67
	County	4.589
	Federal	2,865,237.28
	Non Profit	5,828.82
	Special District	1,441.81
	State	27,568.19
North Coast Watershed Management Area	Private Other	1,228,591.74
	City	61.06
	County	762.29
	Federal	484,439.96
	Non Profit	45,443.82
	Special District	8.56
	State	140,189.78
Russian Bodega Watershed Management Area	Private Other	940216.02
	City	3064.84
	County	3017.26
	Federal	52058.89
	Non Profit	10222.72
	Special District	6755.76
	State	28286.07
Trinity Watershed Management Area	Private Other	484,154.22
	County	16.50
	Federal	1,415,711.06
	Special District	48.40
	State	814.55

Source: California Protected Areas Database (CPAD — www.calands.org)

TABLE 65 GROUNDWATER BASINS OF NORTH COAST WMAS

WMA NAME	GROUNDWATER BASINS	SUB-BASINS
Eel WMA	1-10 Eel River Valley	
	1-11 Covelo Round Valley	
	1-12 Laytonville Valley	
	1-13 Little Lake Valley	
	1-30 Pepperwood Town Area	
	1-31 Weott Town Area	
	1-32 Garberville Town Area	
	1-33 Larabee Valley	
	1-34 Dinsmores Town Area	
	1-36 Hettenshaw Valley	
	1-38 Lower Laytonville Valley	
	1-39 Branscomb Town Area	
	1-42 Sherwood Valley	
	1-43 Williams Valley	
	1-44 Eden Valley	
	1-48 Gravelly Valley	
	1-9 Eureka Plain	
Humboldt WMA	1-10 Eel River Valley	
	1-25 Prairie Creek Area	
	1-26 Redwood Creek Area	
	1-27 Big Lagoon Area	
	1-8.01 Mad River Valley	1-8.01 Dows Prairie School
	1-8.02 Mad River Valley	1-8.02 Mad River Lowland
	1-9 Eureka Plain	
Klamath WMA	1-14 Lower Klamath River Valley	
	1-15 Happy Camp Town Area	
	1-16 Seiad Valley	
	1-17 Bray Town Area	
	1-18 Red Rock Valley	
	1-2.01 Klamath River Valley	1-2.01 Tule Lake
	1-2.02 Klamath River Valley	1-2.02 Lower Klamath
	1-22 Fairchild Swamp Valley	
	1-25 Prairie Creek Area	
	1-3 Butte Valley	
	1-4 Shasta Valley	Shasta Valley
	1-5 Scott River Valley	

WMA NAME	GROUNDWATER BASINS	SUB-BASINS
North Coast WMA	1-1 Smith River Plain	
	1-10 Eel River Valley	
	1-14 Lower Klamath River Valley	
	1-19 Anderson Valley	
	1-20 Garcia River Valley	
	1-21 Fort Bragg Terrace Area	
	1-28 Mattole River Valley	
	1-29 Honeydew Town Area	
	1-37 Cottoneva Creek Valley	
	1-40 Ten Mile River Valley	
	1-41 Little Valley	
	1-45 Big River Valley	
	1-46 Navarro River Valley	
	1-49 Annapolis Ohlson Ranch Fm Highlands	
	1-61 Fort Ross Terrace Deposits	
Russian Bodega WMA	1-50 Knights Valley	
	1-51 Potter Valley	
	1-52 Ukiah Valley	
	1-53 Sanel Valley	
	1-54.01 Alexander Valley	1-54.01 Alexander Area
	1-54.02 Alexander Valley	1-54.02 Cloverdale Area
	1-55.01 Santa Rosa Valley	1-55.01 Santa Rosa Plain
	1-55.02 Santa Rosa Valley	1-55.02 Healdsburg Area
	1-55.03 Santa Rosa Valley	1-55.03 Rincon Valley
	1-56 Mcdowell Valley	
	1-57 Bodega Bay Area	
	1-59 Wilson Grove Formation Highlands	
	1-60 Lower Russian River Valley	
	1-61 Fort Ross Terrace Deposits	
	2-19 Kenwood Valley	
Trinity WMA	1-35 Hyampom Valley	
	1-6 Hayfork Valley	
	1-62 Wilson Point Area	
	1-7 Hoopa Valley	

Source: California Department of Water Resources

TABLE 66 LAND COVER TYPES OF NORTH COAST WMAS

WMA NAME	TYPE (WHR13)	ACRES
Eel WMA	Agriculture	4,4630.38
	Barren/Other	20,522.82
	Conifer Forest	1,254,520.47
	Hardwood Forest	576,268.21
	Hardwood Woodland	22,453.41
	Herbaceous	260,219.18
	Shrub	158,792.88
	Urban	6,423.81
	Water	10,638.37
	Wetland	1,551.63
Humboldt WMA	Agriculture	12,300.08
	Barren/Other	6,488.08
	Conifer Forest	518,240.01
	Hardwood Forest	84,656.35
	Hardwood Woodland	3,622.55
	Herbaceous	46,478.47
	Shrub	26,508.74
	Urban	13,763.20
	Water	5,476.64
	Wetland	1,250.96
Klamath WMA	Agriculture	235,705.75
	Barren/Other	39,668.59
	Conifer Forest	2,376,493.04
	Conifer Woodland	350,346.61
	Desert Shrub	2.67
	Hardwood Forest	270,506.61
	Hardwood Woodland	9,220.3909
	Herbaceous	216,940.50
	Shrub	853,362.52
	Urban	5,954.11
	Water	92,522.38
	Wetland	53,520.52
North Coast WMA	Agriculture	19,178.90
	Barren/Other	17,262.32
	Conifer Forest	1,326,623.44
	Hardwood Forest	276,261.01
	Hardwood Woodland	9,672.07
	Herbaceous	161,341.05
	Shrub	72,113.42
	Urban	9,296.67
	Water	5,930.09
	Wetland	1,700.86

WMA NAME	TYPE (WHR13)	ACRES
Russian Bodega WMA	Agriculture	131,002.27
	Barren/Other	3,908.77
	Conifer Forest	148,084.68
	Hardwood Forest	365,092.12
	Hardwood Woodland	39,326.77
	Herbaceous	209,169.89
	Shrub	84,953.47
	Urban	51,733.82
	Water	10,012.78
	Wetland	316.91
Trinity WMA	Agriculture	1,272.31
	Barren/Other	19,441.10
	Conifer Forest	1,519,306.48
	Conifer Woodland	25.13
	Hardwood Forest	198,583.56
	Hardwood Woodland	8,517.19
	Herbaceous	13,144.28
	Shrub	114,976.45
	Urban	2,667.82
	Water	20,888.21
	Wetland	1,903.01

