NORTH COAST RESOURCE PARTNERSHIP

TECHNICAL REPORT FOR THE NORTH COAST OF CALIFORNIA ECOSYSTEM SERVICE VALUATION

EARTH ECONOMICS

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Presented to:
West Coast Watershed and the North Coast Resource Partnership

14 March 2016

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ACKNOWLEDGMENTS

We would like to thank all who supported this project, including Karen Gaffney and Katherine Gledhill of West Coast Watershed, the University of California Cooperative Extension, and the Earth Economics Board of Directors for their continued support and guidance.

INTRODUCTION TO VALUATION

All economies operate within and are dependent on healthy landscapes, and if the landscape is degraded, economies can falter.[1] Like a road, building, or other built capital asset, the goods and services produced by the landscape of California's North Coast region are also economic assets.

California's North Coast Region produces a multitude of goods—timber, wild mushrooms, milk and cheese, salmon, wine, and clean water, among others. These products are bought and sold in markets—they have economic value. Natural and working landscapes in the North Coast region provide a suite of services and benefits that—although less tangible than the goods outlined above—provide economic value through flood risk reduction, carbon sequestration, groundwater recharge, recreation opportunities such as hiking and camping, and the removal of air pollutants. An ecosystem that reduces the risk of flood damage, for example, also provides benefits by protecting local jobs, preventing costs such as infrastructure repairs, reconstruction, and restoration, and by keeping people safe.

Without healthy natural lands, many of the services and benefits that we currently receive for free would not exist. Without natural services, costly built capital solutions, which often have lower resilience and shorter longevity, would need to be implemented.[2] Additionally, not every service can be replaced, like a beautiful view, a native plant or animal species, or a culturally significant site or resource. Sometimes, if natural areas are lost, their economic goods and services are also lost. The goods and services of a healthy landscape provide a steady stream of benefits to residents, creating a stable, resilient, and prosperous economy and a healthy quality of life.[3]

Just as the value of built capital assets can be measured, so too can natural assets be quantified in economic terms. If an area's natural assets were appraised like a business, based on the value of the goods and services they provide, how much would they be worth? Many would argue that the ecosystems within a landscape are priceless.[4] Considering something as priceless, however, generally leads to either an extremely high value, or, as in traditional economic analyses of nature's benefits, a value of zero. When it comes to natural capital, the latter outcome has generally prevailed and is often the default value in decision making, leading to the loss and degradation of valuable natural areas. Pricelessness may not be a practical value when it comes to making decisions about development and natural resource extraction. On the other hand, like a human life, the natural landscape provides real value, and this value can be identified using ecosystem valuation techniques. The identification and monetary valuation of nature's goods and services provides evidence of the economic importance of the North Coast's landscape.

Natural capital valuation is becoming increasingly necessary in today's world where climate change threatens our communities and systems. Throughout history, new economic measures have been constructed based on decision making needs. In 1930, the United States lacked measures of Gross Domestic Product (GDP), unemployment, inflation, consumer spending, and money supply.[5] Benefit-cost analysis and rate of return calculations were initiated after the 1930s to examine and compare investments in built capital assets such as roads, power plants, factories, and dams. These basic economic measures are now standard guides to investment in today's economy, and are foundational to decision making by elected officials and others. Natural asset valuation is a necessary new economic measure that can reveal the economic benefits of investment in maintaining or restoring natural landscapes.

Today, the North Coast region is valued as a place to live, work, and visit. This value is inextricably linked to the health of its ecosystems, productivity of its natural assets, and the opportunity these landscapes provide. This report aims to quantify the valuable contributions to the economy that the working lands and natural systems of California's North Coast provide – not only internal to the North Coast region, but also services such as carbon sequestration, biodiversity, and water supply and quality that benefit all of California and the world.

INTRODUCTION TO ECOSYSTEM GOODS AND SERVICES

This section introduces the concepts of natural capital and ecosystem services and shows how they provide value to human communities and economic systems.

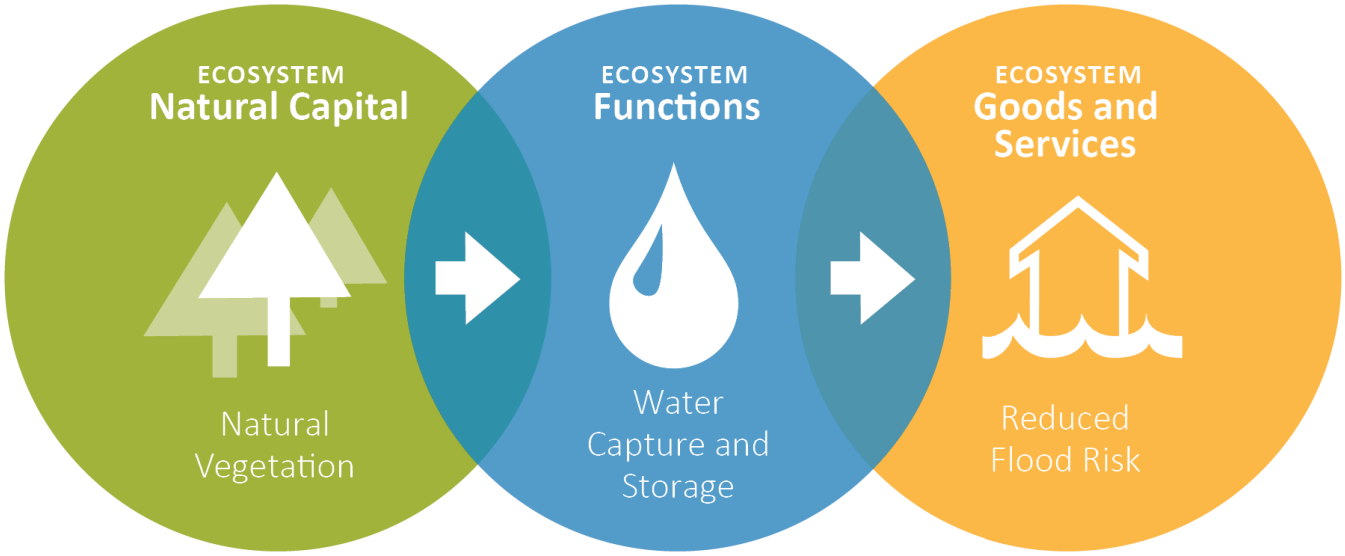
NATURAL CAPITAL AND ECOSYSTEM SERVICES

The term "natural capital" is an extension of the traditional economic notion of capital. Economies depend on built, financial, human, social, and natural capital, and a robust and resilient economy requires that all these forms of capital are healthy and work productively and synergistically.

Just like other forms of capital, natural capital also provides a flow of goods and services. Natural capital has

specific ecosystem functions that provide the economy with a diverse flow of goods and services. For example, natural capital assets within a watershed (e.g. forests, wetlands, and rivers) perform critical functions such as capturing, storing, conveying, and filtering rainfall that produces goods such as potable water for communities or services such as reduced flood risk which protects people and built capital.[7] Ecosystem goods and services are the end product of natural capital and ecosystem functions, and are defined as the benefits people derive from nature. Figure 1 illustrates the relationship between natural capital, ecosystem functions, and the production of ecosystem goods and services.

Figure 1. Goods and services flow from natural capital



Ecosystem Goods

Goods are physical objects created as a result of a process, like drinking water, timber, fish, crops, and wildlife. Ecosystem goods are typically tangible items produced by nature that are quantifiable in terms of flow, volume, weight, or quantity. The quantity of water produced per second, the weight of catch while fishing, or the board feet of timber cut in a 40-year rotation can be measured by the physical quantity that an ecosystem produces over time. The production of goods can be easily valued by multiplying the quantity produced by the current market price.

Most goods are excludable, which means that if one individual owns or uses a particular good, that individual can exclude others from owning or using the same good. For example, if one person eats an apple, another person cannot eat that same apple. Excludable goods can be traded and valued in markets. The sustainable stream of goods provided by an ecosystem is a "flow of goods." These goods can provide enormous economic return. However, the collection and sale of ecosystem goods can affect the ability of the remaining ecosystem to provide other goods and services, such as flood protection, clean drinking water, or recreation. By examining the value of the entire suite of ecosystem goods and services, the economic relationships and tradeoffs can be better understood.

Ecosystem Services

Ecosystem services are the beneficial conditions and processes through which natural ecosystems sustain and fulfill human life. Unlike ecosystem goods, ecosystem services are not tangible items that you can hold. Flood risk reduction, recreational value, aesthetic value, and water filtration are a few examples of the services that ecosystems provide.

By nature, many ecosystem services are non-excludable. They cannot be privately owned and are not traded in markets. Natural flood risk reduction, for example, cannot be owned or traded, unlike built infrastructure such as a dam or levee. Flood risk reduction is a non-excludable service because all downstream residents benefit from the flood risk reduction provided by forested land or dams upstream. Similarly, when one person enjoys a view of the sunset, it does not prevent another person from enjoying the same sunset.

Many ecosystem services, such as oxygen production, soil regulation, and storm protection, either are not, or cannot be, sold in markets. However, markets for some ecosystem services are possible and slowly growing; water temperature trading and carbon sequestration markets are examples.

A FRAMEWORK FOR ASSESSING ECOSYSTEM SERVICES

Within the past decade, considerable progress has been made to systematically link functioning ecosystems with human well-being. Work completed by de Groot et al. (2002),[8] the Millennium Ecosystem Assessment (MEA),[7] and The Economics of Ecosystems and Biodiversity[9] (TEEB) have marked key advancements in this task.

Recognizing the lack of a standardized framework for the growing amount of information on the value of ecosystem goods and services, de Groot et al. were among the first to present a conceptual framework and typology for describing, classifying and valuing ecosystem functions, goods and services in a consistent manner. They accomplished the initial step of translating the complexity of ecological structures and processes into a limited set of ecosystem functions and subsequently identified how these functions provide goods and services of value to people.

In 2001, an international coalition of over 1,360 scientists and experts from the United Nations Environmental Program, the World Bank, and the World Resources Institute assessed the effects of ecosystem change on human well-being. A key goal of the assessment was to develop a better understanding of the interactions between ecological and social systems, and in turn, to develop a knowledge base of concepts and methods that would improve our ability to "...assess options that can enhance the contribution of ecosystems to human well-being."[7] This study produced the landmark MEA, which classifies ecosystem services into four broad categories according to how they benefit humans.

The conceptual framework initiated by de Groot et al. and developed through the MEA provided the impetus for several subsequent initiatives and programs, most notably the TEEB, referenced previously. The goal of TEEB is to help decision makers recognize and incorporate ecosystem service benefits into decision making by using a structured approach to valuation.

Although it is well recognized that further research and refinement is needed since the frameworks simplify reality, these studies provided a key conceptual framework for valuing natural capital and its related ecosystem goods and services.

Earth Economics has adapted the MEA's ecosystem service descriptions to develop a framework that best articulates and values the vast array of critical services and benefits that natural capital provides. Table 1 in Appendix C defines the four categories and 21 distinct ecosystem services used in Earth Economics' framework.

ECOSYSTEM SERVICE VALUATION METHODOLOGY

The goal of this analysis is to provide ecosystem service values for natural areas of the North Coast region of California. The study area is a hydrological region that is comprised of six Watershed Management Areas (WMA) and covers the jurisdictional boundaries of various North Coast counties. 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.

This chapter describes the steps taken in the valuation analysis. The first step is to assess the extent of natural capital in the study area. This is accomplished by determining the spatial extent of land covers using Geographic Information System (GIS) software. Next, the Benefit Transfer Method (BTM) is used to determine dollar-per-acre values for ecosystem services. Last, these two datasets are combined to estimate the total value of economic benefits provided by the North Coast. These methods are described in detail in the following sections.

LAND COVER ANALYSIS

First, land cover acreage for the North Coast region was derived from the U.S. Forest Service's CALVEG spatial data using GIS software.[10] The acreage was calculated for every regional description category in the CALVEG data and summarized among the entire outer coast study area, by county, and by WMA. The regional description categories were grouped into 17 different land cover categories for the ecosystem service valuation (see Table 2 in Appendix C).

The GIS data was modified in several ways to enable a more detailed description of the natural capital of the study area. "Spatial attributes" were constructed to describe unique locations of ecosystems within the landscape. In this analysis, we considered four spatial attributes that affect ecosystem service values: proximity to agricultural areas, and the location of land covers within coastal, riparian, or urban zones. Identifying the spatial attributes of land cover data allows the application of more granular study values and increases accuracy as each attribute provides information that narrows the scope of values and mitigates uncertainty. Valuations tend to be more accurate when the spatial distribution of values is taken into account.[11] In the following paragraphs, we provide examples of how these spatial attributes affect ecosystem service values.

Agriculture is a unique land cover because it provides ecosystem goods and services directly to consumers, and it also relies on a range of ecosystem services to support

production. Non-point sources of pollution related to agriculture risk damage to ecosystems, but management regimes can promote agricultural practices that improve the ecological function of farmland.[12] Pollinating services, weed and pest control, and water purification aid in the production process while minimizing costs.

The western border of California meets the Pacific Ocean, providing a bounty of goods and services for California's ocean economy.[13] In California, 77% of the population lives within coastal counties and generates 86% of all economic activity. Areas in proximity to coastlines benefit from unique ocean and coastal resources. Land covers within or near coastal areas generate different services than inland land types, like essential habitat for living resources not found in freshwater habitats, wave attenuation, unique recreational opportunities, and transportation.

Riparian borders are a vegetative buffer that surrounds a body of water. Land covers that reside within these borders often have a large positive effect on nearby waters and are more ecologically productive.[14] The vegetation along a body of water helps reduce nitrogen and phosphorus levels, sedimentation, maintain base flow, and increase erosion control.

The majority of the North Coast region is rural. The lack of development leaves open space for ecosystems to thrive, benefiting residents and tourists alike. Ecosystem service values vary significantly along the urban-rural gradient.[15] Areas of higher urbanization tend to have degraded ecosystems, but urban parks and open space are also tremendously valuable as they provide services in an urban landscape. For example, Annadel State Park offers Santa Rosa residents hiking and biking trails, provides wildlife habitat that promotes seed dispersal and pollination, and creates opportunities to explore a scenic view in an urban setting. It is important to identify which services are provided in land covers that are within and near urban areas to control for the variation in values.

Table 3 in Appendix C describes how each spatial attribute was derived and the datasets involved in calculating the boundaries of each spatial attribute. Appendix A describes some limitations arising from this spatial attribute analysis.

VALUATION METHODOLOGY

With land cover acreage and spatial attributes defined, the next step in the analysis involved employing benefit transfer methodology (BTM) to identify ecosystem services values. Due to the large size of the North Coast region and variety of ecosystems, ecosystem services, and socioeconomic contexts, function transfer methods were not used. Instead, a "unit transfer" approach was taken, and values were only adjusted for inflation during the transfer.

The Benefit Transfer Method

Benefit transfer methodology (BTM), broadly defined as "...the use of existing data or information in settings other than for what it was originally collected", is frequently used to indirectly estimate the value of ecological goods or services.[16] BTM is often the most practical option available to quickly generate reasonable estimates at a fraction of the cost of conducting local, primary studies. This methodology is widely used in the field of ecosystem service valuation.[17]

The BTM process is similar to a home appraisal in which the value and features of comparable, neighboring homes (e.g. two bedrooms, garage, one acre, recently remodeled) are used to estimate the value of the home in question. In our analysis, the BTM process identifies previously published ecosystem service values from comparable ecosystems and transfers them to our study site, the North Coast of California. As with home appraisals, the BTM results can be somewhat rough, but quickly yield values appropriate for policy work and analysis.

The process begins by finding primary studies with land cover classifications (wetland, forest, grassland, etc.) comparable to those within the study area. Any primary studies deemed to have incompatible assumptions or land cover types are excluded. Individual primary study values are adjusted and standardized for units of measure, inflation, and land cover classification to generate an "apples-to-apples" comparison. However, transferring primary study values using a unit transfer approach assumes that supply and demand factors (such as those described above) between the primary study site and the study site of this report are the same, and this assumption can lead to under- or overestimates of the actual value of a service in the North Coast. Appendix A describes in detail the limitations of this type of approach.

Selecting Valuation Literature

Primary studies are selected from Earth Economics' Ecosystem Service Toolkit (EVT). The EVT is one of the largest repositories of published, peer-reviewed primary valuation studies, reports, and gray literature on the value of ecosystem services.[1] Primary valuations use techniques developed and vetted within environmental and natural resource economics communities over the last four decades. The techniques can be grouped into three broad categories: 1) direct market valuation approaches; 2) revealed preference approaches; and 3) stated preference approaches.[18] Table 4 in Appendix C provides

1 Visit www.esvaluation.org for more information.

descriptions of the most common valuation techniques and examples of how they can be analytically employed.

In addition to the EVT, a wealth of information on biophysical carbon sequestration and storage rates can be found in published scientific literature for most ecosystems. This analysis combines biophysical carbon sequestration from these studies and the social cost of carbon[19] to provide accurate estimates of the economic value of climate stability.

Before a value is added to a report, we examined the degree of correspondence, or the similarity of location and socioeconomic indicators from the primary data and the applied study region.[20] Conducting a defensible benefit transfer requires careful thought, research, and choices, particularly as regards the transferability between the study site (the site of the original published literature) and the transfer site (the site to be valued through benefit transfer). The following criteria were used to assess the transferability of literature values from the EVT to the North Coast region:

Criteria 1: Similarity of ecosystem goods and services

At the most basic level, the commodity being valued at the study site and the transfer site should be the same. The similarity of uses, goods, and services at the study and transfer sites is critical for a valid transfer.[20–23] Studies that valued services that do not exist in the North Coast region were not included in the dataset. For example, a value for protection from hurricane damage from the East Coast of the United States is not an appropriate service to transfer to the North Coast of California.