Source: California Department of Forestry and Fire Protection CALFIRE

TABLE 67 LAND USE TYPES OF NORTH COAST WMAS

WMA	LAND USE	ACRES
Eel WMA	Barren	20,421.63
	Commercial and Services	118.09
	Conifer Forest	1,253,917.79
	Cropland and Pasture	44,592.13
	Hardwood Forest	598,239.24
	Herbaceous Rangeland	259,458.15
	Lakes	8,081.96
	Nonforested Wetland	1,550.74
	Other Urban or Built-up Land	132.55
	Residential	1,145.10
	Rural Development	6,266.13
	Shrub and Brush Rangeland	158,742.40
	Streams and Canals	2,556.40
	Transportation, Communications, Utilities	798.83
Humboldt WMA	Barren	6,331.51
	Bays and Estuaries	24.46
	Commercial and Services	305.57
	Conifer Forest	516,429.07
	Cropland and Pasture	12,281.85
	Hardwood Forest	87,538.78
	Herbaceous Rangeland	44,656.40
	Lakes	4,720.50
	Nonforested Wetland	1,205.14
	Other Urban or Built-up Land	33.14
	Residential	4,076.23
	Rural Development	13,444.07
	Shrub and Brush Rangeland	26,365.96
	Streams and Canals	687.19
	Transportation, Communications, Utilities	640.71
	Water	44.48
Klamath WMA	Barren	39284.74
	Commercial and Services	547.53
	Conifer Forest	2726162.70
	Cropland and Pasture	235458.67
	Hardwood Forest	279509.28
	Herbaceous Rangeland	216200.82
	Lakes	87952.88
	Nonforested Wetland	53378.19
	Other Urban or Built-up Land	96.74
	Residential	825.74
	Rural Development	5527.56
	Shrub and Brush Rangeland	852774.07
	Streams and Canals	3062.57
	Transportation, Communications, Utilities	1955.27
	Water	1506.93
North Coast WMA	Barren	17,057.72
	Commercial and Services	90.96
	Conifer Forest	1,325,779.68
	Cropland and Pasture	19,100.62
	Hardwood Forest	285,652.87
	Herbaceous Rangeland	160,648.74
	Lakes	4,656.45
	Nonforested Wetland	1,693.96
	Other Urban or Built-up Land	103.19
	Residential	1622.80
	Rural Development	9207.49
	Shrub and Brush Rangeland	72065.61
	Streams and Canals	158.34
	Transportation, Communications, and Utilities	426.10
	Water	1115.30

WMA	LAND USE	ACRES
Russian Bodega WMA	Barren	3,820.26
	Commercial and Services	94.29
	Conifer Forest	146,923.12
	Cropland and Pasture	130,857.27
	Hardwood Forest	402,336.18
	Herbaceous Rangeland	207,386.07
	Lakes	8,957.75
	Nonforested Wetland	308.24
	Other Urban or Built-up Land	73.39
	Residential	4,826.81
	Rural Development	51,339.96
	Shrub and Brush Rangeland	84,906.55
	Streams and Canals	1,055.03
	Transportation, Communications, and Utilities	716.55
Trinity WMA	Barren	19,349.92
	Commercial and Services	106.30
	Conifer Forest	1,519,133.24
	Cropland and Pasture	1272.31
	Hardwood Forest	207,029.36
	Herbaceous Rangeland	13,092.91
	Lakes	20,456.99
	Nonforested Wetland	1,899.45
	Other Urban or Built-up Land	29.80
	Residential	347.82
	Rural Development	2,602.44
	Shrub and Brush Rangeland	114,869.48
	Streams and Canals	431.22
	Transportation, Communications, and Utilities	104.30

Source: California Department of Forestry and Fire Protection CALFIRE

TABLE 68 ECONOMICALLY DISADVANTAGED COMMUNITIES OF NORTH COAST WMAS

WMA NAME	STATUS	PERCENT AREA	PERCENT DAC or SDAC
Eel WMA	DAC	19.15	81.89
	SDAC	62.74	
	Not DAC	18.11	
Humboldt WMA	DAC	29.13	49.66
	SDAC	20.53	
	Not DAC	50.34	
Klamath WMA	DAC	18.44	96.57
	SDAC	78.13	
	Not DAC	3.43	
North Coast WMA	DAC	28.92	59.84
	SDAC	30.92	
	Not DAC	40.16	
Russian Bodega WMA	DAC	27.3	29.34
	SDAC	2.04	
	Not DAC	70.66	
Trinity WMA	DAC	25.91	78.00
	SDAC	52.09	
	Not DAC	21.99	

Source: US Census 2010 and California Department of Water Resources (http://www.water.ca.gov/irwm/grants/resourceslinks.cfm)

P.2 PROFILE OF NATIVE AMERICAN TRIBES/ TRIBAL AREAS

North Coast Tribes are separate and independent sovereign nations within the territorial boundaries of the United States. The sovereignty of Tribes has been acknowledged in the U.S. Constitution. This sovereignty is inherent and flows from the pre-constitutional and extra-constitutional governance of the Tribe. Early federal policy and U.S. Supreme Court case law recognizes that Tribes retain the inherent right to govern within political boundaries (Worcester v. Georgia (1832) and that power to interact with Tribes is vested in the federal government. (Cherokee Nation v. Georgia (1831). This established governmental structure recognizes the sovereign and political independence of Tribal nations and its members. This right is also recognized by the State of California. Pursuant to the Executive Order B-10-11, the State "recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority of their members and territory."

The North Coast is the ancestral territory of North Coast Tribes. The majority of the North Coast Tribes have an inherent responsibility for managing their ancestral territories whether they currently have the capacity to or not. Therefore, North Coast Tribes' jurisdiction goes beyond the gathering, fishing, and hunting rights that each individual Tribal member retains. Each North Coast Tribes exerts their jurisdictional authority according to their own traditional policies, laws, mandates and capacity.

The North Coast Region has a significantly higher percentage of Native American residents (4%) than the state average (1.7%; US Census 2010). Thirty-two North Coast Tribal Nations are represented in the North Coast (Table 70). Tribal lands (Table 69 presents a partial listing) totaling more than 250,000 acres are distributed throughout the North Coast (Map 2 "Land Ownership").

TABLE 69 NATIVE AMERICAN TRIBAL LANDS OF THE NORTH COAST REGION

NAME	TYPE	AREA (SQ. METER)	ACRES
Bear River Band — Rohnerville	Rancheria	107,905	27

NAME	TYPE	AREA (SQ. METER)	ACRES
Cahto Indian Tribe — Laytonville	Rancheria	788,833	195
Cher-Ae Heights Indian Community — Trinidad	Rancheria	271,924	67
Cloverdale Rancheria of Pomo Indians	Rancheria	19,262	5
Coast Indian Community of Yurok Indians — Resighini	Rancheria	930,640	230.0
Coast Miwok/S. Pomo — Federated Indians of Graton	Rancheria	215,112	53.2
Coyote Valley Band of Pomo Indians — Coyote Valley	Reservation	254,678	63
Guidiville Rancheria	Rancheria	76,281	19
Hoopa Valley Tribe	Reservation	355,983,910	87,966
Hopland Band of Pomo Indians	Rancheria	115,588	29
Karuk — Karuk Happy Camp #2	Reservation	723,579	179
Karuk — Karuk-Happy Camp #1	Reservation	8,067	2
Karuk — Karuk-Yreka	Reservation	43,281	11
Karuk — Former SAC-196,198 PDA's	Reservation	3,215	1
Karuk — Karuk Orleans Horn Property	Reservation	341,335	84
Karuk — Orleans Karuk Tribal Office	Reservation	18,855	5
Karuk Tribe — Karuk-Happy Camp Res'n	Reservation	8,969	2
Kashia Band of Pomo Indians — Stewarts Point	Rancheria	174,566	43
Manchester Band of Pomo Indians	Rancheria	1,519,250	375
Smith River	Rancheria	547,090	135
Elk Valley	Rancheria	360,902	89
Blue Lake	Rancheria	127,046	31
Pit River Tribe — XL Ranch	Reservation	2,600,716	643
Pomo Indians — Sherwood Valley	Rancheria	1,183,167	292
Pomo Indians — Potter Valley	Rancheria	70,966	18
Pomo Indians — Redwood Valley	Rancheria	327,299	81
Pomo Indians — Pinoleville	Rancheria	432,874	107
Pomo Indians — Dry Creek	Rancheria	326,346	81
Quartz Valley Indian Community	Reservation	2,486,697	615
Round Valley Indian Tribes	Reservation	439,018,462	108,484
Smith River Indians — Big Lagoon	Rancheria	30,358	8
Wiyot Indians — Table Bluff	Rancheria	59,832	15
Yurok Tribe	Reservation	227,952,683	56,328
Total		1,037,129,688	256,280

Source: CalTrans & Bureau of Indian Affairs 2012

TABLE 70 NATIVE AMERICAN TRIBES OF THE NORTH COAST REGION

TRIBAL NATIONS OF THE NORTH COAST REGION
Bear River Band of Rohnerville Rancheria
Big Lagoon Rancheria
Blue Lake Rancheria
Cher-Ae Heights Indian Community of the Trinidad Rancheria
Cahto Tribe of Laytonville Rancheria
Cloverdale Rancheria of Pomo Indians
Coyote Valley Band of Pomo Indians
Dry Creek Rancheria Band of Pomo Indians
Elk Valley Rancheria
Federated Indians of Graton Rancheria
Guidiville Rancheria
Habematolel Pomo of Upper Lake
Hoopa Valley Tribe
Hopland Band of Pomo Indians of the Hopland Rancheria
The Karuk Tribe
Kashia Band of Pomo Indians of the Stewarts Point Rancheria
Klamath Tribes (Klamath, Modoc & Yahooskin)
Lytton Rancheria of California
Manchester Band of Pomo Indians of the Manchester Rancheria
Mishewal Wappo Tribe of Alexander Valley
Nor-Rel-Muk Nation
Pinoleville Pomo Nation
Pit River Tribe
Potter Valley Tribe
Quartz Valley Indian Community of the Quartz Valley Reservation
Redwood Valley Rancheria
Resighini Rancheria
Round Valley Indian Tribes/Covelo Indian Community
Shasta Indian Nation
Shasta Nation
Sherwood Valley Rancheria of Pomo Indians
Smith River Rancheria
Winnemem Wintu Tribe
Wiyot Tribe
The Yokayo Tribe of Indians
The Yurok Tribe
Source: North Coast Resource Partnership 2014

P.3 PROFILE OF COUNTIES

For the sake of presenting a comprehensive suite of descriptive data, the following analyses include information for counties in the Region that are not currently members of the NCRP/ signatories to the NCIRWMP MoMU (i.e. Glenn, Marin, and Lake which account for just 2.2% of the Region area; Lake County is a signatory to the MoMU, but is not a participating member of the NCRP.)

TABLE 71 COUNTY SIZE AND RELATIVE PROPORTION OF THE NORTH COAST REGION

COUNTY	ENTIRE COUNTY AREA (ACRE)	COUNTY AREA IN NORTH COAST REGION (ACRE)	PERCENT OF COUNTY	PERCENT OF NORTH COAST REGION
Del Norte	649,371.60	649,371.60	100.0%	5.2%
Glenn	849,231.02	54,337.81	6.4%	0.4%
Humboldt	2,293,383.36	2,293,383.36	100.0%	18.5%
Lake	851,668.60	193,022.40	22.7%	1.6%
Marin	335,916.36	22,740.98	6.8%	0.2%
Mendocino	2,246,050.43	2,246,050.43	100.0%	18.1%
Modoc	2,690,175.61	751,456.09	27.9%	6.0%
Siskiyou	4,065,123.79	3,328,853.31	81.9%	26.8%
Sonoma	1,016,012.50	832,651.03	82.0%	6.7%
Trinity	2,052,349.97	2,052,349.97	100.0%	16.5%
TOTAL		**12,424,216.98**		**100.0%**

Source: US Census 2010

TABLE 72 LAND OWNER TYPES OF NORTH COAST COUNTIES

COUNTY	LANDOWNER	ACRES
Del Norte		
	Private Other	153,734.66
	City	38.08
	County	259.051
	Federal	442,190.83
	State	52,617.07
Glenn		
	Private Other	1,970.48
	Federal	5,2456.33
Humboldt		
	Private Other	1,698,232.62
	City	1,751.46
	County	800.13
	Federal	506,596.89
	Non Profit	1,127.06
	Special District	459.15
	State	84,818.91
Lake		
	Private Other	27,950.39
	Federal	164,348.90
	State	79.70
Marin		
	Private Other	22,700.65
	Non Profit	0.18
Mendocino		
	Private Other	1,808,411.54
	City	121.45
	County	11.193
	Federal	299,637.38
	Non Profit	41,926.07
	Special District	115.68
	State	95,553.44
Modoc		
	Private Other	127,252.08
	County	1.92
	Federal	623,956.90
	State	245.047
Siskiyou		
	Private Other	1,231,791.24
	City	461.67
	County	2.67
	Federal	2,062,364.32
	Non Profit	5,828.82
	Special District	1,441.81
	State	2,5483.58
Sonoma		
	Private Other	750,969.68
	City	3,014.84
	County	3,475.93
	Federal	2,3306.82
	Non Profit	1,3740.19
	Special District	6,755.76
	State	32,264.61
Trinity		
	Private Other	494,521.67
	County	16.50
	Federal	1,557,358.49
	Special District	32.27
	State	814.55

Source: California Protected Areas Database (CPAD — www.calands.org)

TABLE 73 GROUNDWATER BASINS OF NORTH COAST COUNTIES

COUNTY	GROUNDWATER BASINS	SUB-BASINS
Del Norte		
	1-1 Smith River Plain	
	1-14 Lower Klamath River Valley	
	1-25 Prairie Creek Area	
Humboldt		
	1-10 Eel River Valley	
	1-14 Lower Klamath River Valley	
	1-25 Prairie Creek Area	
	1-26 Redwood Creek Area	
	1-27 Big Lagoon Area	
	1-28 Mattole River Valley	