Criteria 2: Similarity of land cover types

Like Criteria 1, the similarity between land cover types at both sites is important. Errors associated with benefit transfers are lessened as the similarity between the study site and the transfer site increases.[11,20,24] Land cover types which did not exist in the CALVEG data were excluded from the dataset. For example, tropical rainforests do not exist in the North Coast and are therefore inappropriate land cover types for value transfer.

Criteria 3: Literature is of sound methodology

Earth Economics ensures that credible sources with the latest methods provide values for this analysis. Studies must meet data quality conditions, including the use of correct economic methodologies.[20,21,25,26] There are common best practice methods for valuing market and non-market goods and services, with certain valuation methods best suited to specific ecosystem services. For example, the value of the food ecosystem service is more appropriately valued using market pricing techniques than a stated preference approach. Table 5 in Appendix C lists each ecosystem service and the most appropriate valuation methodologies as identified by the literature.[27] Additionally, studies using primary valuation methods were prioritized over those using secondary methodologies. Where a gap in primary valuations existed, a secondary valuation study was used.

Criteria 4: Transferability of ecosystem services

Some ecosystem services are more easily transferred than others. Ecosystem processes with large or even global benefits, such as carbon sequestration, are highly transferable. Other services with more local effects, like habitat for a specific species or aesthetic views, are not as transferable. Table 6 describes the transferability of each ecosystem service in Earth Economics' classification.

Regardless of transferability, ecosystem services with study sites from California were given priority. However, many gaps existed in the California valuation literature, in which case non-California studies were utilized. For services with low transferability, values were transferred only from California. Services with medium transferability were derived from temperate regions in the United States. Services with high transferability were derived from areas in the greater United States.

Criteria 5: Similar demographics and cultural attitudes

Benefit transfers are more accurate when the demographic characteristics, attitudes, and beliefs of consumers at the transfer and study sites are similar.[21,28,29] Although it is difficult to determine cultural attitudes of sites from published literature, to partially address these effects, only valuation studies from the United States were considered for the dataset.

Calculating Ecosystem Service Values

All ecosystem service values were standardized to account for differences in units and for inflation. The unit of measure for this analysis is dollars per acre per year, adjusted to 2014 United States dollars using Bureau of Labor Statistics Consumer Price Index inflation factors.

Values for ecosystem services can vary due to factors such as scarcity, income effects, and uniqueness of habitat, among others. The values provided include an array of marginal and average values for ecosystem services that incorporate different potential demand scenarios and states of the environment. By extracting values from a large pool of studies and contexts, we illustrate a well-informed value approximation. The analysis presents high, low, and average dollar-per-acre values that reflect the variability and uncertainty in the data, with the average value representing a measure

of central tendency. Table 7 in Appendix C summarizes the land cover/ecosystem service combinations that were valued in this analysis. One to ten ecosystem services were valued for each land cover type.

A combination not included in the analysis does not necessarily mean that the ecosystem does not produce that service or that the service is not valuable, but rather shows a lack of primary, peer-reviewed data for that service. For example, shrubland provides highly valuable services such as recreation, habitat, and carbon sequestration, yet there are few valuation studies of this land cover type. Caution should be exercised when comparing total ecosystem services values across land covers, as the difference in values could stem from an information gap rather than true differences in ecosystem service value. Continued investment in local primary valuations is an ongoing need in order to fill in the gaps of this valuation. See Appendix A for a detailed discussion on study limitations.

Using the previously outlined criteria, total per-acre-per-year values for each land cover, ecosystem service, and spatial attribute combination were selected from the literature. These per-acre-per-year values were multiplied by the number of acres fitting the combination. The result was an annual value representing the flow of ecosystem service value provided for each land type in question. These flows were then summed across all land cover types in the North Coast region to produce a total ecosystem service value for the entire study area. Equation 1 shows the formula used in determining total ecosystem service values of the study area.

Equation 1. Total ecosystem service value calculation

$$Total\ Ecosystem\ Service\ Value = \sum[Acres_{ij} * \sum(\$/acre/year)_{ijk}]_{ij}$$

Where:

i = spatial attribute i

j = land cover type j

$Acres_{ij}$ *= the total number of acres for each land cover j in the spatial attribute i*

$(\$/acre/year)_{ijk}$ *= the dollar per acre per year value of each ecosystem service k on each land cover j in spatial attribute i*

Here we describe in detail the process outlined in Equation 1 using real data for coniferous forests outlined in the results section of this report. Each primary study provided a low, average, and high value estimate for one or more ecosystem services on a given land cover type. Studies are also tagged with one to four spatial attributes, which are then only used on land covers which were assigned the corresponding attributes. The example below demonstrates how these are combined in Equation 1 using the combination of Coniferous Forest and the Riparian and Urban spatial attributes. Overall, 383 acres of land in the North Coast match this combination ($acres_{ij}$). Ecosystem service values were combined from valuation studies under 7 different ecosystem services. When studies valued the same ecosystem service, corresponding low, average, and high values were calculated from the range of studies. Study values were summed if the studies valued different ecosystem services (for example, natural biological resistance and active animalian biological control). In the example below, bold values show the final dollar per acre per year values for each ecosystem service k. These are summed to get the total dollar per acre per year value for the land cover and spatial attribute combination (in this example, 1,827 to 10,016, average of 5,372). This value is multiplied by the number of acres for this combination, 383, to produce final annual values for this combination (669,294 to 3833,358, average 2,055,946).

Land Cover (j): Coniferous Forest
Attribute (i): Riparian, Urban
Area Valued (Acresij): 383

Ecosystem Service (k)	Author(s)	Low ($/acre/year)	Average ($/acre/year)	High ($/acre/year)
Aesthetic Information		**347**	**2,675**	**5,508**
Real Estate Value	McPherson and Simpson 2002	347	1,258	2,170
Real Estate Value	Thompson et al. 1999	5,508	5,508	5,508
Air Quality		**31**	**93**	**169**
Removal of Air Pollutants	McPherson and Simpson 2002	78	124	169
Removal of Air Pollutants	McPherson et al. 1998	31	31	31
Biological Control		**14**	**14**	**14**
Natural Resistance	Pimentel 1998	2	2	2
Natural Resistance	Pimentel et al. 1997	2	2	2
Active Animalian Control	Pimentel 1998	12	12	12
Climate Stability		89	144	665
Greenhouse Gas Sequestration	Smith et al. 2006	89	144	665
Soil Formation		**6**	**6**	**6**
Unspecified	Costanza et al. 2006	6	6	6
Water Capture, Conveyance, & Supply		**101**	**317**	**528**
Stormwater Runoff Reduction	Hill et al. 2013	144	144	144
Stormwater Runoff Reduction	McPherson and Simpson 2002	90	108	127
Water Supply	Costanza et al. 2006	11	197	384
Water Quality		**1,240**	**2,123**	**3,127**
Phosphorus Removal	Hill et al. 2013	710	815	920
Nitrogen Removal	Hill et al. 2013	531	1,309	2,207
Total $/acre/year value		1,827	5,372	10,016
Total Annual Ecosystem Service Value		699,294	2,055,946	3,833,358

A total of 240 land cover/spatial attribute combinations were valued for the North Coast (i.e. this processes was undergone 240 times). Due to space considerations, these tables are provided outside this report as supplementary information.[2] The annual totals are summed over all land covers and spatial attributes to provide a total value flow for the entire North Coast. This annual dollar value is like an annual flow of income from natural capital. It represents the benefits people receive each year from the natural areas of the North Coast region.

ASSET VALUATION METHODOLOGY

Provided the natural capital of the North Coast region is not degraded or depleted, the annual flow of ecosystem services will continue into the future. Just as with built capital, we can calculate the asset value of natural capital in the North Coast.

Asset values provide a measure of the expected benefits flowing from natural capital over time. The net present value allows a comparison of benefits that are produced at various points in time. To calculate the net present value, a discount rate must be used.

Discounting allows sums of money from different time periods to be compared by expressing the values in present terms. In other words, discounting shows how much future sums of money are worth today. Discounting is designed to take two major factors into account:

- Time preference: people tend to prefer consumption now over consumption in the future, meaning a dollar today is worth more than a dollar received in the future.
- Opportunity cost of investment: investment in capital today provides a positive return in the future.

However, experts disagree on the appropriate discount rate for natural capital benefits.[30,31] Traditional economic discounting uses a constant rate. For example, the Federal Office of Management and Budget uses a standard rate of 7%. High discount rates such as this causes benefits far in the future to be highly discounted and can tremendously affect projects that consider costs and benefits over long time periods. As natural capital can produce benefits for hundreds of years, this issue is particularly relevant to this work.

One solution is to use a declining discount rate.[32,33] Empirical evidence shows decision makers act in terms of declining discount rates rather than constant rates for project planning.[34]in the long run and in the absence of a commitment device, society is stuck in a situation where all agents prefer further investments, yet no agent invests. This holds no matter whether agents are aware of the time inconsistency of their preferences. As a consequence, awareness of the time-inconsistency problem poses at best a short run remedy. Moreover, such an outcome may be Pareto inefficient and may explain the weak performance of long-run environmental policies.","shortTitle":"Now or Never","author":[{"family":"Winkler","given":"Ralph"}],"issued":{"date-parts":[["2009"]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} Declining discount rates also consider future and current generations in a more balanced form and can help mitigate uncertainties concerning the future.

To account for uncertainty in the use of discount rates, we utilize a constant 3% discount rate and a declining discount rate as outlined by Weitzman (2001)[35] for this analysis. Utilizing multiple discount rates shows how differences in time preference change the valuation of natural assets.[36] The asset value of ecosystem services produced by the North Coast region is calculated using the net present value (NPV) of the flow of benefits as seen in Equation 2.

Equation 2. Net present value formula

$$NPV = \sum_{n=1}^{T} \frac{C_n}{(1+r_n)^n}$$

Where:
C_n = net benefit at time n
T = Total time period
r_n = discount rate at time n

Net present values can be calculated over different timeframes depending on the purpose of the analysis and the nature of the project. In the case of natural capital valuations, ecosystems are self-maintaining, stable over long periods, and continuously productive as long as they remain unimpaired. Although arbitrary, we chose a timeframe of 100 years for the NPV calculation. It is, however, worth noting that, if kept healthy, the natural capital of the North Coast watersheds will continue to provide benefits well beyond 100 years into the future.

The asset value calculated in this report is based on a snapshot of the current land cover, consumer preferences, population base, and productive capacities. As such, it does not consider the possibility of future environmental degradation or change in value due to scarcity. Rather, it assumes that the ecosystems of the North Coast region will remain the same over 100 years. For more information on the caveats of this analysis, see Appendix A.

For example, the average annual benefits provided by the North Coast is calculated as approximately 27 billion in the following section, in other words, C_n = 27 billion. C_n

2 Supplementary information may be downloaded at the following link: provide link here.

is equal across all years, as we assume the asset value is based on a snapshot. For traditional discounting using a 3% discount rate, r_n is always .03. However, for the declining discount rate, , r_n changes over time, beginning from 4% up to year 5, 3% up to year 25, 2% up to year 75, and 1% after year 75. The result is that in each year of the calculation (i.e. 1 to 100), Cn is discounted below 27 billion, depending on the rate and year. These discounted values are summed across 100 years to estimate the NPV.

VALUATION RESULTS AND DISCUSSION

LAND COVER

Mapping goods and services provided by built capital such as factories, restaurants, schools, and businesses provides a view of the region's economy across the landscape. Retail, residential, and industrial areas are found throughout the landscape. The same is true for natural capital in the North Coast region. The GIS analysis shows the size and location of the natural assets of the North Coast region. Table 9 through Table 11 present the acres of the North Coast's natural assets, presented by the total study area, by WMA, and by county.

Very little of the North Coast is urban or agricultural; less than half a percent is developed, and only four percent is designated as cropland or pasture. The vast majority of the North Coast is forested (75%). Herbaceous land covers (grassland and shrubland) are the second most common at 18% of total land cover.

ANNUAL VALUE

The North Coast region provides between $15 billion and $45 billion in ecosystem service benefits to people each year, with an average of $27 billion.

Table 12 shows the annual ecosystem service values for the entire north coast by land cover type. Table 13 and Table 14 show the annual ecosystem service values by WMA and by county, respectively. The annual values show the variety and levels of benefits that the North Coast's ecosystems provide. Forests provide the largest annual ecosystem benefit due to their prevalence. Coniferous forests make up over half of the North Coast's land cover and about three quarters of the annual value from ecosystem goods and services in the region. Combining all three forest types, their values account for roughly 90% of the total annual value.

Per acre results reveal the ecosystems that provide the most benefit per unit. However, caution must be used when comparing per-acre results across land covers as these differences may be due to information gaps rather than other factors. While forests provide the greatest annual value due to their prevalence, throughout the North Coast region, beaches, wetlands, and open water sources provide high per-acre values.

These results show the significant amount of economic benefits provided by the North Coast. Yet, these numbers are still an underestimate since many ecosystem service and land cover combinations could not be valued.

ASSET VALUE

We estimate the asset value of the ecosystems of the North Coast region to be approximately $861 billion using a 3% discount rate or $1.3 trillion using a declining discount rate. Table 15 shows the range and average NPV over the entire study area. Table 16 and Table 17 show the range and average NPV by WMA and by county, respectively. Note that these calculations do not include built infrastructure in the region; only the value of ecosystem service benefits. The asset values shown here reveal the scope and scale of benefits to the regional economy and communities.

These values demonstrate that investment in natural capital can provide vast long-term benefits if these assets are conserved or enhanced. Moreover, investment in natural capital can yield a tremendous return on investment due to both the low cost of investment and the large amount of benefits restored.

DISCUSSION

Assessing the economic value of landscapes and ecosystem services is challenging. The values presented in this study represent a broad screening-level appraisal of the natural capital assets of the North Coast of California. This analysis represents a conservative baseline for understanding and measuring the substantial value of the North Coast's extensive natural assets. Further research and data gathering both locally and throughout the greater United States will help to fill gaps and improve our understanding of the full value of the region's natural capital and its complex interactions with the local economy.

With better data and emerging valuation methods, it is very likely that the values here represent only a fraction of nature's true contribution to the economy. Even in this early stage, these values can immediately be used to educate stakeholders, improve decision-making, and structure funding mechanisms. Here are some specific opportunities to apply these results:

Educating the public and policy-makers

For many decades, nature has largely been assumed to provide 'free' services to the local economy. However, whether through supplying water or carrying away waste products, nature provides critical services. Because we have come from a time of natural resource abundance, people and their accounting systems have valued these services at zero. This view is starting to change, and the values in this report can be used to convey a clear and detailed message that nature is critical to the economy and does indeed have a dollar value. This message is the first step in changing policy and practice.

Estimating economic rates-of-return for conservation projects

The spatial data, economic values, and methods described in this report can be used to estimate a rate of return on conservation investments such as easements, open space acquisitions, and stewardship/restoration activities.

Scaling investments in natural capital to the size of the asset

Combining an understanding of the scale of natural capital asset value in the North Coast with an understanding of the potential return on natural capital investment can be used to inform future investments and determine the appropriate scale of conservation activities.

Encouraging investment in natural capital and its stewardship

The information in this report can incentivize and enable private and public investment in natural capital stewardship. Values can be used to show how payments for ecosystem services or investment in natural assets can support jobs, conserve biodiversity, build resiliency, and provide high returns on that investment to a broad spectrum of beneficiaries.

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APPENDIX A. STUDY LIMITATIONS

Valuation exercises have limitations that must be noted, yet these limitations should not detract from the core finding that ecosystems produce significant economic value for society. A benefit transfer analysis estimates the economic value of a given ecosystem (e.g., wetlands) from prior studies of that ecosystem type. Like any economic analysis, this methodology has strengths and weaknesses. Some arguments against benefit transfer include:

- Every ecosystem is unique; per-acre values derived from another location may be irrelevant to the ecosystems being studied.
- Even within a single ecosystem, the value per acre depends on the size of the ecosystem; in most cases, as the size decreases, the per-acre value is expected to increase and vice versa. (In technical terms, the marginal cost per acre is generally expected to increase as the quantity supplied decreases; a single average value is not the same as a range of marginal values).
- To value all, or a large proportion, of the ecosystems in a large geographic area is questionable in terms of the standard definition of exchange value. We cannot conceive of a transaction in which all or most of a large area's ecosystems would be bought and sold. This emphasizes the point that the value estimates for large areas (as opposed to the unit values per acre) are more comparable to national income account aggregates and not exchange values.37 These aggregates (i.e. GDP) routinely impute values to public goods for which no conceivable market transaction is possible. The value of ecosystem services of large geographic areas is comparable to these kinds of aggregates (see below).

Proponents of the above arguments recommend an alternative valuation methodology that amounts to limiting valuation to a single ecosystem in a single location. This method only uses data developed expressly for the unique ecosystem being studied, with no attempt to extrapolate from other ecosystems in other locations. The size and landscape complexity of most ecosystems makes this approach to valuation extremely difficult and costly. Responses to the above critiques can be summarized as follows:

- While every wetland, forest or other ecosystem is unique in some way, ecosystems of a given type, by their definition, have many things in common. The use of average values in ecosystem valuation is no more or less justified than their use in other macroeconomic contexts, such as in the development of economic statistics such as Gross Domestic or Gross State Product.
- As employed here, the prior studies upon which we based our calculations encompass a wide variety of time periods, geographic areas, investigators and analytic methods. Many of them provide a range of estimated values rather than single-point estimates. The present study preserves this variance; no studies were removed from the database because their estimated values were deemed to be "too high" or "too low." Also, only limited sensitivity analyses were performed. This approach is similar to determining an asking price for a piece of land based on the prices of comparable parcels ("comps"): even though the property being sold is unique, realtors and lenders feel justified in following this procedure to the extent of publicizing a single asking price rather than a price range.
- The objection to the absence of even an imaginary exchange transaction was made in response to the study by Costanza et al. of the value of all of the world's ecosystems.38 Leaving that debate aside, one can conceive of an exchange transaction in which, for example, all or a large portion of a watershed might be sold for development, so that the basic technical requirement of an economic value reflecting the exchange value could be satisfied. Even this is not necessary if one recognizes the different purpose of valuation at this scale – a purpose that is more analogous to national income accounting than to estimating exchange values.37

The presentation of our study results clearly displays the range of values and their distribution. The final estimates are not precise; however, it is better to provide estimates than to assume that ecosystem services have zero value or even infinite value. Pragmatically, in estimating the value of ecosystem services, it is better to be approximately right than precisely wrong.