COUNTY	GROUNDWATER BASINS	SUB-BASINS
	1-29 Honeydew Town Area	
	1-30 Pepperwood Town Area	
	1-31 Weott Town Area	
	1-32 Garberville Town Area	
	1-33 Larabee Valley	
	1-34 Dinsmores Town Area	
	1-7 Hoopa Valley	
	1-8.01 Mad River Valley	1-8.01 Dows Prairie School Area
	1-8.02 Mad River Valley	1-8.02 Mad River Lowland
	1-9 Eureka Plain	
Lake		
	1-48 Gravelly Valley	
Marin		
	1-59 Wilson Grove Formation Highlands	
Mendocino		
	1-11 Covelo Round Valley	
	1-12 Laytonville Valley	
	1-13 Little Lake Valley	
	1-19 Anderson Valley	
	1-20 Garcia River Valley	
	1-21 Fort Bragg Terrace Area	
	1-37 Cottoneva Creek Valley	
	1-38 Lower Laytonville Valley	
	1-39 Branscomb Town Area	
	1-40 Ten Mile River Valley	
	1-41 Little Valley	
	1-42 Sherwood Valley	
	1-43 Williams Valley	
	1-44 Eden Valley	
	1-45 Big River Valley	
	1-46 Navarro River Valley	
	1-49 Annapolis Ohlson Ranch Fm Highlands	
	1-51 Potter Valley	
	1-52 Ukiah Valley	
	1-53 Sanel Valley	
	1-56 McDowell Valley	
	1-61 Fort Ross Terrace Deposits	
Modoc		
	1-2.01 Klamath River Valley	1-2.01 Tulelake
	1-22 Fairchild Swamp Valley	
Siskiyou		
	1-15 Happy Camp Town Area	
	1-16 Seiad Valley	
	1-17 Bray Town Area	
	1-18 Red Rock Valley	
	1-2.01 Klamath River Valley	1-2.01 Tulelake
	1-2.02 Klamath River Valley	1-2.02 Lower Klamath
	1-3 Butte Valley	
	1-4 Shasta Valley	Shasta Valley
	1-5 Scott River Valley	
Sonoma		
	1-49 Annapolis Ohlson Ranch Farm Highlands	
	1-50 Knights Valley	
	1-54.01 Alexander Valley	1-54.01 Alexander Area
	1-54.02 Alexander Valley	1-54.02 Cloverdale Area
	1-55.01 Santa Rosa Valley	1-55.01 Santa Rosa Plain
	1-55.02 Santa Rosa Valley	1-55.02 Healdsburg Area
	1-55.03 Santa Rosa Valley	1-55.03 Rincon Valley
	1-57 Bodega Bay Area	
	1-59 Wilson Grove Formation Highlands	
	1-60 Lower Russian River Valley	
	1-61 Fort Ross Terrace Deposits	
	2-19 Kenwood Valley	
Trinity		
	1-34 Dinsmores Town Area	
	1-35 Hyampom Valley	
	1-36 Hettenshaw Valley	
	1-6 Hayfork Valley	
	1-62 Wilson Point Area	

Source: California Department of Water Resources

TABLE 74 LAND COVER TYPES OF NORTH COAST COUNTIES

COUNTY	LAND COVER TYPE (WHR13)	ACRES
Del Norte		
	Agriculture	10,628.80
	Barren/Other	8,510.29
	Conifer Forest	487,921.47
	Hardwood Forest	77,299.17
	Hardwood Woodland	14.46
	Herbaceous	5,401.47
	Shrub	46,848.97
	Urban	5,521.78
	Water	5,482.20
	Wetland	1,195.36
Glenn		
	Barren/Other	124.98
	Conifer Forest	47,658.70
	Hardwood Forest	3,150.19
	Herbaceous	1,191.58
	Shrub	2,229.93
	Water	8.90

COUNTY	LAND COVER TYPE (WHR13)	ACRES
	Wetland	61.60
Humboldt		
	Agriculture	45,241.74
	Barren/Other	23,829.80
	Conifer Forest	1,524,873.63
	Hardwood Forest	359,476.27
	Hardwood Woodland	22,806.12
	Herbaceous	223,703.23
	Shrub	57,672.81
	Urban	19,441.99
	Water	14,456.18
	Wetland	2226.15
Lake		
	Barren/Other	996.99
	Conifer Forest	106,502.63
	Hardwood Forest	27,644.72
	Hardwood Woodland	3,680.15
	Herbaceous	3,554.28
	Shrub	47,464.78
	Water	2,122.29
	Wetland	404.31
Marin		
	Agriculture	1,911.02
	Barren/Other	23.57
	Conifer Forest	9.34
	Hardwood Forest	78.28
	Hardwood Woodland	683.86
	Herbaceous	19,074.16
	Shrub	589.56
	Urban	64.49
	Water	196.37
	Wetland	73.390
Mendocino		
	Agriculture	50,811.56
	Barren/Other	11,058.47
	Conifer Forest	1,134,790.82
	Hardwood Forest	637,072.97
	Hardwood Woodland	27,779.26
	Herbaceous	233,775.61
	Shrub	131,354.10
	Urban	13,277.94
	Water	5,560.26
	Wetland	233.51
Modoc		
	Agriculture	47,977.17
	Barren/Other	980.08
	Conifer Forest	123,428.92
	Conifer Woodland	180,084.51
	Hardwood Forest	17.12
	Herbaceous	6,263.46
	Shrub	342,761.69
	Urban	9.56
	Water	42,876.60
	Wetland	7,050.29
Siskiyou		
	Agriculture	187,325.83
	Barren/Other	36,332.70
	Conifer Forest	1,941,716.03
	Conifer Woodland	170,262.10
	Desert Shrub	2.67
	Hardwood Forest	188,799.85
	Hardwood Woodland	648.94
	Herbaceous	207,459.24
	Shrub	496,447.33
	Urban	5,614.96
	Water	45,896.69
	Wetland	46,830.07
Sonoma		
	Agriculture	99,451.46
	Barren/Other	4,450.07
	Conifer Forest	206,174.03
	Hardwood Forest	242,044.82
	Hardwood Woodland	29,422.74
	Herbaceous	160,894.71
	Shrub	38,626.23
	Urban	44,364.40
	Water	7,804.20
	Wetland	243.52
Trinity		
	Agriculture	742.12
	Barren/Other	20,984.51
	Conifer Forest	1,570,185.87
	Conifer Woodland	25.13
	Hardwood Forest	235,784.25
	Hardwood Woodland	7,776.84
	Herbaceous	45,974.75
	Shrub	146,710.96
	Urban	1,544.29
	Water	21,064.79
	Wetland	1,925.70

Source: California Department of Forestry and Fire Protection CALFIRE

TABLE 75 LAND USE TYPES OF NORTH COAST COUNTIES

COUNTY	LAND USE	ACRES
Del Norte		

COUNTY	LAND USE	ACRES
	Barren	8,285.01
	Commercial and Services	87.62
	Conifer Forest	487,409.75
	Cropland and Pasture	10,575.65
	Hardwood Forest	77,041.41
	Herbaceous Rangeland	5,056.09
	Lakes	3,077.47
	Nonforested Wetland	1,191.36
	Other Urban or Built-up Land	2.22
	Residential	1,043.02
	Rural Development	5,460.18
	Shrub and Brush Rangeland	46,808.94
	Streams and Canals	1040.57
	Transportation, Communications, and Utilities	380.51
Glenn		
	Water	1,364.16
	Barren	124.98
	Conifer Forest	47,658.70
	Hardwood Forest	3,150.19
	Herbaceous Rangeland	1,191.58
	Lakes	8.90
	Nonforested Wetland	61.60
	Shrub and Brush Rangeland	2,229.93
Humboldt		
	Barren	23,570.04
	Bays and Estuaries	24.46
	Commercial and Services	445.67
	Conifer Forest	1,522,566.31
	Cropland and Pasture	45,192.59
	Hardwood Forest	381,311.42
	Herbaceous Rangeland	221,390.35
	Lakes	9,014.01
	Nonforested Wetland	2,179.67
	Other Urban or Built-up Land	58.49
	Residential	4,829.70
	Rural Development	18,960.51
	Shrub and Brush Rangeland	57,526.70
	Streams and Canals	5,103.91
	Transportation, Communications, and Utilities	1,240.28
	Water	313.80
Lake		
	Barren	989.65
	Commercial and Services	22.69
	Conifer Forest	106,477.28
	Hardwood Forest	31,283.50
	Herbaceous Rangeland	3,532.70
	Lakes	2,122.29
	Nonforested Wetland	403.42
	Other Urban or Built-up Land	79.39
	Residential	32.47
	Shrub and Brush Rangeland	4,7426.75
Marin		
	Barren	23.57
	Conifer Forest	9.34
	Cropland and Pasture	1,911.02
	Hardwood Forest	762.14
	Herbaceous Rangeland	19,071.93
	Lakes	1,96.37
	Nonforested Wetland	73.39
	Rural Development	64.49
	Shrub and Brush Rangeland	589.56
	Transportation, Communications, and Utilities	2.22
Mendocino		
	Barren	10,989.97
	Commercial and Services	64.49
	Conifer Forest	1,134,264.20
	Cropland and Pasture	50,688.13
	Hardwood Forest	664,278.02
	Herbaceous Rangeland	233,046.60
	Lakes	5,191.08
	Nonforested Wetland	227.29
	Other Urban or Built-up Land	89.18
	Residential	1,308.33
	Rural Development	13,070.23
	Shrub and Brush Rangeland	131,338.09
	Streams and Canals	329.14
	Transportation, Communications, and Utilities	789.72
	Water	40.03
Modoc		
	Barren	980.08
	Commercial and Services	38.47
	Conifer Forest	303,460.28
	Cropland and Pasture	47,900.66
	Hardwood Forest	17.12
	Herbaceous Rangeland	6,263.46
	Lakes	42,876.60
	Nonforested Wetland	7,042.72
	Other Urban or Built-up Land	1.33
	Residential	54.26
	Rural Development	9.56
	Shrub and Brush Rangeland	342,637.15
	Transportation, Communications, and Utilities	167.68
Siskiyou		
	Barren	3,6024.46
	Commercial and Services	435.89
	Conifer Forest	2,111,430.16

COUNTY	LAND USE	ACRES
	Cropland and Pasture	187,155.25
	Hardwood Forest	189,276.43
	Herbaceous Rangeland	206,740.25
	Lakes	44,543.65
	Nonforested Wetland	46,698.63
	Other Urban or Built-up Land	95.41
	Residential	760.80
	Rural Development	5,203.76
	Shrub and Brush Rangeland	495,987.42
	Streams and Canals	404.53
	Transportation, Communications, and Utilities	1,631.25
	Water	948.50
Sonoma		
	Barren	4,366.23
	Commercial and Services	87.62
	Conifer Forest	205,042.50
	Cropland and Pasture	99,397.42
	Hardwood Forest	269,688.65
	Herbaceous Rangeland	159,197.19
	Lakes	6,748.94
	Nonforested Wetland	234.85
	Other Urban or Built-up Land	135.66
	Residential	4,470.31
	Rural Development	44,110.65
	Shrub and Brush Rangeland	38,579.31
	Streams and Canals	1,055.03
	Transportation, Communications, and Utilities	361.61
	Water	0.22
Trinity		
	Barren	20,911.56
	Commercial and Services	80.28
	Conifer Forest	1,570,020.41
	Cropland and Pasture	742.12
	Hardwood Forest	243,496.60
	Herbaceous Rangeland	45,952.06
	Lakes	21,047.22
	Nonforested Wetland	1,922.81
	Other Urban or Built-up Land	7.12
	Residential	345.60
	Rural Development	1,508.27
	Shrub and Brush Rangeland	146,599.10
	Streams and Canals	17.57
	Communications and Utilities	68.50

Source: California Department of Forestry and Fire Protection CALFIRE

The data included in Table 76 are organized by Region 1 counties to allow for comparison of statistics at varying scales.

Note: Unless otherwise stated, values are provided for the entire county, not for only the portion of the county within the NCIRWMP boundary.

TABLE 76 SOCIOECONOMIC & DEMOGRAPHIC ATTRIBUTES OF NORTH COAST COUNTIES

ATTRIBUTE	METRIC	COUNTY	REGION	CALIFORNIA
DEL NORTE COUNTY				
Area/ Size	Land area in square miles, 2010	1,006.37	50,246	155,779.22
Population Size	Population, 2012 estimate	28,290	na	38,041,430
Population Size	Population, 2010	28,610	675,845	37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	-1.10%		2.10%
Population Size	Households, 2007-2011	9,818		12,433,172
Population Density	Persons per square mile, 2010	28.4		239.1
Age Distribution	Persons under 5 years, percent, 2012	5.80%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	21.10%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	14.40%		12.10%
Native American	American Indian, percent, 2012	8.80%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	78.20%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	14.30%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	-4.20%		1.30%
Unemployment	Percent unemployed, May 2013	10.40%	5% in 2010	8.60%
Economy	Retail sales per capita, 2007	$7,176		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$19,247		$29,634
Median Household Income	Median household income, 2007-2011	$37,588		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	21.20%		14.40%
HUMBOLDT COUNTY				
Area/ Size	Land area in square miles, 2010	3,567.99		155,779.22
Population Size	Population, 2012 estimate	134,827		38,041,430
Population Size	Population, 2010	134,623		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	0.20%		2.10%
Population Size	Households, 2007-2011	53,724		12,433,172
Population Density	Persons per square mile, 2010	37.7		239.1
Age Distribution	Persons under 5 years, percent, 2012	5.50%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	19.70%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	14.20%		12.10%
Native American	American Indian, percent, 2012	6.20%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	90.20%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	26.30%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	0.10%		1.30%
Unemployment	Percent unemployed, May 2013	7.70%		8.60%
Economy	Retail sales per capita, 2007	$13,428		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$24,209		$29,634
Median Household Income	Median household income, 2007-2011	$40,376		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	18.40%		14.40%
MENDOCINO COUNTY				
Area/ Size	Land area in square miles, 2010	3,506.34		155,779.22
Population Size	Population, 2012 estimate	87,428		38,041,430
Population Size	Population, 2010	87,841		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	-0.50%		2.10%
Population Size	Households, 2007-2011	34,102		12,433,172
Population Density	Persons per square mile, 2010	25.1		239.1
Age Distribution	Persons under 5 years, percent, 2012	6.00%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	22.00%		24.30%