GENERAL LIMITATIONS

- Static Analysis. This analysis is a static, partial equilibrium framework that ignores interdependencies and dynamics, though new dynamic models are being developed. The effect of this omission on valuations is difficult to assess.
- Increases in Scarcity. The valuations probably underestimate shifts in the relevant demand curves as the sources of ecosystem services become more limited. The values of many

ecological services rapidly increase as they become increasingly scarce.39 If ecosystem services are scarcer than assumed, their value has been underestimated in this study. Such reductions in supply appear likely as land conversion and development proceed; climate change may also adversely affect the ecosystems, although the precise impacts are difficult to predict.

GIS LIMITATIONS

- GIS Data. Since this valuation approach involves using benefit transfer methods to assign values to land cover types based, in some cases, on the context of their surroundings, one of the most important issues with GIS quality assurance is reliability of the land cover maps used in the benefits transfer, both in terms of categorical precision and accuracy.
- Scale and Resolution. Developers of Land Cover data typically rely on several data types and sources in its efforts to map and monitor resources over broad landscapes. Hierarchically, these data range in scale from coarse to fine, with widely varying spatial and spectral resolutions. Lower resolution source data may result in inadequate data for high value ecosystem units (i.e., wetland, beach, riparian vegetation). Ecosystem Health. There is the potential that ecosystems identified in the GIS analysis are fully functioning to the point where they deliver higher values than those assumed in the original primary studies. This situation would result in an underestimate of current value. On the other hand, if ecosystems are less healthy than those in primary studies, this valuation overestimates current value.
- Spatial Effects. This ecosystem service valuation assumes spatial homogeneity of services within ecosystems, i.e. that every acre of forest produces the same ecosystem services. This is clearly not the case. Whether this would increase or decrease valuations depends on the spatial patterns and services involved. Resolving this difficulty requires spatial dynamic analysis. More elaborate system dynamic studies of ecosystem services have shown that including interdependencies and dynamics leads to significantly higher values, as changes in ecosystem service levels cascade throughout the economy.39
- Limitations of datasets used to calculate spatial attributes. The Farmland Mapping & Monitoring Program (FMMP) does not map the farmlands (or Urban/Built-up areas) in Del Norte, Humboldt or Trinity counties. Additionally, only partial areas of Siskiyou and Modoc are mapped, though the non-mapped areas do not contain any urban/built-up areas of any size nor are areas where agriculture is likely to occur. For counties where no FMMP data exists, the same calculation as described in Table 3 was performed using land cover classification in the CALVEG data instead of the FMMP category. For the urban spatial attribute, the Urban category was used. For the agriculture spatial attribute, the following categories were used: agriculture, cropland, deciduous orchard, dryland grain crops, evergreen orchard, irrigated grain crops, irrigated row and field crops, irrigated hayfield, orchard and vineyard, urban-agriculture, and vineyard.

BENEFIT TRANSFER/ DATABASE LIMITATIONS

- Incomplete coverage. That not all ecosystems have been valued or studied well is perhaps the most serious issue, because it results in a significant underestimate of the value of ecosystem services. More complete coverage would almost certainly increase the values shown in this report, since no known valuation studies have reported estimated values of zero or less for an ecosystem service.
- Selection Bias. Bias can be introduced in choosing the valuation studies, as in any appraisal methodology. The use of ranges partially mitigates this problem.

PRIMARY STUDY LIMITATIONS

- Price Distortions. Distortions in the current prices used to estimate ecosystem service values are carried through the analysis. These prices do not reflect environmental externalities and are therefore again likely to be underestimates of true values.
- Non-linear/Threshold Effects. The valuations assume smooth and/or linear responses to changes in ecosystem quantity with no thresholds or discontinuities. Assuming (as seems likely) that such gaps or jumps in the demand curve would move demand to higher levels than a smooth curve, the presence of thresholds or discontinuities would likely produce higher values for affected services (Limburg et al., 2002). Further, if a critical threshold is passed, valuation may leave the normal sphere of marginal change and larger-scale social and ethical considerations dominate, such as an endangered species listing.

- Sustainable Use Levels. The value estimates are not necessarily based on sustainable use levels. Limiting use to sustainable levels would imply higher values for ecosystem services as the effective supply of such services is reduced. If the above problems and limitations were addressed, the result would most likely be a narrower range of values and significantly higher values overall. At this point, however, it is impossible to determine more precisely how much the low and high values would change.

APPENDIX B. ANNOTATED BIBLIOGRAPHY

1. Allen, J., Cunningham, M., Greenwood, A., Rosenthal, L. 1992. The value of California wetlands: an analysis of their economic benefits. The Campaign to Save California Wetlands, Oakland, California.

   Land Cover: Saline Herbaceous Wetland

   Ecosystem Service: Habitat, Recreation & Tourism, Water Quality

   Valuation Method: Benefit Transfer

   Location: California

   Study Description: This paper reviewed the literature on ecosystem service valuation in California prior to 1992. The authors used the benefit transfer method to estimate the total economic value of California's 454,000 acres of wetlands. Estimates are described with a lower-bound, median, and upper-bound. Ecosystem services valued in this study include flood control, groundwater storage, water purification and recreation.

   Notes: Despite being a benefit transfer paper, the primary studies used in this article were carefully chosen to represent the Californian region.

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   Land Cover: Fresh Herbaceous Wetland

   Ecosystem Service: Water Capture, Conveyance, and Supply

   Valuation Method: Meta-Analysis

   Location: United States

   Study Description: This paper presents a meta-analysis of the economic valuation literature on ecosystem services provided by wetlands in agricultural landscapes. The study includes values from the United States and Europe with information on site attributes to improve transferability. A meta-regression is used to produce a value function for wetland regulating services that can be transferred based on site attributes. The authors focus on the value of flood control, water supply and nutrient cycling to create a database containing 66 value estimates standardized in USD per hectare per year.

   Notes: Applied to wetlands under the agriculture spatial attribute.

3. Brander, L.M., Florax, R.J., Vermaat, J.E. 2006. The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature. Environmental and Resource Economics 33: 223-250.

   Land Cover: Fresh Herbaceous Wetland, Saline Herbaceous Wetland

   Ecosystem Service: Disaster Risk Reduction, Water Capture, Conveyance, and Supply, Water Quality

   Valuation Method: Meta-Analysis

   Location: Global

   Study Description: This meta-analysis examined 80 studies with sufficient information for statistical analysis to produce a comprehensive review of the valuation literature on wetlands. The authors include information on geography, climate, and socio-economic demographics for each study examined into the meta-analysis. The studies used avoided cost, hedonic pricing, contingent valuation, and market pricing to show the benefits of wetlands as an ecosystem service provider.

4. Bridgeham, S.D., Megonigal, J.P., Keller, J.K., Bliss, N.B., Trettin, C. 2006. The carbon balance of North American wetlands. Wetlands 26(4): 889-916.

   Land Cover: Fresh Herbaceous Wetland

   Ecosystem Service: Climate Stability

   Valuation Method: Avoided Cost

   Location: Lower 48 United States

   Study Description: This study analyzed the carbon balance of wetlands in North America, taking into account published literature and soil databases.

The loss of wetlands has had the largest impact on carbon fluxes within Canada, the United States, and Mexico. Six wetland types are analyzed, including peat, freshwater wetlands, saline wetlands, mangroves, and mudflats. The authors estimated that the carbon pool of North America and the annual sequestration rate of different wetland types. The market price for carbon is used to provide a monetary valuation of wetland carbon sequestration.

Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

5. Chmura, C., Anisfeld, S.C., Cahoon, D.R., Lynch, J.C. 2003. Global carbon sequestration in tidal, saline wetland soils. Global biogeochemical cycles 17(4): 1-22.

   Land Cover: Saline Herbaceous Wetland

   Ecosystem Service: Climate Stability

   Valuation Method: Avoided Cost

   Location: California

   Study Description: This study estimated carbon sequestration levels of saline wetlands. Wetlands are known to be immense carbon sinks which play an important role in global carbon cycles. The authors collected data at 154 sites globally on carbon data of mangroves and salt marshes. The authors found that soil carbon density in mangroves is significantly higher than in salt marshes. However, carbon sequestration rates were similar between the two types of wetlands. Carbon density and sequestration both range with annual temperature and other climatic parameters.

   Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

6. Colby, B., Smith-Incer, E. 2005. Visitor Values and Local Economic Impacts of Riparian Habitat Preservation: California's Kern River Preserve. American Water Resources Association 41 (3): 709-717.

   Land Cover: Fresh Herbaceous Wetland

   Ecosystem Service: Recreation & Tourism

   Valuation Method: Contingent Valuation

   Location: Kern River Preserve, California

   Study Description: This study estimates the value of recreation in the Kern River Preserve (KRP). The KRP is located in the South Fork Kern River Valley, 57 miles northeast of Bakersfield, California. With an estimated 6,000 to 8,000 visitors a year, recreational activities include bird watching, rafting, and boating. The river is home to California's largest lowland riparian forest and is one of the first Globally Important Bird Areas designated in the United States. It is a traditionally rural region. The focus of the study, however, is on bird watching as it is the primary recreational activity, attracting well-educated, high-income visitors. The contingent valuation survey asked how much people would be willing to donate to promote regional water conservation in order to prevent stream flows from being diminished, leading to habitat degradation and reduced numbers and diversity of birds and other wildlife.

   Notes: Applicable to general forest types within riparian corridors.

7. Comello, S.D., Maltais-Landry, G., Schwegler, B.R., Lepech, M.D. 2014. Firm-level ecosystem service valuation using mechanistic biogeochemical modeling and functional substitutability. Ecological Economics 100: 63-73.

   Land Cover: Bay/Estuary

   Ecosystem Service: Water Quality

   Valuation Method: Replacement Cost

   Location: Outer Bolsa Bay, California

   Study Description: This study examined natural and engineered systems of phosphorus removal in wetlands in Southern California. The Outer Bolsa Bay is a 25 hectare tidal estuary in the southwest of the Bolsa Chica Ecological Reserve in Huntington Beach, CA. The biogeochemical model developed for this analysis simulated ecosystem performance of phosphorus removal under various nutrient loading conditions. This modeled data is combined with replacement costs to derive a value for the ecosystem service.

8. Cooper, J., Loomis, J.B. 1991. Economic value of wildlife resources in the San Joaquin Valley: Hunting and viewing values. In: Dinar, A. Zilberman, D (eds). The Economics and Management of Water and Drainage in Agriculture. Kluwer Academic Publishers, Norwell, Massachusetts.

   Land Cover: Fresh Herbaceous Wetland

   Ecosystem Service: Recreation & Tourism

   Valuation Method: Travel Cost

Location: San Joaquin Valley, California

Study Description: This study estimates the recreational value of San Joaquin Valley agricultural drainage areas or wetlands where wildlife is found and recreational activities take place. The San Joaquin Valley is an important agricultural area in California, but is also a hub for waterfowl hunting and bird watching. Willingness to pay was calculated through a survey distributed throughout the whole state of California asking questions on recreational trips and willingness to pay. Values are published for each of seven Wildlife Areas or National Wildlife Refuges in the state of California.

9. Costanza, R., Wilson, M., Troy, A., Voinov, A., Voinov, A., Liu, S., D'Agostino, J. 2006. The Value of New Jersey's Ecosystem Services and Natural Capital. New Jersey Department of Environmental Protection, Trenton, New Jersey.

   Land Cover: Agriculture, Bay/Estuary, Beach, Coniferous Forest, Deciduous Forest, Mixed Forest, Grassland, Lake, Wetland

   Ecosystem Service: Soil Quality, Water Capture, Conveyance, and Supply, Soil Formation, Water Storage

   Valuation Method: Benefit Transfer

   Location: New Jersey

   Study Description: This report concludes a two year study evaluating the economic value of New Jersey's natural capital. The authors compile 94 studies to identify and calculate ecosystem services within the state. The study is a comprehensive analysis of the state of New Jersey's natural capital. This provides a conservative baseline for land use planning and policy. Each ecosystem service value is shown as dollars per acre per year. A discussion of potential and limitations provides information on data gaps and availability and the need for future research to enhance current values.

10. Creel, M., Loomis, J.B. 1992. Recreation Value of Water to Wetlands in the San Joaquin Valley: Linked Multinomial Logit and Count Data Trip Frequency Models. Water Resources Research 28 (10): 2597-2606.

    Land Cover: Fresh Herbaceous Wetland

    Ecosystem Service: Recreation & Tourism

    Valuation Method: Travel Cost

    Location: Kern and Pixley National Wildlife Refuges

    Study Description: This study estimates the recreational benefits from providing increased quantities of water to wildlife and fisheries habitats. The study covers fourteen recreational sites in the San Joaquin Valley, including the National Wildlife Refuges, the State Wildlife Management Areas, and six adjacent river destinations. The authors valued waterfowl hunting, fishing, and wildlife viewing as ecosystem services. The authors provided results in dollar value per acre foot of water and concluded that the value of water is affected by the total supply of water to the recreational site.

    Notes: Used in the riparian spatial attribute.

11. Delfino, K., Skuja, M., Albers, D. 2007. Economic Oasis: Revealing the True Value of the Mojave Desert. Defenders of Wildlife, Washington, D.C.

    Land Cover: River

    Ecosystem Service: Water Storage

    Valuation Method: Market Price

    Location: Mojave Desert in San Bernardino, Inyo, Riverside, and Kern Counties, California

    Study Description: This paper examines the market and nonmarket values of the Mojave Desert. The Mojave Desert comprises nearly 20 million acres in southeastern California, southwestern Arizona, and southwestern Nevada. The authors attempted to strike a balance between financial incentives and environmental impact by examining recreation, aesthetic value, military, and filming expenditures within the desert. The report found that these industries provided funding for economic development with little impact to the natural ecosystems. Other ecosystem services valued in the region include greenhouse gas mitigation and water conveyance and supply.

12. DeLonge, M.S., Ryals, R., Silver, W. 2013. A Lifecycle Model to Evaluate Carbon Sequestration Potential and Greenhouse Gas Dynamics of Managed Grasslands. Ecosystems 16: 962-979.

    Land Cover: Grassland

    Ecosystem Service: Climate Stability

    Valuation Method: Avoided Cost

    Location: California

Study Description: The authors designed a field-scale model that quantifies greenhouse gas emissions (CO2, CH4, and N2O) from the production, application, and ecosystem response of soil amendments. This model developed case studies for grazed annual grasslands for Marin and Yuba counties in California. The authors are able to show that while manure emits larger amounts of greenhouse gases than fertilizers, the composting of manure and vegetation can offset much of the emissions. The results indicate a savings of 23 Mg CO2/ Ha over a three year period, compared to a 14 Mg CO2 emission over that same period without proper management of waste.

Notes: Valued both coastal and valley sites. Coastal site values were applied to the coastal spatial attribute only. This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

13. Duarte, C.M., Middelburg, J.J., Caraco, N. 2004. Major role of marine vegetation on the oceanic carbon cycle. Biogeosciences Discussions, European Geosciences Union 1 (1): 659-679.

    Land Cover: Bay/Estuary

    Ecosystem Service: Climate Stability

    Valuation Method: Avoided Cost

    Location: Global

    Study Description: This paper examined the carbon sequestration capabilities of global marine vegetation and soil. The analysis considers coastal ecosystems such as sea grass meadows, salt marshes, and mangrove forests along ocean coasts, which provide this regulating service. The report used biophysical data to show changes in sequestration rates across varying land covers. The results show that the total sequestration from underwater vegetation and soil sources could be double that of current global carbon sequestration estimates.

    Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

14. EcoAgriculture Partners. 2011. Farm of the Future: Working lands for ecosystem services. USDA, Washington, D.C.

    Land Cover: Fresh Herbaceous Wetland, Pasture, Shrubland

    Ecosystem Service: Habitat

    Valuation Method: Avoided Cost

    Location: Yolo County, California

    Study Description: This document shows a management regime for the Sacramento River Ranch Farm. This 3,960 acre farm is located along the Sacramento River in Northern California. The farm provides environmental credits in wetland and shrub land cover types with an emphasis on habitat restoration, which creates a funding mechanism for the services provided to downstream users of the Sacramento River. The Sacramento River Ranch Farm sells developmental rights from their land to local funders and developers as environmental credits for conservation easement, providing market prices for ecosystem services.

15. Eiswerth, M.E., Donaldson, S.G., Johnson, D.M. 2000. Potential Environmental Impacts and Economic damages of Eurasian Watermilfoil (*Myriophyllum spicatum*) in Western Nevada and Northeastern California. Weed Science 14: 511-518.

    Land Cover: Lake

    Ecosystem Service: Recreation & Tourism

    Valuation Method: Travel Cost

    Location: Truckee River Watershed in California and Nevada

    Study Description: This paper estimated the value of recreational service flows from the Truckee River watershed below Lake Tahoe. The Truckee River watershed drainage area is estimated at over 3,120 square miles in California and Nevada. The study examined the impact of an increase in Eurasian watermilfoil on water-based recreation activities. The authors combined benefit transfer values with recreation visitation records to create a lower-bound estimate of recreational values from the river. The authors show that an increase in Eurasian watermilfoil can decrease recreational activities and value.

16. Faux, J., Perry, G.M. 1999. Estimating Irrigation Water Value Using Hedonic Price Analysis: A Case Study in Malheur County Oregon. Land Economics 75(3): 440-452.