ATTRIBUTE	METRIC	COUNTY	REGION	CALIFORNIA
Age Distribution	Persons 65 years and over, percent, 2012	17.20%		12.10%
Native American	American Indian, percent, 2012	6.30%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	83.60%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	22.10%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	-3.40%		1.30%
Unemployment	Percent unemployed, May 2013	7.00%		8.60%
Economy	Retail sales per capita, 2007	$14,716		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$23,585		$29,634
Median Household Income	Median household income, 2007-2011	$44,527		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	17.80%		14.40%
MODOC COUNTY				
Area/ Size	Land area in square miles, 2010	3,917.77		155,779.22
Population Size	Population, 2012 estimate	9,327		38,041,430
Population Size	Population, 2010	9,686		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	-3.70%		2.10%
Population Size	Households, 2007-2011	3,947		12,433,172
Population Density	Persons per square mile, 2010	2.5		239.1
Age Distribution	Persons under 5 years, percent, 2012	5.00%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	21.20%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	21.20%		12.10%
Native American	American Indian, percent, 2012	5.10%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	83.10%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	16.20%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	-3.00%		1.30%
Unemployment	Percent unemployed, May 2013	10.30%		8.60%
Economy	Retail sales per capita, 2007	$5,827		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$20,769		$29,634
Median Household Income	Median household income, 2007-2011	$35,402		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	19.80%		14.40%
SISKIYOU COUNTY				
Area/ Size	Land area in square miles, 2010	6,277.89		155,779.22
Population Size	Population, 2012 estimate	44,154		38,041,430
Population Size	Population, 2010	44,900		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	-1.70%		2.10%
Population Size	Households, 2007-2011	19,782		12,433,172
Population Density	Persons per square mile, 2010	7.2		239.1
Age Distribution	Persons under 5 years, percent, 2012	5.20%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	20.20%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	21.10%		12.10%
Native American	American Indian, percent, 2012	4.50%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	88.80%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	22.60%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	-3.50%		1.30%
Unemployment	Percent unemployed, May 2013	11.10%		8.60%
Economy	Retail sales per capita, 2007	$9,120		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$22,335		$29,634
Median Household Income	Median household income, 2007-2011	$37,865		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	18.40%		14.40%

ATTRIBUTE	METRIC	COUNTY	REGION	CALIFORNIA
SONOMA COUNTY				
Area/ Size	Land area in square miles, 2010	1,575.85		155,779.22
Population Size	Population, 2012 estimate	491,829		38,041,430
Population Size	Population, 2010	483,878		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	1.60%		2.10%
Population Size	Households, 2007-2011	184,170		12,433,172
Population Density	Persons per square mile, 2010	307.1		239.1
Age Distribution	Persons under 5 years, percent, 2012	5.70%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	21.40%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	15.20%		12.10%
Native American	American Indian, percent, 2012	2.20%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	86.40%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	31.80%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	1.30%		1.30%
Unemployment	Percent unemployed, May 2013	6.10%		8.60%
Economy	Retail sales per capita, 2007	$13,929		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$33,119		$29,634
Median Household Income	Median household income, 2007-2011	$64,343		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	10.70%		14.40%
TRINITY COUNTY				
Area/ Size	Land area in square miles, 2010	3,179.25		155,779.22
Population Size	Population, 2012 estimate	13,526		38,041,430
Population Size	Population, 2010	13,786		37,253,956
Population Size	Population, percent change, April 1, 2010 to July 1, 2012	-1.90%		2.10%
Population Size	Households, 2007-2011	5,731		12,433,172
Population Density	Persons per square mile, 2010	4.3		239.1
Age Distribution	Persons under 5 years, percent, 2012	4.40%		6.70%
Age Distribution	Persons under 18 years, percent, 2012	17.60%		24.30%
Age Distribution	Persons 65 years and over, percent, 2012	22.00%		12.10%
Native American	American Indian, percent, 2012	4.90%		1.70%
Education	High school graduate or higher, percent of persons age 25+, 2007-2011	90.30%		80.80%
Education	Bachelor's degree or higher, percent of persons age 25+, 2007-2011	19.30%		30.20%
Employment	Private nonfarm employment, percent change, 2010-2011	-4.50%		1.30%
Unemployment	Percent unemployed, May 2013	11.30%		8.60%
Economy	Retail sales per capita, 2007	$4,966		$12,561
Per Capita Income	Per capita money income in the past 12 months (2011 dollars), 2007-2011	$22,551		$29,634
Median Household Income	Median household income, 2007-2011	$37,672		$61,632
Poverty Rate	Persons below poverty level, percent, 2007-2011	17.60%		14.40%

Source: US Census 2010

TABLE 77 HISTORIC & PROJECTED POPULATION GROWTH OF NORTH COAST COUNTIES

COUNTY	1980	1990	2000	2010	2020	80–90 % CHANGE	90–00 % CHANGE	00–10 % CHANGE	10–20 % CHANGE
Del Norte	18,217	23,460	27,507	29,126	30,765	22%	15%	5%	5%
Humboldt	108,514	119,118	126,518	133,138	139,518	9%	6%	5%	5%
Mendocino	66,738	80,345	86,265	94,300	100,664	17%	7%	6%	6%
Modoc	9,449	9,678	9,449	9,547	9,285	2%	-2%	-3%	-3%
Siskiyou	39,732	43,531	44,301	46,611	45,862	9%	2%	-2%	-2%

COUNTY	1980	1990	2000	2010	2020	80–90 % CHANGE	90–00 % CHANGE	00–10 % CHANGE	10–20 % CHANGE
Sonoma	299,681	388,222	458,614	515,968	602,783	23%	15%	14%	14%
Trinity	11,858	13,063	13,022	13,442	13,402	9%	0%	0%	0%
North Coast						**14%**	**7%**	**5%**	**5%**

Source: Department of Commerce, CA Dept. of Finance 2012

TABLE 78 ECONOMICALLY DISADVANTAGED COMMUNITIES OF NORTH COAST COUNTIES

COUNTY	STATUS	PERCENT AREA	PERCENT DAC OR SDAC
Del Norte	DAC	4.49	26.05
	SDAC	21.56	
	Not DAC	73.95	
Humboldt	DAC	31.57	75.79
	SDAC	44.22	
	Not DAC	24.22	
Mendocino	DAC	30.13	85.18
	SDAC	55.05	
	Not DAC	14.82	
Modoc	DAC	0	100
	SDAC	100	
	Not DAC	0	
Siskiyou	DAC	24.93	97.92
	SDAC	72.99	
	Not DAC	2.08	
Sonoma	DAC	6.62	7.30
	SDAC	0.68	
	Not DAC	92.7	
Trinity	DAC	23.99	80.87
	SDAC	56.88	
	Not DAC	19.14	

Source: US Census 2010 and California Department of Water Resources

NORTH COAST INTEGRATED REGIONAL WATER MANAGEMENT PLAN

PHASE III
August 2014

APPENDIX Q
TECHNICAL SOURCES, RESOURCES, & REFERENCES

APPENDIX Q
TECHNICAL SOURCES, RESOURCES, & REFERENCES

Appendix Q is intended to address the IRWM Plan Standard for documenting "Technical Analysis" (DWR 2012). For a listing of stakeholder and partner input and interview participants see Appendix L Table 54 "Stakeholders & Participants in NCIRWM Planning Processes" and Table 55 "Public Outreach & Plan Input Opportunities".

Q.1 TECHNICAL SOURCES & ANALYSES

TABLE 79 TECHNICAL SOURCES FOR THE NCIRWMP UPDATE

TYPE OF DATA OR STUDY	USE IN NCIRWMP DOCUMENT	DATA SOURCE
SPATIAL DATA		
The North Coast Region: Overview of Features	Map 1	State Water Resources Control Board, U.S. Bureau of Reclamation, California Department of Conservation, California Department of Fish and Wildlife, California Department of Forestry
Land Ownership	Map 3	and Fire Protection
Cities, Towns & Other Population Centers	Map 4	Unites States Geological Survey, US Census Bureau
Urban Boundaries & Urban Growth Areas	Map 5	California Resources Agency
General Plan & Coastal Zone Boundaries	Map 6	California Coastal Commission, California Resources Agency
Special Districts (Water Resource Related)	Map 7	Bureau of Reclamation, MPGIS and Federal Water Contractors, California Department of Water Resources, California Natural Resources Agency, Humboldt County Community Development Services, Sonoma County Water Agency
Resource Conservation Districts	Map 8	California Association of Resource, Conservation Districts (CARCD)
Watershed Management Areas (WMAs)	Map 9	California Department of Fish and Wildlife
Klamath WMA	Map 12	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
Trinity River Watershed Management Trinity River WMA	Map 15	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
Humboldt Bay Watershed Management Area	Map 11	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
Eel River Watershed Management Area	Map 10	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
North Coast Rivers Watershed Management Area	Map 13	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
Russian/ Bodega Watershed Management Area	Map 14	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, United States Geological Survey
Hydrologic Units (Basins) and Areas	Map 16	California Department of Fish and Wildlife
Groundwater Basins & Sub-basins	Map 17	California Department of Water Resources
California Energy Commission Climate Zones	Map 18	California Energy Commission
Average Minimum January Temperature (1971-2000)	Map 19	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Maximum July Temperature (1971-2000)	Map 20	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Annual Average Precipitation (1971-2000)	Map 21	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Flood Zones	Map 22	Federal Emergency Management Agency
Surface Waters	Map 23	California Department of Fish and Wildlife, United States Geological Survey
Land Cover	Map 25	California Department of Forestry and Fire Protection — FRAP
Protected Area Land Ownership	Map 26	California Protected Areas Database (CPAD — www.calands.org)
Management Status of Protected Lands	Map 27	United States Geological Survey (GAP)
Significant Biological/ Wilderness Areas	Map 28	Bureau of Land Management, California Department of Fish and Wildlife
Impaired Water Bodies [303(d) Listed]	Map 29	Environmental Protection Agency, State Department of Water Resources, United States Geological Survey
Salmonid Evolutionarily Significant Units	Map 30	National Oceanic and Atmospheric Administration

TYPE OF DATA OR STUDY	USE IN NCIRWMP DOCUMENT	DATA SOURCE
Salmonid Critical Habitats	Map 31	National Oceanic and Atmospheric Administration
Critical Habitats (Non-Salmonid)	Map 32	United States Fish and Wildlife Service, National Oceanic and Atmospheric Administration
Potential Wildlife Corridors	Map 34	California Department of Fish and Wildlife, California Department of Transportation
Wildfire Risk (1971-2000)	Map 33	California Energy Commission
Land Use	Map 36	California Department of Forestry and Fire Protection — FRAP
Water Supply Infrastructure: Dams & Lakes	Map 39	California Department of Water Resources
Energy Infrastructure	Map 40	Federal Emergency Management Agency
Forest Biomass Tons/Hectare	Map 35	USFS Forest Inventory and Analysis (FIA) program and the Remote Sensing Applications Center (RSAC)
Population Density & Distribution	Map 41	US Census Bureau
Median Household Income (MHI) (2010)	Map 42	US Census Bureau
Economically Disadvantaged Communities	Map 2	California Department of Water Resources, US Census Bureau 2010 http://www.water.ca.gov/irwm/grants/resourceslinks.cfm
NCIRWMP Project Locations in the North Coast IRWM Region	Map 45	State Water Resources Control Board, North Coast Integrated Regional Water Management Planning Process
Projects in the Klamath WMA	Map 46	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projects in the Trinity River WMA	Map 51	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projects in the Humboldt Bay WMA	Map 47	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projects in the Eel River WMA	Map 43	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projects in the North Coast Rivers WMA	Map 44	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projects in the Russian/ Bodega WMA	Map 45	State Water Resources Control Board, California Department of Fish and Wildlife, California Spatial Information Library, North Coast Integrated Regional Water Management Planning Process, United States Geological Survey
Projected Average Change in Minimum January Temperature (2000-2099)	Map N1	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Maximum July Temperature (2000-2099)	Map N2	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Precipitation (2000-2099)	Map N3	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Annual Snowfall (1971-2000)	Map N4	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Snowfall (2000-2099)	Map N5	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Annual Snowmelt (1971-2000)	Map N6	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Average Annual Snowmelt (2000-2099)	Map N7	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Annual Average Sublimation *[snow evaporation]* (1971-2000)	Map N8	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Sublimation (2000-2099)	Map N9	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Annual Average Snowpack Remaining (2000-2099)	Map N10	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)

TYPE OF DATA OR STUDY	USE IN NCIRWMP DOCUMENT	DATA SOURCE
Average Annual Runoff (1971-2000)	Map 37	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Runoff (2000-2099)	Map N11	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Annual Recharge (1971-2000)	Map 38	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Recharge (2000-2099)	Map N12	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Annual Actual Evaportanspiration (1971-2000)	Map N13	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Actual Evapotranspiration (2000-2099)	Map N14	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Ave. Potential Evapotranspiration (1971-2000)	Map N15	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Ave. Change in Annual Potential Evapotranspiration (2000-2099)	Map N16	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Annual Soil Water Storage (1971-2000)	Map N17	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Annual Soil Water Storage (2000-2099)	Map N18	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Excess Water (1971-2000)	Map N19	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Excess Water (2000-2099)	Map N20	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Average Climatic Water Deficit (1971-2000)	Map N21	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Average Change in Climatic Water Deficit (2000-2099)	Map N22	United States Geological Survey, GFDL General Circulation Model, Higher Emissions (A2)
Projected Change in Wildfire Risk (2000-2099)	Map N23	California Energy Commission
Sea Level Rise & Coastal Inundation	Map 23	The Pacific Institute
Projected Coastal Flood Extent (2000-2100)	Map 44	The Pacific Institute
Sea Level Rise in Arcata Bay, Crescent City, and Environs	Map 43	Laird 2013 (see References) for CA Coastal Conservancy
TABULAR DATA		
Matrix of NCIRWMP Objectives & Statewide IRWM Priorities	Table 1	California Department of Water Resources IRWM Guidelines 2012
Matrix of NCIRWMP Objectives & Local Project Priorities	Table 2	NA
Matrix of NCIRWMP Objectives & Local Project Goals — Proposition 50	Table 3	NA
Matrix of NCIRWMP Objectives & Local Project Goals — Proposition 84	Table 4	NA
Matrix of NCIRWMP Objectives & Key Issues	Table 5	NA
Matrix of Local Project Priorities & Resource Management Strategies	Table 6	California Department of Water Resources California Water Plan 2009, 2013
Local Water & Land Use Plans For The North Coast Region	Table 7	NA
Select General Plans of North Coast Entities	Table 8	NA
Stormwater Management & Hazard Mitigation Plans of North Coast	Table 9	NA
Indicators to Evaluate NCIRWM Plan & Project Performance	Table 10	NA
Indicators to Measure Attributes of Social & Environmental Equity	Table 11	NA