    Land Cover: Cropland

    Ecosystem Service: Food

    Valuation Method: Market Price

    Location: Treasure Valley, Oregon

Study Description: This study examines the water demand in the western United States. Treasure Valley within Malheur County in Oregon contains vast amounts of farmland irrigated by the Malheur and Owyhee rivers. The authors demonstrated the application of hedonic price analysis in estimating the value of water for irrigation. Other attributes of the land are included in the hedonic analysis, including soil quality, which is determined to be a significant factor in agricultural land value.

17. Gascoigne, W., Hoag, D., Koontz, L., Tangen, B., Shaffer, T., Gleason, R. 2011. Valuing ecosystem and economic services across land-use scenarios in the Prairie Pothole Region of the Dakotas, USA. Ecological Economics 70(10): 1715-1725.

    Land Cover: Grassland

    Ecosystem Service: Soil Retention

    Valuation Method: Avoided Cost

    Location: North and South Dakota

    Study Description: This study looks at land-use change scenarios where native prairies are converted to farmland and other land covers. It models biophysical changes in specific sites and counties and attributes economic values derived from other studies, but adjusted to local bio-geographical characteristics. It concludes that large investments in native prairie conservation would provide over $1 billion of benefits to society over 20 years. The largest benefits arise from increases in carbon sequestration, followed by additional waterfowl.

18. Hill, B.H., Kolka, R.K., McCormick, F.H., Starry, M.A. 2013. A synoptic survey of ecosystem services from headwater catchments in the United States. Ecosystem Services 7: 106-115.

    Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest

    Ecosystem Service: Water Quality, Water Capture, Conveyance, and Supply

    Valuation Method: Avoided Cost, Market Price

    Location: West Coast of the U.S.

    Study Description: This paper examined the contribution of headwater streams and catchments with downstream ecosystems in the United States. Given the importance of these regions, concern about the underestimation of these zones has emerged. Catchment extent is determined using data derived from the National Hydrography Dataset throughout the lower 48 United States. Production functions are created for water supply, climate regulation, and water purification and their results reported for nine USA ecoregions. Ecosystem service values are presented in dollars per hectare per year and annual totals.

19. Ingraham, M., Foster, S. 2008. The value of ecosystem services provided by the U.S. National Wildlife Refuge System in the contiguous U.S. Ecological Economics 67: 608-618.

    Land Cover: Fresh Herbaceous Wetland, Saline Herbaceous Wetland

    Ecosystem Service: Disaster Risk Reduction, Water Quality

    Valuation Method: Meta-Analysis

    Location: United States Wildlife Refuges

    Study Description: This report estimates the total economic value of ecosystem services provided by the U.S. Wildlife Refuge System. The authors identified ecosystems present in the Refuge System within the contiguous U.S. and calculate the value of the associated services. The methods of valuation included direct, indirect, and contingent valuations. The authors transferred averaged values from site-specific primary studies to fungible ecoregions to provide ecosystem services values for the U.S. Wildlife Refuge System.

20. Kildow, J.T., Colgan, C.S. 2005. California's Ocean Economy. National Ocean Economics Program, Center for the Blue Economy, Middlebury Institute of International Studies at Monterey, Monterey, California.

    Land Cover: Marine

    Ecosystem Service: Food, Navigation

    Valuation Method: Market Price

    Location: California

Study Description: The authors estimate economic value of California's Ocean Economy. California's coast stretches roughly 840 miles and contains 80% of all economic activity for the state of California. The authors examined six marine-related industries in the state of California, including coastal construction, living resources, offshore minerals, ship and boat building and repair, maritime transportation and ports, and coastal tourism and recreation. Methods for valuation included market price and benefit transfer to calculate total values for California's coast.

Notes: Only the fisheries and navigation values were used in this report.

21. King, P.G. 2001. Economic Analysis of Beach Spending and the Recreational Benefits of Beaches in the City of San Clemente. San Francisco State University, San Francisco, CA.

    Land Cover: Beach

    Ecosystem Service: Recreation & Tourism

    Valuation Method: Travel Cost

    Location: San Clemente, California

    Study Description: King conducted a survey of beach visitors in the city of San Clemente, California. San Clemente maintains nearly 10 square miles of beaches, attracting visitors from around the state. Results showed that most visitors lived in the city or within 20 miles of the city. A travel cost model was used to determine consumer surplus for a beach day for the high season and off season. Market values related to recreation are also estimated, including expenditures, revenues, and costs for beach maintenance.

22. Leschine, T.M., Wellman, K.F., Green, T.H. 1997. The Economic Value of Wetlands: Wetlands' Role in Flood Protection in Western Washington. Washington State Department of Ecology – Northwest Regional Office, Bellevue, Washington.

    Land Cover: Fresh Herbaceous Wetland

    Ecosystem Service: Disaster Risk Reduction

    Valuation Method: Replacement Cost

    Location: Snohomish and King Counties, Washington

    Study Description: This study highlights the importance of flood-mitigating wetlands in Western Washington. Sites analyzed include Scriber Creek in Lynwood, a 5.1-mile-long stream emptying into a wetland of about 6.8 square miles in a highly urbanized and developing community. Flooding along rivers and streams in the lowlands of Western Washington has been increasingly frequent. The authors use cost estimates for engineered hydrologic enhancements to wetlands currently providing flood protection as proxies for the value of the flood protection these same wetlands currently provide. The argument is illustrated by estimating the dollar-per-acre values of wetlands systems for flood protection.

    Notes: The study area is heavily developed. These values were only used in the urban spatial attribute.

23. Lew, D.K., Larson, D.M. 2005. Valuing Recreation and Amenities at San Diego County Beaches. Coastal Zone Management Journal 33: 71-86.

    Land Cover: Beach

    Ecosystem Service: Recreation & Tourism

    Valuation Method: Travel Cost

    Location: San Diego County, California

    Study Description: This study presents the recreational benefits provided by beaches in San Diego County. The authors create a recreation demand model that shows a beach user's choice based on which beach, number of visitor days, beach closures, and beach amenities. Visitors spend roughly $1.7 billion per year in coastal beach communities in San Diego County. The paper analyzes the threat of water pollution on recreation activities and the loss in economic activity from degrade beach water quality from stormwater runoff, sewage spills, lagoon openings, and outflow from the Tijuana River.

24. Liu, S., Liu, J., Young, C.J., Werner, J.M., Wu, Y., Li, Z., Dahal, D., Oeding, J., Schmidt, G., Sohl, T.L., Hawbaker, T.J., Sleeter, B.M. 2012. Chapter 5: Baseline carbon storage, carbon sequestration, and greenhouse-gas fluxes in terrestrial ecosystems of the western United States. In: Zhu, Z. Reed, B.C. (eds). Baseline and projected future carbon storage and greenhouse-gas fluxes in ecosystems of the western United States. USGS Professional Paper 1797.

    Land Cover: Cropland, Fresh Herbaceous Wetland, Grassland, Pasture, Shrubland

    Ecosystem Service: Climate Stability

    Valuation Method: Avoided Cost

Location: Various locations in the western U.S., including California

Study Description: This chapter describes the modeling and analysis of baseline carbon storage and carbon flux in ecosystems of the western United States. The authors include all of California, Oregon, Washington, Idaho, Nevada, Utah, Arizona and parts of Montana, Wyoming, Colorado, New Mexico, and Texas in the analysis. Land-use and land-cover mapping and modeling results are used to assess the carbon sequestration and storage levels. The results are provided in the amount of CO2 sequestered by land cover.

Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

25. McPherson, E.G., Scott, K.I., Simpson, R.D. 1998. Estimating cost effectiveness of residential yard trees for improving air quality in Sacramento, California, using existing models. Atmospheric Environment 32 (1): 75-84.

    Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest

    Ecosystem Service: Air Quality

    Valuation Method: Avoided Cost

    Location: Sacramento, California

    Study Description: This study examined the air quality improvements from urban trees and forests. Sacramento has an estimated population of about 470,000 and covers an area of 100 square miles. It has a Mediterranean climate, characterized by damp to wet, mild winters and hot, dry summers. Sacramento's Shade program will result in the planting of 500,000 trees. Sampling a wide variety of plots throughout urban regions in Sacramento, the authors estimated the pollution mitigation benefit of urban trees. A cost analysis is conducted to determine if shade trees planted in residential yards can be a cost effective means to improve air quality. The authors used deterministic models to estimate pollutant deposition and biogenic hydrocarbon emissions estimated annually for 30 years in California.

    Notes: Applicable to urban forests.

26. McPherson, E.G., Simpson, J.R., Peper, P.J., Xiao, Q. 1999. Benefit-Cost Analysis of Modesto's Municipal Urban Forest. Arboriculture 25(5): 235-248.

    Land Cover: Mixed Forest

    Ecosystem Service: Aesthetic Information; Air Quality; Water Capture, Conveyance, and Supply

    Valuation Method: Hedonic Pricing, Avoided Cost

    Location: Modesto, California

    Study Description: This benefit-cost analysis examined the effects of urban forest on Modesto's municipal budget. Modesto is a 9,000 ha city in the central valley of California. The authors calculated a total benefit from Modesto's urban forest through replacement cost of the services provided by urban trees. The benefits received from urban forestry include heat-island reduction (cooler temperatures from increased shade), reduced stormwater runoff and greenhouse gas sequestration and storage.

    Notes: Applicable to urban forests.

27. McPherson, G. E., Simpson, R. D. 2002. A Comparison of Municipal Forest Benefits and Costs in Modesto and Santa Monica, California, USA. Urban Forestry & Urban Greening. 1: 61-74.

    Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest

    Ecosystem Service: Aesthetic Information; Air Quality; Water Capture, Conveyance, and Supply

    Valuation Method: Hedonic Pricing, Avoided Cost

    Location: Modesto, CA and Santa Monica, CA

    Study Description: The authors compare functions and values of urban tree populations in Modesto and Santa Monica, California. Modesto and Santa Monica have extensive tree planting programs. Modesto is in a central valley and has a population of 182,000 within 9,000 ha. Santa Monica is on the Pacific Ocean, has a population of 92,000 within 2,000 ha. The authors applied spatial modeling to tree inventory data to estimate the total nonmarket benefits. Most benefits were from the aesthetic value of trees, while the majority of costs were from pruning trees and foliage. Benefits and costs were unevenly distributed throughout each city, largely because of variation in tree sizes and growth rates, prices, residential property values, and climate.

    Notes: Applicable to urban forests.

28. Moore, R.G., McCarl, B.A. 1987. Off-Site Costs of Soil Erosion: A Case Study in the Willamette Valley. Western Agricultural Economics Association 12 (1): 42-49.

Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest, Cropland

Ecosystem Service: Soil Retention

Valuation Method: Avoided Cost

Location: Willamette Valley, Oregon

Study Description: This study aims to express the marginal cost of erosion in Oregon's Willamette Valley. The costs evaluated are water treatment; road, river channel, and dam maintenance; and hydroelectric generation. By examining avoided costs of a reduction in erosion, this study shows that reduction in erosion provides substantial economic benefits.

29. Nellemann, C., Corcoran, E., Duarte, C.M., Valdés, L., De Young, C., Fonseca, L., Grimsditch, G. (Eds). 2009. Blue Carbon. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal, www.grida.no.

    Land Cover: Marine

    Ecosystem Service: Climate Stability

    Valuation Method: Avoided Cost

    Location: Global

    Study Description: This study focuses on the carbon sequestration and storage capabilities of marine sources. Marine life plays a significant role in the global carbon cycle. Around 55% of all biological carbon (green carbon) is captured by marine living organisms, and defined as blue carbon. The authors point to mangroves, salt marshes, and seagrasses as a source for 71% of all carbon storage from ocean sediments. This documents expresses the importance of coastal and marine ecosystems in greenhouse gas mitigation.

    Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

30. O'Higgins, T.G., Ferraro, S.P., Dantin, D.D., Jordan, S.J., Chintala, M.M. 2010. Habitat scale mapping of fisheries ecosystem service values in estuaries. Ecology and Society 15(4): 7-28.

    Land Cover: Bay/Estuary

    Ecosystem Service: Food

    Valuation Method: Market Price

    Location: Yaquina Bay, Oregon

    Study Description: This study presents a standardized method which combines habitat mapping with ecosystem service values. The method is used for three case studies in Yaquina Bay, Oregon, Weeks Bay, Alabama, and Lagoon Pond, Massachusetts. Ecosystem service value for recreational and commercial fisheries is analyzed through this method, which utilizes consumer surplus values. Results are broken down by land cover type within the study sites to highlight different characteristics of the study sites.

    Notes: Only the value from Oregon was used in this study.

31. Pendleton, L., Mohn, C., Vaughn, R.K., King, P., Zoulas, J.G. 2012. Size Matters: The Economic Value of Beach Erosion and Nourishment in Southern California. Contemporary Economic Policy 30 (2): 223-237.

    Land Cover: Beach

    Ecosystem Service: Recreation and Tourism

    Valuation Method: Travel Cost

    Location: Orange and Los Angeles Counties, California

    Study Description: This study investigates the welfare benefits of increased beach width. Despite widespread beach nourishment programs in California, the benefits of such management is unknown. Beaches in Los Angeles and Orange County in California are examined. A model is developed which quantifies recreation benefits as a function of beach width and other attributes.

32. Pimentel, D., Harvey, C., Resosudarmo, P., Sinclair, K., Kurz, D., McNair, M., Crist, S., Shpritz, L., Fitton, L., Saffouri, R., Blair, R. 1995. Environmental and economic costs of soil erosion and conservation benefits. Science 267: 1117-1122.

    Land Cover: Cropland

    Ecosystem Service: Soil Retention

    Valuation Method: Avoided Cost

    Location: United States

    Study Description: This paper examines the costs of soil erosion related to agricultural productivity. The authors note that soil erosion reduces soil fertility and crop productivity. Agricultural practices can be implemented to reduce erosion and conserve water and soil resources. The study concludes that there are $44 billion in damages due to erosion. The authors estimate that a

$6.4 billion investment per year is essential to reduce erosion rates to sustainable levels.

Notes: Applicable to general cultivated lands.

33. Pimentel, D., Wilson, C., McCullum, C., Huang, J., Paulette, D., Flack, J., Tran, Q., Saltman, T., Cliff, B. 1997. Economic and Environmental Benefits of Biodiversity. BioScience 47(11): 747-757.

    Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest, Cropland

    Ecosystem Service: Biological Control, Soil Formation

    Valuation Method: Avoided Cost, Replacement Cost

    Location: United States

    Study Description: This article discusses ecosystem services of the United States which are enhanced by biodiversity. A coarse economic analysis is performed using existing literature. The economic and environmental benefits are evaluated of ecosystem services such as biomass and organic waste recycling, soil formation, nitrogen fixation, bioremediation of chemical pollution, genetic resources and crop and livestock yields, biotechnology, biological pest control, perennial grains, pollination, habitat and ecotourism, pharmaceuticals, and carbon sequestration.

34. Pimentel, D. 1998. Economic and Environmental Benefits of Biological Diversity in the State of Maryland. Maryland Department of Natural Resources, Annapolis, MD.

    Land Cover: Coniferous Forest, Deciduous Forest, Mixed Forest, Cropland, Pasture

    Ecosystem Service: Biological Control, Soil Formation, Food

    Valuation Method: Avoided Cost, Replacement Cost, Market Price

    Location: Maryland

    Study Description: Pimentel estimates the annual economic and environmental benefits of biodiversity in the state of Maryland. Primary research and published literature are used to produce economic values for several ecosystem services including soil formation, pollination, recreation, and waste treatment.

35. Rein, F.A. 1999. An economic analysis of vegetative buffer strip implementation. Case study: Elkhorn Slough, Monterey Bay, California. Coastal Management 27(4): 377-390.

    Land Cover: Grassland

    Ecosystem Service: Biological Control, Disaster Risk Reduction, Soil Retention, Water Quality

    Valuation Method: Avoided Cost

    Location: Elkhorn Slough Watershed, California

    Study Description: This study investigates the economics of implementing vegetative buffer strips as a tool to protect water quality from nonpoint pollution. The study site examined in this paper is Elkorn Slough, California's first National Estuarine Research Reserve. The authors evaluate environmental costs and benefits of implementing vegetative buffer strips in this area as a means of capturing nonmarket ecosystem service values to inform decision making. Benefits evaluated include tourism, commercial fisheries, long-term road maintenance, and harbor protection using replacement cost and market pricing methods.

36. Richer, J. 1995. Willingness to Pay for Desert Protection. Contemporary Economic Policy 13(4): 93-104.

    Land Cover: Shrubland

    Ecosystem Service: Recreation & Tourism

    Valuation Method: Contingent Valuation

    Location: California

    Study Description: This paper examines the impact of increasing national park and wilderness areas in the Mojave Desert within California. The California Protection Act, which was under review during the writing of this paper, would add an additional 3 million acres to the national parks system and 4 million acres of wilderness areas protected outside the parks. The author conducts a dichotomous choice contingent valuation to examine the willingness to pay for the implementation of the California Desert Protection Bill, which is a proxy for increased environmental quality and recreation activities.

37. Ryals, R., Silver, W.L. 2013. Effects of organic matter amendments on net primary productivity and greenhouse gas emissions in annual grasslands. Ecological Applications 23 (1): 46-59.

    Land Cover: Grassland

    Ecosystem Service: Climate Stability

Valuation Method: Avoided Cost

Location: California

Study Description: Ryals and Silver examine the efficacy of amending grasslands with organic waste to increase carbon storage and greenhouse gas mitigation. The sites chosen for study are valley grasslands located in Browns Valley, California and coastal grasslands in Nicasio, California. The authors used field manipulations to determine these effects on net primary production and greenhouse gas emissions over three years.

Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

38. Shaw, M.R., Pendleton, L., Cameron, D., Morris, B., Bratman, G., Bachelet, D., Klausmeyer, K., MacKenzie, J., Conklin, D., Lenihan, J., Haunreiter, E., Daly, C. 2009. The Impact of Climate Change on California's Ecosystem Services. California Climate Change Center, Sacramento, CA.

    Land Cover: Grassland

    Ecosystem Service: Food

    Valuation Method: Market Price

    Location: California

    Study Description: California benefits from a wide range of ecosystem services. This paper examines the changes in these services due to climate change. The primary objective for the study is to examine the changes in carbon sequestration, forage production, water quantity for salmon production and water quantity (snow) for recreational skiing values due to changes in the climate. The authors accomplish this by modeling spatial projections of ecosystem services by monetizing the value of the service under multiple scenarios.

39. Smith, J.E., Heath, L.S., Skog, K.E., Birdsey, R.A. 2006. Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States. USDA Forest Service Northeastern Research Station, General technical report NE-343.

    Land Cover: Coniferous Forest, Deciduous Forest

    Ecosystem Service: Climate Stability

    Valuation Method: Avoided Cost

    Location: Southwest U.S.

    Study Description: This study calculates the average net annual additions to carbon in forest and in forest products. The authors develop carbon yield tables for 51 forest types within 10 regions of the United States that includes calculations for carbon sequestration in harvested wood products. The results are intended to be applied to inventories to estimate the total carbon sequestration of all wood types and products.

    Notes: This study produces estimates of carbon sequestration in tons of carbon, which are valued using the social cost of carbon.

40. Thompson, R., Hanna, R., Noel, J., Piirto, D. 1999. Valuation of tree aesthetics on small urban-interface properties. Aboriculture 25(5): 225-234.

    Land Cover: Coniferous Forest

    Ecosystem Service: Aesthetic Information

    Valuation Method: Hedonic Pricing

    Location: Lake Tahoe Basin, California

    Study Description: Healthy, attractive forests add to property values, but a multitude of stressed threaten the sustainability of forests. This study analyzes the effect of forest condition on urban-wildland interface properties in the Lake Tahoe Basin of California. Stand density index (SDI) and tree health were estimated to measure forest quality and used in a hedonic pricing model to show the influence of tree stands on property value.

41. Trust for Public Land. 2011. The Economic Benefits of Seattle's Park and Recreation System. Trust for Public Land, Seattle, WA.

    Land Cover: Grassland

    Ecosystem Service: Water Quality

    Valuation Method: Avoided Cost

    Location: King County, Washington

    Study Description: The goal of this report is to determine the economic benefits of Seattle's park system, which includes more than 5,400 acres within city boundaries. The study assesses seven major factors which contribute to the park system's value: property value, tourism, direct use, health, community cohesion, clean water, and clean air. These factors are enumerated based on direct income to the city's treasury, increased property values, resident savings, and health benefits.

42. Wade, W. W., McCollister, G. M., McCann, R. J., Johns, G. M. 1989. Recreation Benefits for California Reservoirs: A multi-scale facilities-augmented gravity travel cost model. Spectrum Economics, Inc., Palo Alto, CA.

Land Cover: Reservoir

Ecosystem Service: Recreation & Tourism

Valuation Method: Travel Cost

Location: California

Study Description: This report estimates the recreational benefit of lakes and reservoirs in the state of California. Eighty-three fresh lakes and reservoirs and three recreation activities are included in the analysis. The authors develop a gravity travel cost model to estimate the benefits of recreation to users of these lakes.

43. Ward, F. A., Roach, B. A., Henderson, J. 1996. The economic value of water in recreation: Evidence from the California drought. Water Resources Research 32(4): 1075-1081.

Land Cover: Reservoir

Ecosystem Service: Recreation & Tourism

Valuation Method: Contingent Valuation

Location: California

Study Description: One obstacle to efficient management of reservoir systems is the lack of information on how recreational values change with reservoir levels. This study aims to address this gap in information by evaluating evidence from the 1985-1991 California drought. The study site includes Army Corps of Engineers reservoirs in the Sacramento district of California. Surveys were conducted during the early part of the drought, and a regional travel cost model was developed to estimate the values of water recreation at these lakes.

44. Woodward, R., Wui, Y. 2001. The economic value of wetland services: a meta-analysis. Ecological Economics 37(2): 257-270.

Land Cover: Fresh Herbaceous Wetland, Saline Herbaceous Wetland

Ecosystem Service: Food, Water Capture, Conveyance, and Supply, Water Quality

Valuation Method: Meta-Analysis

Location: Global

Study Description: The purpose of this analysis is to evaluate the relative value of different wetland services, the sources of bias in wetland valuation, and the returns to scale exhibited in wetland values. A meta-analysis is conducted from 39 studies, including published reports, gray literature, and theses, which had sufficient information. The meta-analysis predicted ecosystem values per acre for flood risk reduction, water quality, recreation activities, commercial fishing, storm buffering, and habitat.

45. Zavaleta, E. 2000. The Economic Value of Controlling an Invasive Shrub. A Journal of the Human Environment 29(3): 462-467.

Land Cover: Shrubland

Ecosystem Service: Disaster Risk Reduction, Water Capture, Conveyance, and Supply

Valuation Method: Avoided Cost

Location: Arizona, California, Colorado, Nevada

Study Description: This article evaluates the economic impacts of tamarisk, an invasive shrub, on the provisioning of ecosystem services. Tamarisk has invaded most riparian areas of arid and semi-arid regions of western USA. Impacts due to tamarisk include increases to sedimentation, flood risks, and replacing vegetation which consumes less water - with significant economic implications for a region in which water is scarce. The value of the absence of invasive species was derived by calculating the avoided cost of having to remove and control for them.

APPENDIX C. VALUATION TABLES

Table 1. Framework of ecosystem goods and services

Good/Service	Economic Benefit to People
Provisioning Services	
Food	Producing crops, fish, game, and fruits
Medicinal Resources	Providing traditional medicines, pharmaceuticals, and assay organisms
Ornamental Resources	Providing resources for clothing, jewelry, handicrafts, worship, and decoration
Energy and Raw Materials	Providing fuel, fiber, fertilizer, minerals, and energy
Water Storage	The quantity of water held by a water body (surface or ground water) and its capacity to provide water supply reliability.
Regulating Services	
Air Quality	Providing clean, breathable air
Biological Control	Providing pest and disease control
Climate Stability	Supporting a stable climate at global and local levels through carbon sequestration and other processes
Disaster Risk Reduction	Preventing and mitigating natural hazards such as floods, hurricanes, fires, and droughts
Pollination and Seed Dispersal	Pollination of wild and domestic plant species
Soil Formation	Creating soils for agricultural and ecosystems integrity; maintenance of soil fertility
Soil Quality	Improving soil quality by decomposing human and animal waste and removing pollutants
Soil Retention	Retaining arable land, slope stability, and coastal integrity
Water Quality	Improving water quality by decomposing human and animal waste and removing pollutants
Water Capture, Conveyance, and Supply	Providing natural irrigation, drainage, groundwater recharge, river flows, drinking water supply, and water for industrial use.
Navigation	Maintaining water depth that meets draft requirements for recreational and commercial vessels
Supporting Services	
Habitat and Nursery	Maintaining genetic and biological diversity, the basis for most other ecosystem functions; promoting growth of commercially harvested species
Information Services	
Aesthetic Information	Enjoying and appreciating the presence, scenery, sounds, and smells of nature
Cultural Value	Using nature as motifs in art, film, folklore, books, cultural symbols, architecture, media, and for religious and spiritual purposes
Recreation and Tourism	Experiencing the natural world and enjoying outdoor activities
Science and Education	Using natural systems for education and scientific research

Table 2. CALVEG types and land cover categories used in this valuation

Calveg Regional Description	Land Cover Type Assigned for This Analysis
Barren	Barren
Dune	Barren
High Water Line/Gravel/Sand Bar	Barren
Playa	Barren
Snow/Ice	Barren
Tilled Earth	Barren
Urban-related Bare Soil	Barren
Bay or Estuary	Bay/Estuary
Beach Sand	Beach
Baker Cypress	Coniferous Forest
Pacific Douglas-Fir	Coniferous Forest
White Fir	Coniferous Forest
Bishop Pine	Coniferous Forest
Douglas-Fir - White Fir	Coniferous Forest
Eastside Pine	Coniferous Forest
Brewer Spruce	Coniferous Forest
Jeffrey Pine	Coniferous Forest
Lodgepole Pine	Coniferous Forest
Mixed Conifer - Fir	Coniferous Forest
Douglas-Fir - Grand Fir	Coniferous Forest
Douglas-Fir - Ponderosa Pine	Coniferous Forest
Mixed Conifer - Pine	Coniferous Forest
Monterey Pine	Coniferous Forest
Ponderosa Pine	Coniferous Forest
Ponderosa Pine - White Fir	Coniferous Forest
Red Fir	Coniferous Forest
Redwood	Coniferous Forest
Foxtail Pine	Coniferous Forest
Grand Fir	Coniferous Forest
Gray Pine	Coniferous Forest
Incense Cedar	Coniferous Forest
Subalpine Conifers	Coniferous Forest
Ultramafic Mixed Conifer	Coniferous Forest
Western White Pine	Coniferous Forest
Klamath Mixed Conifer	Coniferous Forest
Knobcone Pine	Coniferous Forest
Yellow Pine - Western Juniper	Coniferous Forest
McNab Cypress	Coniferous Forest
Monterey Cypress	Coniferous Forest
Western Juniper	Coniferous Forest
Mountain Hemlock	Coniferous Forest
Non-Native/Ornamental Conifer	Coniferous Forest
Redwood - Douglas-Fir	Coniferous Forest
Sitka Spruce	Coniferous Forest
Sitka Spruce - Grand Fir	Coniferous Forest
Sitka Spruce - Redwood	Coniferous Forest
Port Orford Cedar	Coniferous Forest
Pygmy Cypress	Coniferous Forest
Sargent Cypress	Coniferous Forest
Shore Pine	Coniferous Forest
Sugar Pine	Coniferous Forest
Whitebark Pine	Coniferous Forest
Agriculture (General)	Cropland
Conifer Agriculture (Xmas Trees)	Cropland
Flooded Row Crop Agriculture	Cropland
Orchard Agriculture	Cropland
Vineyard - Shrub Agriculture	Cropland
Bigleaf Maple	Deciduous Forest
Black Cottonwood	Deciduous Forest
Black Oak	Deciduous Forest
Canyon Live Oak	Deciduous Forest
Blue Oak	Deciduous Forest
Brewer Oak	Deciduous Forest
California Bay	Deciduous Forest
California Buckeye	Deciduous Forest
Interior Live Oak	Deciduous Forest
Coast Live Oak	Deciduous Forest
Coastal Mixed Hardwood	Deciduous Forest
Cottonwood - Alder	Deciduous Forest
Montane Mixed Hardwood	Deciduous Forest
Oregon White Oak	Deciduous Forest
Riparian Mixed Hardwood	Deciduous Forest
Eucalyptus	Deciduous Forest
Fremont Cottonwood	Deciduous Forest
Interior Mixed Hardwood	Deciduous Forest
Tanoak (Madrone)	Deciduous Forest
Madrone	Deciduous Forest
Non-Native/Ornamental Hardwood	Deciduous Forest
Quaking Aspen	Deciduous Forest
Red Alder	Deciduous Forest
Tree Chinquapin	Deciduous Forest
Valley Oak	Deciduous Forest
White Alder	Deciduous Forest
Willow	Deciduous Forest
Willow - Alder	Deciduous Forest
Tule - Cattail	Fresh Herbaceous Wetland
Wet Meadows	Fresh Herbaceous Wetland
Alpine Grasses and Forbs	Grassland
Annual Grasses and Forbs	Grassland
Non-Native/Ornamental Grass	Grassland
Perennial Grasses and Forbs	Grassland
Intermittent Lake or Pond	Lake
Perennial Lake or Pond	Lake
Water (General)	Lake
Ocean	Marine
Non-Native/Ornamental Conifer/Hardwood	Mixed Forest
Pastures and Crop Agriculture	Pasture
Reservoir	Reservoir
Intermittent Stream Channel	River
River/Stream/Canal	River
Water (General)	River
Pickleweed - Cordgrass	Saline Herbaceous Wetland
Alpine Mixed Scrub	Shrubland
Basin Sagebrush	Shrubland
Big Basin Sagebrush	Shrubland
Birchleaf Mountain Mahogany	Shrubland
Bitterbrush	Shrubland
Bitterbrush - Sagebrush	Shrubland

Calveg Regional Description	Land Cover Type Assigned for This Analysis
Blueblossom Ceanothus	Shrubland
Bush Chinquapin	Shrubland
Ceanothus Mixed Chaparral	Shrubland
Chamise	Shrubland
Coastal Bluff Scrub	Shrubland
Coyote Brush	Shrubland
Curlleaf Mountain Mahogany	Shrubland
Curlleaf Mountain Mahogany (tree)	Shrubland
Deerbrush	Shrubland
Greasewood	Shrubland
Great Basin - Mixed Chaparral Transition	Shrubland
Great Basin Mixed Scrub	Shrubland
Greenleaf Manzanita	Shrubland
Huckleberry Oak	Shrubland
Low Sagebrush	Shrubland
Lower Montane Mixed Chaparral	Shrubland
Manzanita Chaparral	Shrubland
Mendocino Manzanita	Shrubland
Mountain Alder	Shrubland
Mountain Sagebrush	Shrubland
Mountain Whitethorn	Shrubland
Non-Native/Ornamental Shrub	Shrubland
North Coast Mixed Shrub	Shrubland
Pinemat Manzanita	Shrubland
Rabbitbrush	Shrubland
Riparian Mixed Shrub	Shrubland
Salal - California Huckleberry	Shrubland
Scrub Oak	Shrubland
Silver Sagebrush	Shrubland
Snowbrush	Shrubland
Ultramafic Mixed Shrub	Shrubland
Upper Montane Mixed Chaparral	Shrubland
Upper Montane Mixed Shrub	Shrubland
Wedgeleaf Ceanothus	Shrubland
Whiteleaf Manzanita	Shrubland
Willow (Shrub)	Shrubland
Wyoming Sagebrush	Shrubland
Urban or Industrial Impoundment	Urban
Urban/Developed (General)	Urban

Table 3. Definition of spatial attributes and datasets used

Spatial Attribute	Dataset	Definition	Justification
Riparian	United States Geological Survey National Hydrography Dataset - 24k	Within 75 feet of stream channel flowlines that have either perennial status or Geographic Name Information System identification number.	In California, most riparian buffers range from 50 feet to 100 feet.[1]
Urban	California Department of Conservation Farmland Mapping & Monitoring Program	Within 1,500 feet of an FMMP Urban/Built-up designated area that is either within an urban service area of is over 300 contiguous acres.	Effects on real estate prices by environmental amenities are generally realized within the first 1500 feet of the amenity source.[2]
Coastal	Coastal Zone Boundary (CCC)	Within 1,000 yards inland from the mean high tide water line.	California's coastal zone generally extends 1,000 yards inland from the mean high tide line.3
Agriculture	California Department of Conservation Farmland Mapping & Monitoring Program	Contiguous land cover cells which are directly adjacent to FMMP Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance designated areas that are over 40 contiguous acres in size.	A study based in California suggests that ecosystems adjacent to farmland provide enhanced ecosystem service benefits due to this proximity.4

Table 4. Common primary valuation methods

Method	Description	Example
Market Price	Valuations are directly obtained from what people are willing to pay for the service or good on a private market.	Timber is often sold on a private market.
Replacement Cost	Cost of replacing open space services with man-made systems.	The cost of replacing a watershed's natural filtration services with a filtration facility.
Avoided Cost	Costs avoided or mitigated by open space services that would have been incurred in the absence of those services.	Wetlands buffer hurricane storm surge reducing coastal damage and subsequent recovery costs.
Production Approaches	Value created from an open space service through increased economic outputs.	Improvement in watershed health leads to an increase in commercial and recreational salmon catch.
Travel Cost	Derived from travel costs to consume or enjoy open space services, a reflection of the implied value of the service.	Parks attract tourists who must value the resource at least at the cost of travel incurred for the visit.
Hedonic Pricing	Value implied by what consumers are willing to pay for the service via related markets.	Housing prices along the coastline tend to exceed the prices of inland homes thus indicating open space services value of the coast (beach, saltwater, etc.).
Contingent Valuation	Value elicited by posing hypothetical, valuation scenarios.	People are willing to pay for wilderness preservation to avoid development.

Table 5. Appropriate valuation methods for ecosystem services

Ecosystem Service	Most Appropriate Method for Valuation[5]
Aesthetic Information	H, CV, TC, CA
Air Quality	CV, AC, RC
Biological Control	AC, P
Climate Stability	CV, M, AC, RC
Cultural Value	CV, CA
Disaster Risk Reduction	AC
Energy & Raw Materials	M, P
Food	M, P
Habitat and Nursery	CV, P, AC, TC
Medicinal Resources	M, AC
Navigation	M, CV
Ornamental Resources	AC, RC, H
Pollination and Seed Dispersal	M, P
Recreation and Tourism	TC, CV, CA
Science and Education	CA
Soil Formation	AC, CV, RC, P
Soil Quality	RC, AC, CV
Soil Retention	AC, RC, H
Water Capture, Conveyance, and Supply	M, AC, RC, H, P, CV, TC
Water Quality	RC, AC, CV
Water Storage	M, AC, RC, P, CV

Key: AC, avoided cost; CV, contingent valuation; CA, conjoint analysis; H, hedonic pricing; M, market pricing; P, production approach; RC, replacement cost; TC, travel cost.

Table 6. Transferability of ecosystem services

Ecosystem Service	Transferability Across Sites[6]	Minimum Geographic Inclusion Criteria
Aesthetic Information	Low	Studies conducted in California only
Air Quality	High	Studies in the greater US acceptable
Biological Control	High	Studies in the greater US acceptable
Climate Stability	High	Studies in the greater US acceptable
Cultural Value	Low	Studies conducted in California only
Disaster Risk Reduction	Medium	US studies conducted in temperate zones only
Energy & Raw Materials	High	Studies in the greater US acceptable
Food	High	Studies in the greater US acceptable
Habitat and Nursery	Low	Studies conducted in California only
Medicinal Resources	Low	Studies conducted in California only
Navigation	High	Studies in the greater US acceptable
Ornamental Resources	Medium	US studies conducted in temperate zones only
Pollination and Seed Dispersal	Medium	US studies conducted in temperate zones only
Recreation and Tourism	Low	Studies conducted in California only
Science and Education	High	Studies in the greater US acceptable
Soil Formation	Medium	US studies conducted in temperate zones only
Soil Quality	Medium	US studies conducted in temperate zones only
Soil Retention	Medium	US studies conducted in temperate zones only
Water Capture, Conveyance, and Supply	Medium	US studies conducted in temperate zones only
Water Quality	Medium	US studies conducted in temperate zones only
Water Storage	Medium	US studies conducted in temperate zones only

Table 7. Gap analysis and ecosystem service/land cover combinations valued in the North Coast

Ecosystem Service	Bay/Estuary	Beach	Coniferous Forest	Cropland	Deciduous Forest	Fresh Herbaceous Wetland	Grassland	Lake	Marine	Mixed Forest	Pasture	Reservoir	River	Saline Herbaceous Wetland	Shrubland
Aesthetic Information			x		x					x					
Air Quality			x		x					x					
Biological Control			x	x	x		x			x					
Climate Stability	x		x	x	x	x	x		x		x			x	x
Disaster Risk Reduction						x	x							x	x
Food	x			x		x	x		x		x			x	
Habitat						x					x			x	x
Navigation									x						
Recreation & Tourism		x				x		x				x		x	x
Soil Formation			x	x	x		x			x					
Soil Quality	x														
Soil Retention			x	x	x		x			x					
Water Capture, Conveyance, & Supply	x		x		x	x	x			x				x	x
Water Quality	x		x		x	x	x			x				x	
Water Storage								x					x		

Key: A cell containing an x indicates a land cover/ecosystem service combination that was valued in this analysis.

Table 9. Land cover acres for the North Coast

Land Cover Type	Sum of Acre	Percent of Total Area
Barren	144,140	1%
Bay/Estuary	863	0%
Beach	4,109	0%
Coniferous Forest	7,749,987	62%
Cropland	264,982	2%
Deciduous Forest	1,539,355	12%
Grassland	1,003,970	8%
Lake	82,796	1%
Marine	225	0%
Pasture	246,482	2%
Reservoir	20,259	0%
River	32,636	0%
Saline Herbaceous Wetland	3,177	0%
Shrubland	1,241,897	10%
Urban	51,061	0%
Mixed Forest	626	0%
Fresh Herbaceous Wetland	47,484	0%
Grand Total	12,434,048	100%

Table 10. Land cover acres by WMA

WMA	Land cover Type	Acres	Percent of WMA
Eel WMA	Barren	23,312	1%
Eel WMA	Beach	755	0%
Eel WMA	Coniferous Forest	1,338,818	57%
Eel WMA	Cropland	21,930	1%
Eel WMA	Deciduous Forest	523,003	22%
Eel WMA	Grassland	277,196	12%
Eel WMA	Lake	943	0%
Eel WMA	Marine	16	0%
Eel WMA	Pasture	30,017	1%
Eel WMA	Reservoir	2,311	0%
Eel WMA	River	12,397	1%
Eel WMA	Saline Herbaceous Wetland	847	0%
Eel WMA	Shrubland	122,414	5%
Eel WMA	Urban	2,524	0%
Eel WMA	Fresh Herbaceous Wetland	293	0%
Eel WMA Total		2,356,778	100%
Humboldt WMA	Barren	8,219	1%
Humboldt WMA	Bay/Estuary	32	0%
Humboldt WMA	Beach	2,466	0%
Humboldt WMA	Coniferous Forest	561,124	76%
Humboldt WMA	Cropland	3,962	1%
Humboldt WMA	Deciduous Forest	61,192	8%
Humboldt WMA	Grassland	43,079	6%
Humboldt WMA	Lake	3,750	1%
Humboldt WMA	Marine	49	0%
Humboldt WMA	Pasture	13,838	2%
Humboldt WMA	Reservoir	15,907	2%
Humboldt WMA	River	2,373	0%
Humboldt WMA	Saline Herbaceous Wetland	1,374	0%
Humboldt WMA	Shrubland	12,241	2%
Humboldt WMA	Urban	4,557	1%
Humboldt WMA	Fresh Herbaceous Wetland	46	0%
Humboldt WMA Total		734,210	100%
Klamath WMA	Barren	52,327	1%
Klamath WMA	Beach	45	0%
Klamath WMA	Coniferous Forest	2,724,175	61%
Klamath WMA	Cropland	123,948	3%
Klamath WMA	Deciduous Forest	213,159	5%
Klamath WMA	Grassland	319,077	7%
Klamath WMA	Lake	51,303	1%
Klamath WMA	Marine	5	0%
Klamath WMA	Pasture	131,175	3%
Klamath WMA	Reservoir	258	0%
Klamath WMA	River	9,420	0%
Klamath WMA	Shrubland	826,594	18%
Klamath WMA	Urban	5,884	0%
Klamath WMA	Mixed Forest	64	0%
Klamath WMA	Fresh Herbaceous Wetland	44,275	1%
Klamath WMA Total		4,501,709	100%
North Coast WMA	Barren	15,016	1%
North Coast WMA	Bay/Estuary	14	0%
North Coast WMA	Beach	759	0%
North Coast WMA	Coniferous Forest	1,393,295	73%
North Coast WMA	Cropland	10,645	1%
North Coast WMA	Deciduous Forest	227,554	12%
North Coast WMA	Grassland	161,396	9%
North Coast WMA	Lake	3,597	0%
North Coast WMA	Marine	155	0%
North Coast WMA	Pasture	11,685	1%
North Coast WMA	Reservoir	54	0%
North Coast WMA	River	3,241	0%
North Coast WMA	Saline Herbaceous Wetland	739	0%
North Coast WMA	Shrubland	64,636	3%
North Coast WMA	Urban	2,801	0%
North Coast WMA	Mixed Forest	232	0%
North Coast WMA	Fresh Herbaceous Wetland	351	0%
North Coast WMA Total		1,896,171	100%
Russian Bodega WMA	Barren	15,083	1%
Russian Bodega WMA	Bay/Estuary	816	0%
Russian Bodega WMA	Beach	85	0%
Russian Bodega WMA	Coniferous Forest	168,239	16%
Russian Bodega WMA	Cropland	103,631	10%
Russian Bodega WMA	Deciduous Forest	385,310	37%
Russian Bodega WMA	Grassland	183,424	18%
Russian Bodega WMA	Lake	5,824	1%
Russian Bodega WMA	Pasture	59,031	6%
Russian Bodega WMA	Reservoir	1,704	0%
Russian Bodega WMA	River	2,867	0%
Russian Bodega WMA	Saline Herbaceous Wetland	218	0%
Russian Bodega WMA	Shrubland	84,166	8%
Russian Bodega WMA	Urban	33,574	3%
Russian Bodega WMA	Mixed Forest	213	0%
Russian Bodega WMA	Fresh Herbaceous Wetland	236	0%
Russian Bodega WMA Total		1,044,421	100%
Trinity WMA	Barren	30,184	2%
Trinity WMA	Coniferous Forest	1,564,335	82%

WMA	Land cover Type	Acres	Percent of WMA
Trinity WMA	Cropland	865	0%
Trinity WMA	Deciduous Forest	129,136	7%
Trinity WMA	Grassland	19,797	1%
Trinity WMA	Lake	17,379	1%
Trinity WMA	Pasture	735	0%
Trinity WMA	Reservoir	25	0%
Trinity WMA	River	2,337	0%
Trinity WMA	Shrubland	131,845	7%
Trinity WMA	Urban	1,721	0%
Trinity WMA	Mixed Forest	116	0%
Trinity WMA	Fresh Herbaceous Wetland	2,282	0%
Trinity WMA Total		1,900,760	100%

Table 11. Land cover acres by county

County	Land Cover Type	Acres	Percent of County
Del Norte	Barren	6,514	1%
Del Norte	Bay/Estuary	8	0%
Del Norte	Beach	171	0%
Del Norte	Coniferous Forest	550,464	82%
Del Norte	Cropland	2,404	0%
Del Norte	Deciduous Forest	49,121	7%
Del Norte	Grassland	6,181	1%
Del Norte	Lake	3,292	0%
Del Norte	Marine	52	0%
Del Norte	Pasture	9,060	1%
Del Norte	Reservoir	3	0%
Del Norte	River	3,171	0%
Del Norte	Saline Herbaceous Wetland	716	0%
Del Norte	Shrubland	37,900	6%
Del Norte	Urban	2,016	0%
Del Norte	Mixed Forest	242	0%
Del Norte	Fresh Herbaceous Wetland	155	0%
Del Norte Total		671,469	100%
Glenn	Barren	334	1%
Glenn	Coniferous Forest	48,245	89%
Glenn	Deciduous Forest	2,891	5%
Glenn	Grassland	1,644	3%
Glenn	Lake	10	0%
Glenn	Shrubland	1,241	2%
Glenn	Fresh Herbaceous Wetland	57	0%
Glenn Total		54,422	100%
Humboldt	Barren	23,141	1%
Humboldt	Bay/Estuary	32	0%
Humboldt	Beach	3,636	0%
Humboldt	Coniferous Forest	1,619,348	70%
Humboldt	Cropland	16,041	1%
Humboldt	Deciduous Forest	288,621	13%
Humboldt	Grassland	221,697	10%
Humboldt	Lake	3,093	0%
Humboldt	Marine	173	0%
Humboldt	Pasture	38,191	2%
Humboldt	Reservoir	15,912	1%
Humboldt	River	16,404	1%
Humboldt	Saline Herbaceous Wetland	2,221	0%
Humboldt	Shrubland	44,059	2%
Humboldt	Urban	7,600	0%
Humboldt	Mixed Forest	130	0%
Humboldt	Fresh Herbaceous Wetland	95	0%
Humboldt Total		2,300,394	100%
Lake	Barren	1,214	1%
Lake	Coniferous Forest	118,071	62%
Lake	Deciduous Forest	21,170	11%
Lake	Grassland	5,447	3%
Lake	Lake	14	0%
Lake	Reservoir	2,233	1%
Lake	River	119	0%
Lake	Shrubland	41,182	22%
Lake	Urban	41	0%
Lake	Fresh Herbaceous Wetland	7	0%
Lake Total		189,498	100%
Marin	Barren	83	0%
Marin	Beach	0	0%
Marin	Cropland	18,276	81%
Marin	Deciduous Forest	492	2%
Marin	Grassland	3,227	14%
Marin	Lake	39	0%
Marin	Pasture	47	0%
Marin	Reservoir	9	0%
Marin	River	166	1%
Marin	Saline Herbaceous Wetland	40	0%
Marin	Shrubland	290	1%
Marin	Urban	11	0%
Marin	Fresh Herbaceous Wetland	22	0%
Marin Total		22,701	100%
Mendocino	Barren	18,860	1%
Mendocino	Bay/Estuary	7	0%
Mendocino	Beach	191	0%
Mendocino	Coniferous Forest	1,177,953	52%
Mendocino	Cropland	31,385	1%
Mendocino	Deciduous Forest	615,002	27%
Mendocino	Grassland	240,632	11%
Mendocino	Lake	2,653	0%
Mendocino	Pasture	24,937	1%
Mendocino	Reservoir	458	0%
Mendocino	River	3,279	0%
Mendocino	Saline Herbaceous Wetland	23	0%
Mendocino	Shrubland	126,235	6%
Mendocino	Urban	6,687	0%
Mendocino	Fresh Herbaceous Wetland	337	0%
Mendocino Total		2,248,641	100%
Modoc	Barren	799	0%
Modoc	Coniferous Forest	263,893	35%
Modoc	Cropland	41,951	6%
Modoc	Deciduous Forest	33	0%
Modoc	Grassland	76,194	10%
Modoc	Lake	22,001	3%
Modoc	Pasture	5,692	1%
Modoc	Shrubland	336,392	45%

County	Land Cover Type	Acres	Percent of County
Modoc	Urban	290	0%
Modoc	Fresh Herbaceous Wetland	4,421	1%
Modoc Total		751,664	100%
Siskiyou	Barren	49,104	1%
Siskiyou	Coniferous Forest	2,106,570	64%
Siskiyou	Cropland	81,680	2%
Siskiyou	Deciduous Forest	147,037	4%
Siskiyou	Grassland	239,994	7%
Siskiyou	Lake	29,189	1%
Siskiyou	Pasture	125,085	4%
Siskiyou	Reservoir	258	0%
Siskiyou	River	4,316	0%
Siskiyou	Shrubland	480,370	15%
Siskiyou	Urban	4,779	0%
Siskiyou	Mixed Forest	1	0%
Siskiyou	Fresh Herbaceous Wetland	39,892	1%
Siskiyou Total		3,308,276	100%
Sonoma	Barren	11,684	1%
Sonoma	Bay/Estuary	816	0%
Sonoma	Beach	109	0%
Sonoma	Coniferous Forest	224,819	27%
Sonoma	Cropland	72,793	9%
Sonoma	Deciduous Forest	253,747	30%
Sonoma	Grassland	150,882	18%
Sonoma	Lake	3,987	0%
Sonoma	Pasture	43,315	5%
Sonoma	Reservoir	1,361	0%
Sonoma	River	2,768	0%
Sonoma	Saline Herbaceous Wetland	178	0%
Sonoma	Shrubland	38,487	5%
Sonoma	Urban	28,837	3%
Sonoma	Mixed Forest	213	0%
Sonoma	Fresh Herbaceous Wetland	214	0%
Sonoma Total		834,209	100%
Trinity	Barren	32,408	2%
Trinity	Coniferous Forest	1,640,624	80%
Trinity	Cropland	454	0%
Trinity	Deciduous Forest	161,241	8%
Trinity	Grassland	58,072	3%
Trinity	Lake	18,517	1%
Trinity	Pasture	154	0%
Trinity	Reservoir	24	0%
Trinity	River	2,412	0%
Trinity	Shrubland	135,742	7%
Trinity	Urban	801	0%
Trinity	Mixed Forest	39	0%
Trinity	Fresh Herbaceous Wetland	2,284	0%
Trinity Total		2,052,774	100%

Table 12. Valuation results of the North Coast Ecosystem Service Valuation

Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Bay/Estuary	0	1	0	0	51	13,042	13,091	13,140	667,093	669,610	672,127
	0	1	0	1	804	13,042	13,091	13,140	10,479,160	10,518,702	10,558,244
	0	1	1	0	7	13,042	13,091	13,140	89,913	90,252	90,591
	0	1	1	1	0	13,042	13,091	13,140	2,900	2,911	2,922
	1	1	1	0	1	13,042	13,091	13,140	11,602	11,645	11,689
Bay/Estuary Subtotal					863				11,250,667	11,293,121	11,335,574
Beach	0	1	0	0	3,100	122,626	122,626	122,626	380,110,041	380,110,041	380,110,041
	0	1	0	1	11	6,398	543,121	2,123,622	72,562	6,160,155	24,086,407
	0	1	1	0	70	122,626	122,626	122,626	8,617,791	8,617,791	8,617,791
	1	1	0	0	927	122,626	122,626	122,626	113,722,117	113,722,117	113,722,117
Beach Subtotal					4,109				502,522,512	508,610,105	526,536,357
Coniferous Forest	0	0	0	0	6,654,705	1,503	2,628	4,339	10,003,943,087	17,486,975,038	28,874,205,596
	0	0	0	1	33,555	1,827	5,372	10,016	61,306,667	180,243,492	336,068,106
	0	0	1	0	229,382	1,503	2,628	4,339	344,827,785	602,761,812	995,270,391
	0	0	1	1	383	1,827	5,372	10,016	699,294	2,055,946	3,833,358
	0	1	0	0	205,472	1,503	2,628	4,339	308,883,978	539,931,742	891,526,413
	0	1	0	1	32,367	1,827	5,372	10,016	59,136,864	173,864,207	324,173,782
	0	1	1	0	3,818	1,503	2,628	4,339	5,739,669	10,032,988	16,566,305
	0	1	1	1	134	1,827	5,372	10,016	245,423	721,552	1,345,350
	1	0	0	0	559,824	1,504	2,628	4,340	841,982,525	1,471,489,508	2,429,435,591
	1	0	0	1	9,971	1,828	5,372	10,016	18,224,612	53,566,930	99,870,530
	1	0	1	0	7,463	1,504	2,628	4,340	11,224,632	19,616,711	32,387,276
	1	0	1	1	76	1,828	5,372	10,016	139,020	408,616	761,826
	1	1	0	0	4,474	1,504	2,628	4,340	6,729,494	11,760,791	19,417,117
	1	1	0	1	8,349	1,828	5,372	10,016	15,260,481	44,854,568	83,627,145
	1	1	1	0	13	1,504	2,628	4,340	19,400	33,905	55,977
Coniferous Forest Subtotal					7,749,987				11,678,362,932	20,598,317,806	34,108,544,763
Cropland	1	0	0	0	122,143	175	366	557	21,317,062	44,645,350	67,973,638
	1	0	0	1	106,142	175	366	557	18,524,544	38,796,844	59,069,145
	1	0	1	0	2,681	175	366	557	467,820	979,777	1,491,735
	1	0	1	1	418	175	366	557	72,931	152,742	232,554
	1	1	0	0	32,570	175	366	557	5,684,322	11,904,950	18,125,577
	1	1	0	1	185	175	366	557	32,332	67,714	103,096
	1	1	1	0	840	175	366	557	146,676	307,191	467,707
	1	1	1	1	2	175	366	557	388	813	1,238
Cropland Subtotal					264,982				46,246,075	96,855,382	147,464,689
Deciduous Forest	0	0	0	0	1,275,784	1,481	2,625	4,190	1,889,196,876	3,349,008,488	5,345,933,381
	0	0	0	1	15,196	1,805	3,953	6,529	27,423,380	60,064,479	99,218,630
	0	0	1	0	45,143	1,481	2,625	4,190	66,847,728	118,502,000	189,161,599
	0	0	1	1	763	1,805	3,953	6,529	1,376,968	3,015,926	4,981,913
	0	1	0	0	21,786	1,481	2,625	4,190	32,261,017	57,189,603	91,290,246
	0	1	0	1	465	1,805	3,953	6,529	839,184	1,838,036	3,036,194
	0	1	1	0	892	1,481	2,625	4,190	1,320,594	2,341,037	3,736,935
	0	1	1	1	27	1,805	3,953	6,529	48,561	106,362	175,696
	1	0	0	0	147,751	1,482	2,626	4,191	218,897,960	387,961,214	619,228,467
	1	0	0	1	26,371	1,805	3,953	6,530	47,608,558	104,252,671	172,199,286
	1	0	1	0	2,508	1,482	2,626	4,191	3,715,284	6,584,739	10,509,963
	1	0	1	1	284	1,805	3,953	6,530	513,107	1,123,596	1,855,899
	1	1	0	0	2,324	1,482	2,626	4,191	3,443,128	6,102,388	9,740,078
	1	1	1	0	62	1,482	2,626	4,191	91,268	161,757	258,182
Deciduous Forest Subtotal					1,539,355				2,293,583,612	4,098,252,297	6,551,326,468

Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Fresh Herbaceous Wetland	0	0	0	0	10,117	240	10,649	24,395	2,426,343	107,738,099	246,805,857
	0	0	0	1	42	240	11,905	27,863	10,187	505,683	1,183,545
	0	0	1	0	1,221	18,025	29,509	44,330	22,007,804	36,029,476	54,124,840
	0	0	1	1	8	18,025	30,765	47,798	144,313	246,313	382,684
	0	1	0	0	200	240	10,649	24,395	48,055	2,133,826	4,888,158
	0	1	0	1	2	240	11,905	27,863	480	23,828	55,769
	0	1	1	0	25	18,025	29,509	44,330	444,967	728,465	1,094,327
	1	0	0	0	34,873	240	10,465	24,395	8,363,448	364,957,935	850,723,926
	1	0	0	1	192	240	11,721	27,863	46,082	2,252,179	5,353,839
	1	0	1	0	745	39,422	50,722	65,727	29,352,660	37,766,756	48,938,787
	1	0	1	1	41	39,422	51,978	69,195	1,630,703	2,150,097	2,862,286
	1	1	0	0	16	240	10,465	24,395	3,840	167,574	390,619
	1	1	1	0	0	39,422	50,722	65,727	17,534	22,561	29,235
Fresh Herbaceous Wetland Subtotal					47,484				64,496,417	554,722,793	1,216,833,872
Grassland	0	0	0	0	591,506	66	168	264	38,903,171	99,312,794	155,998,594
	0	0	0	1	9,742	509	611	707	4,960,674	5,955,565	6,889,128
	0	0	1	0	10,538	66	168	264	693,078	1,769,304	2,779,188
	0	0	1	1	273	509	611	707	138,844	166,690	192,819
	0	1	0	0	70,514	65	164	264	4,602,370	11,565,714	18,596,760
	0	1	0	1	2,696	509	607	707	1,371,575	1,637,817	1,906,648
	0	1	1	0	898	24,435	29,814	50,947	21,943,315	26,773,539	45,752,221
	0	1	1	1	24	4,406	19,799	50,947	105,833	475,553	1,223,685
	1	0	0	0	241,369	66	168	264	15,874,774	40,525,442	63,656,571
	1	0	0	1	33,398	509	611	707	17,007,264	20,418,167	23,618,812
	1	0	1	0	3,045	66	168	264	200,256	511,218	803,011
	1	0	1	1	166	509	611	707	84,597	101,564	117,485
	1	1	0	0	21,695	65	164	264	1,415,997	3,558,387	5,721,606
	1	1	0	1	17,944	509	607	707	9,128,446	10,900,407	12,689,597
	1	1	1	0	163	24,435	29,814	50,947	3,977,837	4,853,450	8,293,865
Grassland Subtotal					1,003,970				120,408,033	228,525,611	348,239,990
Lake	0	0	1	0	50,190	100	6,735	13,369	5,015,864	338,006,997	670,998,131
	0	0	1	1	210	100	6,735	13,369	20,959	1,412,356	2,803,754
	0	1	1	0	2,960	100	6,735	13,369	295,844	19,936,242	39,576,640
	0	1	1	1	71	100	6,735	13,369	7,112	479,273	951,433
	1	0	1	0	24,858	100	6,735	13,369	2,484,262	167,408,419	332,332,577
	1	0	1	1	1,585	100	6,735	13,369	158,402	10,674,299	21,190,197
	1	1	1	0	2,922	100	6,735	13,369	291,977	19,675,638	39,059,298
Lake Subtotal					82,796				8,274,419	557,593,225	1,106,912,030
Marine	0	1	0	0	218	5,327	5,342	5,358	1,158,642	1,161,968	1,165,294
	0	1	0	1	2	5,327	5,342	5,358	10,662	10,693	10,724
	0	1	1	0	6	5,327	5,342	5,358	29,618	29,703	29,788
Marine Subtotal					225				1,198,922	1,202,364	1,205,805
Mixed Forest	0	0	0	0	299	1,414	2,484	3,674	423,095	742,983	1,099,041
	0	0	0	1	143	1,659	3,983	7,487	236,508	567,857	1,067,292
	0	0	1	0	10	1,414	2,484	3,674	14,785	25,963	38,405
	0	0	1	1	22	1,659	3,983	7,487	36,528	87,703	164,839
	1	0	0	0	21	1,415	2,485	3,675	29,585	51,941	76,825
	1	0	0	1	127	1,660	3,984	7,488	210,772	505,937	950,831
	1	0	1	1	4	1,660	3,984	7,488	6,275	15,063	28,308
Mixed Forest Subtotal					626				957,547	1,997,447	3,425,542

Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Pasture	1	0	0	0	156,860	218	253	289	34,256,760	39,761,887	45,267,014
	1	0	0	1	45,017	218	253	289	9,831,316	11,411,227	12,991,139
	1	0	1	0	4,164	1,823	1,858	1,893	7,591,381	7,737,516	7,883,651
	1	0	1	1	438	1,823	1,858	1,893	798,346	813,714	829,082
	1	1	0	0	35,708	218	253	289	7,798,319	9,051,524	10,304,729
	1	1	0	1	2,827	218	253	289	617,456	716,683	815,909
	1	1	1	0	1,450	1,823	1,858	1,893	2,644,394	2,695,299	2,746,204
	1	1	1	1	16	1,823	1,858	1,893	30,004	30,581	31,159
Pasture Subtotal					246,482				63,567,976	72,218,431	80,868,886
Reservoir	0	0	0	0	2,805	865	12,506	40,284	2,425,642	35,082,503	113,007,968
	0	0	0	1	230	865	12,506	40,284	198,836	2,875,797	9,263,536
	0	0	1	0	298	865	12,506	40,284	257,294	3,721,293	11,987,051
	0	1	0	0	206	865	12,506	40,284	178,068	2,575,424	8,295,971
	0	1	0	1	26	865	12,506	40,284	22,883	330,967	1,066,113
	0	1	1	0	11	865	12,506	40,284	9,230	133,499	430,029
	0	1	1	1	4	865	12,506	40,284	3,077	44,500	143,343
	1	0	0	0	671	865	12,506	40,284	579,970	8,388,206	27,020,139
	1	0	0	1	313	865	12,506	40,284	270,947	3,918,761	12,623,135
	1	0	1	0	8	865	12,506	40,284	7,115	102,906	331,480
	1	1	0	0	11	865	12,506	40,284	9,615	139,062	447,947
	1	1	0	1	15,676	865	12,506	40,284	13,554,483	196,040,938	631,488,237
Reservoir Subtotal					20,259				17,517,160	253,353,855	816,104,948
River	0	0	0	0	10,698	5	6	6	53,556	59,507	65,458
	0	0	0	1	255	5	6	6	1,275	1,416	1,558
	0	0	1	0	11,602	5	6	6	58,082	64,536	70,990
	0	0	1	1	417	5	6	6	2,089	2,321	2,553
	0	1	0	0	4,042	5	6	6	20,238	22,487	24,736
	0	1	0	1	25	5	6	6	127	141	155
	0	1	1	0	1,297	5	6	6	6,492	7,214	7,935
	0	1	1	1	43	5	6	6	217	241	265
	1	0	0	0	778	5	6	6	3,895	4,327	4,760
	1	0	0	1	115	5	6	6	577	641	705
	1	0	1	0	930	5	6	6	4,654	5,171	5,688
	1	0	1	1	134	5	6	6	670	745	819
	1	1	0	0	1,937	5	6	6	9,698	10,775	11,853
	1	1	1	0	363	5	6	6	1,819	2,021	2,224
River Subtotal					32,636				163,389	181,544	199,698
Saline Herbaceous Wetland	0	0	0	0	11	3,840	18,823	37,355	41,843	205,122	407,075
	0	0	0	1	19	3,840	18,823	37,355	71,732	351,637	697,843
	0	0	1	0	1	3,840	18,823	37,355	3,416	16,745	33,231
	0	0	1	1	2	3,840	18,823	37,355	7,686	37,675	74,769
	0	1	0	0	2,250	3,865	18,942	37,577	8,696,840	42,627,044	84,564,181
	0	1	0	1	276	3,865	18,942	37,577	1,066,585	5,227,805	10,371,000
	0	1	1	0	208	3,865	18,942	37,577	805,311	3,947,183	7,830,481
	0	1	1	1	5	3,865	18,942	37,577	20,627	101,102	200,567
	1	1	0	0	393	3,865	18,942	37,577	1,520,378	7,452,045	14,783,480
	1	1	1	0	11	3,865	18,942	37,577	43,832	214,841	426,205
Saline Herbaceous Wetland Subotal					3,177				12,278,250	60,181,198	119,388,832

Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Shrubland	0	0	0	0	995,770	146	146	146	145,520,326	145,520,326	145,520,326
	0	0	0	1	1,877	146	146	146	274,304	274,304	274,304
	0	0	1	0	12,649	224	413	767	2,828,288	5,220,679	9,695,814
	0	0	1	1	25	224	413	767	5,569	10,280	19,093
	0	1	0	0	17,367	146	146	146	2,537,960	2,537,960	2,537,960
	0	1	0	1	383	146	146	146	55,901	55,901	55,901
	0	1	1	0	482	224	413	767	107,707	198,815	369,238
	0	1	1	1	11	224	413	767	2,536	4,681	8,694
	1	0	0	0	199,679	146	146	146	29,180,825	29,180,825	29,180,825
	1	0	0	1	11,844	146	146	146	1,730,909	1,730,909	1,730,909
	1	0	1	0	533	18,411	18,600	18,954	9,806,241	9,906,981	10,095,422
	1	0	1	1	43	18,411	18,600	18,954	790,232	798,350	813,535
	1	1	0	0	1,225	146	146	146	178,980	178,980	178,980
	1	1	1	0	10	18,411	18,600	18,954	184,251	186,144	189,684
Shrubland Subtotal					1,241,897				193,204,029	195,805,134	200,670,685
North Coast Total					12,238,847				15,014,031,940	27,239,110,313	45,239,058,140

Table 13. Detailed valuation results ($/acre/year) by WMA

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Eel	Beach	0	1	0	0	719	122,626	122,626	122,626	88,141,459	88,141,459	88,141,459
		0	1	1	0	7	122,626	122,626	122,626	818,145	818,145	818,145
		1	1	0	0	29	122,626	122,626	122,626	3,572,565	3,572,565	3,572,565
	Coniferous Forest	0	0	0	0	1,281,724	1,503	2,628	4,339	1,926,800,917	3,368,063,897	5,561,291,717
		0	0	0	1	583	1,827	5,372	10,016	1,064,585	3,129,912	5,835,792
		0	0	1	0	39,212	1,503	2,628	4,339	58,946,278	103,038,580	170,135,608
		0	0	1	1	2	1,827	5,372	10,016	4,470	13,141	24,501
		0	1	0	0	425	1,503	2,628	4,339	638,224	1,115,621	1,842,094
		0	1	1	0	2	1,503	2,628	4,339	2,340	4,091	6,755
		1	0	0	0	16,652	1,504	2,628	4,340	25,045,198	43,770,204	72,264,797
		1	0	1	0	88	1,504	2,628	4,340	132,456	231,486	382,185
		1	1	0	0	131	1,504	2,628	4,340	196,342	343,138	566,522
		1	1	1	0	0.4	1,504	2,628	4,340	669	1,169	1,930
	Cropland	1	0	0	0	14,991	175	366	557	2,616,344	5,479,535	8,342,726
		1	0	1	0	218	175	366	557	38,037	79,663	121,289
		1	1	0	0	6,452	175	366	557	1,126,020	2,358,278	3,590,536
		1	1	1	0	269	175	366	557	47,003	98,441	149,879
	Deciduous Forest	0	0	0	0	487,137	1,481	2,625	4,190	721,358,332	1,278,763,059	2,041,255,537
		0	0	0	1	955	1,805	3,953	6,529	1,723,719	3,775,401	6,236,467
		0	0	1	0	14,536	1,481	2,625	4,190	21,525,348	38,158,317	60,911,108
		0	0	1	1	103	1,805	3,953	6,529	185,014	405,229	669,386
		0	1	0	0	1,397	1,481	2,625	4,190	2,068,820	3,667,430	5,854,221
		0	1	1	0	18	1,481	2,625	4,190	27,005	47,872	76,416
		1	0	0	0	17,999	1,482	2,626	4,191	26,665,629	47,260,513	75,432,940
		1	0	1	0	263	1,482	2,626	4,191	389,782	690,825	1,102,633
		1	1	0	0	577	1,482	2,626	4,191	855,016	1,515,378	2,418,708
		1	1	1	0	18	1,482	2,626	4,191	27,018	47,885	76,429
	Fresh Herbaceous Wetland	0	0	0	0	266	240	10,649	24,395	63,683	2,827,734	6,477,759
		0	0	1	0	28	18,025	29,509	44,330	501,088	820,343	1,232,351

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
	Grassland	0	0	0	0	263,561	66	168	264	17,334,328	44,251,421	69,509,266
		0	0	0	1	922	509	611	707	469,533	563,700	652,063
		0	0	1	0	3,818	66	168	264	251,128	641,085	1,007,004
		0	0	1	1	29	509	611	707	14,722	17,675	20,446
		0	1	0	0	2,199	65	164	264	143,514	360,650	579,897
		0	1	1	0	54	24,435	29,814	50,947	1,309,643	1,597,925	2,730,630
		1	0	0	0	4,655	66	168	264	306,154	781,557	1,227,655
		1	0	1	0	68	66	168	264	4,505	11,501	18,065
		1	1	0	0	1,879	65	164	264	122,656	308,232	495,613
		1	1	1	0	11	24,435	29,814	50,947	271,710	331,520	566,521
	Lake	0	0	1	0	824	100	6,735	13,369	82,368	5,550,576	11,018,784
		0	0	1	1	13	100	6,735	13,369	1,289	86,868	172,447
		0	1	1	0	80	100	6,735	13,369	7,979	537,684	1,067,389
		1	0	1	0	4	100	6,735	13,369	378	25,461	50,545
		1	1	1	0	22	100	6,735	13,369	2,245	151,270	300,296
	Marine	0	1	0	0	16	5,327	5,342	5,358	87,668	87,920	88,172
	Pasture	1	0	0	0	7,061	218	253	289	1,542,160	1,789,988	2,037,816
		1	0	0	1	4,010	218	253	289	875,843	1,016,593	1,157,342
		1	0	1	0	332	1,823	1,858	1,893	604,943	616,588	628,233
		1	0	1	1	47	1,823	1,858	1,893	86,362	88,025	89,687
		1	1	0	0	17,768	218	253	289	3,880,412	4,504,002	5,127,591
		1	1	1	0	798	1,823	1,858	1,893	1,453,971	1,481,960	1,509,949
	Reservoir	0	0	1	0	2,299	865	12,506	40,284	1,988,165	28,755,193	92,626,397
		1	0	1	0	12	865	12,506	40,284	10,384	150,187	483,782
	River	0	0	1	0	8,533	5	6	6	42,720	47,466	52,213
		0	1	1	0	1,996	5	6	6	9,993	11,103	12,213
		1	0	1	0	594	5	6	6	2,976	3,307	3,637
		1	1	1	0	1,274	5	6	6	6,376	7,085	7,793
	Saline Herbaceous Wetland	0	1	0	0	714	3,865	18,942	37,577	2,758,855	13,522,365	26,825,874
		0	1	1	0	120	3,865	18,942	37,577	464,966	2,279,003	4,521,121
		1	1	0	0	5	3,865	18,942	37,577	20,627	101,102	200,567
		1	1	1	0	8	3,865	18,942	37,577	29,222	143,228	284,137
	Shrubland	0	0	0	0	119,429	146	146	146	17,453,199	17,453,199	17,453,199
		0	0	1	0	2,151	224	413	767	480,854	887,599	1,648,444
		0	1	0	0	456	146	146	146	66,658	66,658	66,658
		0	1	1	0	0.4	224	413	767	99	184	341
		1	0	0	0	323	146	146	146	47,223	47,223	47,223
		1	0	1	0	0.4	18,411	18,600	18,954	8,189	8,273	8,430
		1	1	0	0	54	146	146	146	7,963	7,963	7,963
Eel Total						2,330,942				2,936,833,486	5,126,532,646	8,363,137,859
Humboldt	Bay/Estuary	0	1	0	0	26	13,042	13,091	13,140	333,546	334,805	336,064
Humboldt		0	1	1	0	7	13,042	13,091	13,140	89,913	90,252	90,591
	Beach	0	1	0	0	1,550	122,626	122,626	122,626	190,055,021	190,055,021	190,055,021
		0	1	1	0	30	122,626	122,626	122,626	3,627,108	3,627,108	3,627,108
		1	1	0	0	887	122,626	122,626	122,626	108,731,435	108,731,435	108,731,435