TYPE OF DATA OR STUDY	USE IN NCIRWMP DOCUMENT	DATA SOURCE
Monitoring Protocols For NCIRWMP Project Evaluation	Table 12	NA
Summary of North Coast Region Attributes	Table 13	Various sources herein
Land Owner Types of the North Coast Region	Table 14	California Protected Areas Database
Municipalities & Census Designated Places of the North Coast Region	Table 15	California Department of Water Resources
Hydrologic Units of the North Coast Region	Table 16	California Interagency Watershed Mapping Committee
Rivers & Streams of the North Coast Region	Table 17	Environmental Protection Agency
Land Cover Types of the North Coast Region	Table 18	California Department of Forestry and Fire Protection's
Protected Areas of the North Coast Region	Table 19	California Protected Areas Database
Marine Managed Areas of the North Coast Region	Table 20	California Coastal Commission, California Department of Fish and Wildlife, State Water Resources Control Board
Wild & Scenic Rivers of the North Coast Region	Table 21	California Department of Fish and Wildlife
Impaired Streams that Flow Directly to North Coast Wild & Scenic Rivers	Table 22	California Department of Fish and Wildlife, Environmental Protection Agency
Nat'l Wilderness Preservation System Areas of the North Coast Region	Table 23	Bureau of Land Management
Beneficial Uses of Water in the North Coast Region, 2011	Table 24	North Coast Regional Water Quality Control Board, Water Quality Control Plan (Basin Plan) 2011
Section 303(d) Impaired Waters of the North Coast Region (2011)	Table 25	Environmental Protection Agency
TMDL Status for Impaired Waters of the North Coast Region	Table 26	North Coast Regional Water Quality Control Board
Threatened & Endangered Species of the North Coast Region	Table 27	US Fish and Wildlife Service, California Department of Fish and Wildlife, NatureServe online
Critical Habitats of the North Coast Region (Non-Salmonid)	Table 28	National Oceanic Atmospheric Administration, United States Fish and Wildlife Service
Critical Habitat for Marbled Murrelet (Area)	Table 29	National Oceanic Atmospheric Administration, United States Fish and Wildlife Service
Critical Habitats of Salmonids in the North Coast Region	Table 30	National Oceanic Atmospheric Administration, United States Fish and Wildlife Service
Critical Habitats that Intersect with North Coast Impaired Streams	Table 31	United States Fish and Wildlife Service
Habitat Attributes of North Coast Coho Salmon	Table 32	NOAA/ National Marine Fisheries Service, Coho Recovery Plan 2012 Section 8
Land Use Types of the North Coast Region	Table 33	California Department of Forestry and Fire Protection
Water Resources & Water Use for North Coast Region Basins	Table 34	North Coast Regional Water Quality Control Board, Water Quality Control Plan (Basin Plan) 2011
DAC Water & Wastewater Service Providers of the North Coast Region	Table 35	NA
Proposition 50 Funded Projects	Table 36	NA
Proposition 84 Funded Projects	Table 37	NA
California Energy Commission Funded Projects	Table 38	NA
Strategic Growth Council Funded Projects	Table 39	NA
Other Funded Projects [Placeholder]	Table 40	NA
Environmental Compliance Summary for NCIRWMP Projects	Table 41	NA
Impact & Benefit Analysis for NCIRWMP Projects	Table 42	Contractor
Indicators of Benefits And Impacts of Proposition 50 Projects	Table 43	Contractor
Indicators of Benefits And Impacts of Proposition 84 Projects	Table 44	Contractor

TYPE OF DATA OR STUDY	USE IN NCIRWMP DOCUMENT	DATA SOURCE
Estimated Project Benefits For Water Supply, Quality, & Services	Table 45	Contractor
Estimated Project Benefits For Designated Beneficial Uses of Water	Table 46	Contractor
Summary of NCIRWMP Use of Funds	Table 47	Contractor
Summary of Funding & Financing to Date	Table 48	Contractor
Small Community Toolkit Elements	Table 49	Contractor
Economically Disadvantaged Community (DAC) Demonstration Project	Table 50	Contractor
Energy Efficiency Block Grant Program	Table 51	Contractor
Common Local Agency Funding Mechanisms	Table 52	Contractor
Summary of Funding Agencies, Mandates, & Eligibility	Table 53	Contractor
Stakeholder Participation in the NCIRWM Planning Process	Table 54	NA
Public Outreach & Plan Input Opportunities	Table 55	NA
Sectors Assessed for Vulnerability to Climate Change	Table 56	Climate Change Handbook for Regional Water Planning: California Department of Water Resources, US Environmental Protection Agency, Resources Legacy Fund, US Army Corps of Engineers
Projected Changes to Climate & Hydrology of North Coast Counties	Table 57	United States Geological Survey, California Energy Commission
Projected Changes to Climate & Hydrology of North Coast WMAs	Table 58	United States Geological Survey, California Energy Commission
Definitions for Climate Change Projection Confidence Ratings	Table 59	Contractor
Definitions for Sensitivity to Climate Change Impacts	Table 60	Contractor
Definitions for Adaptive Capacity to Climate Change Impacts	Table 61	Contractor
Matrix to Determine Climate Change Vulnerability	Table 62	Contractor
Climate Change Vulnerability Assessment (CCVA), North Coast Region	Table 63	Contractor
Land Owner Types of North Coast WMAs	Table 64	California Protected Areas Database)
Groundwater Basins of North Coast WMAs	Table 65	California Department of Water Resources
Land Cover Types of North Coast WMAs	Table 66	California Department of Forestry and Fire Protection
Land Use Types of North Coast WMAs	Table 67	California Department of Forestry and Fire Protection
Economically Disadvantaged Communities of North Coast WMAs	Table 68	California Department of Water Resources, US Census Bureau 2010
Native American Tribal Lands of the North Coast Region	Table 69	na
Native American Tribal Nations of the North Coast Region	Table 70	NCRP, via California Indian Environmental Alliance
County Size and Relative Proportion of the North Coast Region	Table 71	ARC GIS
Land Owner Types of North Coast Counties	Table 72	California Protected Areas Database (CPAD — www.calands.org)
Groundwater Basins of North Coast Counties	Table 73	California Department of Water Resources
Land Cover Types of North Coast Counties	Table 74	California Department of Forestry and Fire Protection
Land Use Types of North Coast Counties	Table 75	California Department of Forestry and Fire Protection
Socioeconomic & Demographic Attributes of North Coast Counties	Table 76	US Census Bureau
Historic & Projected Population Growth of North Coast Counties	Table 77	US Department of Commerce, California Department of Finance 2012
Economically Disadvantaged Communities of North Coast Counties	Table 78	California Department of Water Resources, US Census Bureau 2010

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Q. 3 PERSONAL COMMUNICATIONS

Mr. Donald Bradford, Indian Health Service. 2014. Personal Communication on February 28, 2014. For Section 12 herein ("Long-Term Financing & Implementation")

Mr. Michael Starinsky, USDA Rural Utility Service. 2014. Personal Communication on February 28, 2014. For Section 12 herein ("Long-Term Financing & Implementation")