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Humboldt	Coniferous Forest	0	0	0	0	489,579	1,503	2,628	4,339	735,978,454	1,286,496,409	2,124,241,713
		0	0	0	1	754	1,827	5,372	10,016	1,377,052	4,048,577	7,548,664
		0	0	1	0	18,050	1,503	2,628	4,339	27,133,709	47,429,947	78,315,549
		0	0	1	1	35	1,827	5,372	10,016	63,387	186,361	347,475
		0	1	0	0	49,650	1,503	2,628	4,339	74,637,759	130,467,419	215,425,656
		0	1	0	1	119	1,827	5,372	10,016	217,793	640,318	1,193,887
		0	1	1	0	713	1,503	2,628	4,339	1,071,173	1,872,419	3,091,708
		1	0	0	0	2,123	1,504	2,628	4,340	3,192,320	5,579,054	9,211,042
		1	0	1	0	4	1,504	2,628	4,340	5,686	9,938	16,407
		1	1	0	0	99	1,504	2,628	4,340	148,511	259,545	428,510
		1	1	1	0	1	1,504	2,628	4,340	1,672	2,923	4,826
	Cropland	1	0	0	0	902	175	366	557	157,389	329,627	501,866
		1	0	0	1	27	175	366	557	4,735	9,917	15,099
		1	0	1	0	67	175	366	557	11,722	24,549	37,377
		1	0	1	1	2	175	366	557	311	650	990
		1	1	0	0	2,702	175	366	557	471,507	987,500	1,503,493
		1	1	0	1	86	175	366	557	15,021	31,459	47,897
		1	1	1	0	174	175	366	557	30,352	63,568	96,784
		1	1	1	1	2	175	366	557	388	813	1,238
	Deciduous Forest	0	0	0	0	53,661	1,481	2,625	4,190	79,462,197	140,863,865	224,857,249
		0	0	0	1	87	1,805	3,953	6,529	157,723	345,456	570,648
		0	0	1	0	1,772	1,481	2,625	4,190	2,624,392	4,652,300	7,426,343
		0	0	1	1	9	1,805	3,953	6,529	16,455	36,040	59,533
		0	1	0	0	5,043	1,481	2,625	4,190	7,467,447	13,237,658	21,130,923
		0	1	0	1	159	1,805	3,953	6,529	287,353	629,380	1,039,653
		0	1	1	0	161	1,481	2,625	4,190	239,090	423,839	676,562
		0	1	1	1	4	1,805	3,953	6,529	7,625	16,701	27,589
		1	0	0	0	69	1,482	2,626	4,191	102,470	181,612	289,872
		1	0	1	0	12	1,482	2,626	4,191	17,133	30,366	48,467
		1	1	0	0	212	1,482	2,626	4,191	314,659	557,682	890,122
		1	1	1	0	2	1,482	2,626	4,191	2,306	4,088	6,524
	Fresh Herbaceous Wetland	0	0	0	0	24	240	10,649	24,395	5,707	253,407	580,503
		0	0	1	0	2	18,025	29,509	44,330	32,070	52,502	78,870
		0	1	0	0	14	240	10,649	24,395	3,307	146,834	336,366
		0	1	1	0	7	18,025	29,509	44,330	128,279	210,008	315,482
	Grassland	0	0	0	0	31,783	66	168	264	2,090,351	5,336,290	8,382,140
		0	0	0	1	293	509	611	707	149,263	179,199	207,289
		0	0	1	0	655	66	168	264	43,061	109,928	172,673
		0	0	1	1	42	509	611	707	21,631	25,969	30,040
		0	1	0	0	6,986	65	164	264	455,945	1,145,785	1,842,332
		0	1	0	1	848	509	607	707	431,396	515,136	599,691
		0	1	1	0	198	24,435	29,814	50,947	4,836,441	5,901,052	10,084,071
		0	1	1	1	16	4,406	19,799	50,947	69,576	312,632	804,460
		1	0	0	0	727	66	168	264	47,815	122,063	191,735
		1	0	1	0	43	66	168	264	2,808	7,169	11,261
		1	1	0	0	1,488	65	164	264	97,094	243,996	392,326
		1	1	0	1	0.4	509	607	707	226	270	315
		1	1	1	0	0.4	24,435	29,814	50,947	10,868	13,261	22,661
	Lake	0	0	1	0	1,261	100	6,735	13,369	125,974	8,489,116	16,852,257
		0	0	1	1	5	100	6,735	13,369	489	32,950	65,411
		0	1	1	0	2,449	100	6,735	13,369	244,748	16,492,968	32,741,188
		0	1	1	1	34	100	6,735	13,369	3,423	230,650	457,877
		1	0	1	0	1	100	6,735	13,369	111	7,489	14,866

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Humboldt	Marine	0	1	0	0	48	5,327	5,342	5,358	253,527	254,255	254,983
		0	1	1	0	2	5,327	5,342	5,358	9,478	9,505	9,532
	Pasture	1	0	0	0	2,527	218	253	289	551,791	640,465	729,139
		1	0	0	1	34	218	253	289	7,431	8,625	9,819
		1	0	1	0	292	1,823	1,858	1,893	532,366	542,614	552,862
		1	0	1	1	3	1,823	1,858	1,893	4,865	4,959	5,053
		1	1	0	0	7,668	218	253	289	1,674,656	1,943,776	2,212,896
		1	1	0	1	2,827	218	253	289	617,456	716,683	815,909
		1	1	1	0	471	1,823	1,858	1,893	858,354	874,877	891,400
		1	1	1	1	16	1,823	1,858	1,893	30,004	30,581	31,159
	Reservoir	0	0	1	0	10	865	12,506	40,284	9,038	130,718	421,070
		0	0	1	1	0.2	865	12,506	40,284	192	2,781	8,959
		0	1	1	0	182	865	12,506	40,284	157,684	2,280,613	7,346,324
		0	1	1	1	30	865	12,506	40,284	25,576	369,904	1,191,538
		1	1	1	0	8	865	12,506	40,284	6,923	100,124	322,522
		1	1	1	1	15,676	865	12,506	40,284	13,554,483	196,040,938	631,488,237
	River	0	0	1	0	1,289	5	6	6	6,455	7,173	7,890
		0	1	1	0	778	5	6	6	3,895	4,327	4,760
		0	1	1	1	4	5	6	6	18	20	22
		1	0	1	0	13	5	6	6	67	74	82
		1	1	1	0	289	5	6	6	1,447	1,608	1,769
	Saline Herbaceous Wetland	0	0	0	0	8	3,840	18,823	37,355	32,450	159,074	315,691
		0	0	1	0	1	3,840	18,823	37,355	2,562	12,558	24,923
		0	1	0	0	1,164	3,865	18,942	37,577	4,497,536	22,044,404	43,732,025
		0	1	0	1	140	3,865	18,942	37,577	540,598	2,649,710	5,256,534
		0	1	1	0	56	3,865	18,942	37,577	216,583	1,061,569	2,105,956
		0	1	1	1	3	3,865	18,942	37,577	11,173	54,763	108,641
		1	1	0	0	2	3,865	18,942	37,577	8,595	42,126	83,570
	Shrubland	0	0	0	0	9,330	146	146	146	1,363,427	1,363,427	1,363,427
		0	0	0	1	6	146	146	146	910	910	910
		0	0	1	0	282	224	413	767	63,003	116,297	215,985
		0	1	0	0	2,371	146	146	146	346,552	346,552	346,552
		0	1	0	1	57	146	146	146	8,288	8,288	8,288
		0	1	1	0	44	224	413	767	9,746	17,991	33,412
		0	1	1	1	11	224	413	767	2,536	4,681	8,694
		1	0	0	0	53	146	146	146	7,800	7,800	7,800
		1	1	0	0	87	146	146	146	12,708	12,708	12,708
Humboldt Total						721,435				1,272,285,571	2,213,954,751	3,776,008,736
Klamath	Beach	0	1	0	0	45	122,626	122,626	122,626	5,481,570	5,481,570	5,481,570
Klamath	Coniferous Forest	0	0	0	0	2,123,632	1,503	2,628	4,339	3,192,431,979	5,580,397,433	9,214,260,468
Klamath		0	0	0	1	929	1,827	5,372	10,016	1,696,834	4,988,745	9,301,629
Klamath		0	0	1	0	63,913	1,503	2,628	4,339	96,079,273	167,947,362	277,311,923
Klamath		0	0	1	1	18	1,827	5,372	10,016	32,100	94,375	175,965
Klamath		0	1	0	0	5,217	1,503	2,628	4,339	7,842,899	13,709,452	22,636,822
Klamath		0	1	1	0	52	1,503	2,628	4,339	77,563	135,581	223,869
Klamath		1	0	0	0	515,502	1,504	2,628	4,340	775,321,431	1,354,989,345	2,237,093,314
Klamath		1	0	0	1	7,712	1,828	5,372	10,016	14,095,884	41,431,513	77,245,179
Klamath		1	0	1	0	7,140	1,504	2,628	4,340	10,738,626	18,767,344	30,984,966
Klamath		1	0	1	1	61	1,828	5,372	10,016	112,191	329,760	614,807
Klamath	Cropland	1	0	0	0	55,199	175	366	557	9,633,640	20,176,196	30,718,752
Klamath		1	0	0	1	67,907	175	366	557	11,851,524	24,821,217	37,790,911
Klamath		1	0	1	0	830	175	366	557	144,930	303,533	462,137
Klamath		1	0	1	1	12	175	366	557	2,018	4,227	6,436

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Klamath	Deciduous Forest	0	0	0	0	144,157	1,481	2,625	4,190	213,469,854	378,421,307	604,063,891
Klamath		0	0	0	1	338	1,805	3,953	6,529	610,425	1,336,993	2,208,537
Klamath		0	0	1	0	6,083	1,481	2,625	4,190	9,008,030	15,968,673	25,490,370
Klamath		0	0	1	1	39	1,805	3,953	6,529	69,832	152,950	252,653
Klamath		0	1	0	0	2,950	1,481	2,625	4,190	4,368,827	7,744,687	12,362,638
Klamath		0	1	1	0	77	1,481	2,625	4,190	114,605	203,162	324,303
Klamath		1	0	0	0	56,449	1,482	2,626	4,191	83,630,788	148,222,040	236,578,564
Klamath		1	0	0	1	2,152	1,805	3,953	6,530	3,884,840	8,506,977	14,051,394
Klamath		1	0	1	0	893	1,482	2,626	4,191	1,322,886	2,344,602	3,742,240
Klamath		1	0	1	1	20	1,805	3,953	6,530	36,536	80,006	132,149
Klamath	Fresh Herbaceous Wetland	0	0	0	0	7,622	240	10,649	24,395	1,827,917	81,165,922	185,934,457
Klamath		0	0	0	1	33	240	11,905	27,863	7,947	394,486	923,289
Klamath		0	0	1	0	875	18,025	29,509	44,330	15,778,273	25,830,968	38,804,257
Klamath		0	0	1	1	7	18,025	30,765	47,798	120,261	205,260	318,904
Klamath		0	1	0	0	40	240	10,649	24,395	9,654	428,660	981,972
Klamath		0	1	1	0	6	18,025	29,509	44,330	116,253	190,320	285,905
Klamath		1	0	0	0	34,757	240	10,465	24,395	8,335,660	363,745,350	847,897,366
Klamath		1	0	0	1	173	240	11,721	27,863	41,602	2,033,217	4,833,327
Klamath		1	0	1	0	731	39,422	50,722	65,727	28,800,325	37,056,091	48,017,896
Klamath		1	0	1	1	29	39,422	51,978	69,195	1,157,273	1,525,876	2,031,300
Klamath	Grassland	0	0	0	0	113,551	66	168	264	7,468,187	19,064,938	29,946,832
Klamath		0	0	0	1	762	509	611	707	387,880	465,672	538,668
Klamath		0	0	1	0	2,076	66	168	264	136,556	348,603	547,579
Klamath		0	0	1	1	22	509	611	707	11,325	13,596	15,728
Klamath		0	1	0	0	291	65	164	264	19,001	47,749	76,776
Klamath		0	1	1	0	6	24,435	29,814	50,947	157,592	192,281	328,582
Klamath		1	0	0	0	189,771	66	168	264	12,481,157	31,862,147	50,048,438
Klamath		1	0	0	1	10,053	509	611	707	5,119,450	6,146,184	7,109,628
Klamath		1	0	1	0	2,473	66	168	264	162,621	415,143	652,098
Klamath		1	0	1	1	73	509	611	707	36,919	44,324	51,272
Klamath	Lake	0	0	1	0	25,509	100	6,735	13,369	2,549,294	171,790,768	341,032,243
Klamath		0	0	1	1	43	100	6,735	13,369	4,267	287,564	570,860
Klamath		0	1	1	0	26	100	6,735	13,369	2,623	176,732	350,841
Klamath		1	0	1	0	24,204	100	6,735	13,369	2,418,874	163,002,107	323,585,340
Klamath		1	0	1	1	1,521	100	6,735	13,369	152,045	10,245,949	20,339,854
Klamath	Marine	0	1	0	0	4	5,327	5,342	5,358	23,694	23,762	23,830
Klamath		0	1	1	0	0.2	5,327	5,342	5,358	1,185	1,188	1,192
Klamath	Mixed Forest	0	0	0	0	61	1,414	2,484	3,674	85,877	150,806	223,077
Klamath		0	0	1	0	2	1,414	2,484	3,674	2,517	4,419	6,537
Klamath		1	0	0	0	1	1,415	2,485	3,675	1,574	2,763	4,086
Klamath	Pasture	1	0	0	0	108,489	218	253	289	23,692,976	27,500,483	31,307,989
Klamath		1	0	0	1	19,981	218	253	289	4,363,624	5,064,867	5,766,109
Klamath		1	0	1	0	2,466	1,823	1,858	1,893	4,496,524	4,583,082	4,669,641
Klamath		1	0	1	1	107	1,823	1,858	1,893	194,214	197,953	201,691
Klamath		1	1	0	0	123	218	253	289	26,859	31,175	35,491
Klamath		1	1	1	0	10	1,823	1,858	1,893	17,435	17,770	18,106
Klamath	Reservoir	0	0	1	0	11	865	12,506	40,284	9,230	133,499	430,029
Klamath		0	0	1	1	10	865	12,506	40,284	9,038	130,718	421,070
Klamath		1	0	1	0	190	865	12,506	40,284	164,607	2,380,737	7,668,846
Klamath		1	0	1	1	47	865	12,506	40,284	40,383	584,059	1,881,376
Klamath	River	0	0	1	0	7,901	5	6	6	39,553	43,948	48,343
Klamath		0	1	1	0	899	5	6	6	4,501	5,002	5,502
Klamath		1	0	1	0	620	5	6	6	3,103	3,448	3,793

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Klamath	Shrubland	0	0	0	0	611,015	146	146	146	89,292,786	89,292,786	89,292,786
Klamath		0	0	0	1	1,082	146	146	146	158,082	158,082	158,082
Klamath		0	0	1	0	4,536	224	413	767	1,014,269	1,872,219	3,477,074
Klamath		0	0	1	1	14	224	413	767	3,033	5,599	10,399
Klamath		0	1	0	0	606	146	146	146	88,596	88,596	88,596
Klamath		0	1	1	0	8	224	413	767	1,840	3,396	6,307
Klamath		1	0	0	0	197,175	146	146	146	28,814,837	28,814,837	28,814,837
Klamath		1	0	0	1	11,627	146	146	146	1,699,221	1,699,221	1,699,221
Klamath		1	0	1	0	500	18,411	18,600	18,954	9,208,449	9,303,048	9,480,001
Klamath		1	0	1	1	31	18,411	18,600	18,954	569,130	574,977	585,914
Klamath Total						4,443,497				4,693,389,179	8,885,911,403	14,935,068,822
North Coast	Bay/Estuary	0	1	0	0	14	13,042	13,091	13,140	176,925	177,592	178,260
North Coast		1	1	1	0	1	13,042	13,091	13,140	11,602	11,645	11,689
North Coast	Beach	0	1	0	0	707	122,626	122,626	122,626	86,723,341	86,723,341	86,723,341
North Coast		0	1	0	1	7	6,398	543,121	2,123,622	44,106	3,744,408	14,640,757
North Coast		0	1	1	0	33	122,626	122,626	122,626	4,036,181	4,036,181	4,036,181
North Coast		1	1	0	0	12	122,626	122,626	122,626	1,418,118	1,418,118	1,418,118
North Coast	Coniferous Forest	0	0	0	0	1,120,866	1,503	2,628	4,339	1,684,985,276	2,945,368,161	4,863,343,469
North Coast		0	0	0	1	18,890	1,827	5,372	10,016	34,513,672	101,471,260	189,195,481
North Coast		0	0	1	0	48,332	1,503	2,628	4,339	72,656,557	127,004,261	209,707,347
North Coast		0	0	1	1	161	1,827	5,372	10,016	293,777	863,712	1,610,411
North Coast		0	1	0	0	143,940	1,503	2,628	4,339	216,382,971	378,239,219	624,542,377
North Coast		0	1	0	1	32,235	1,827	5,372	10,016	58,895,098	173,153,406	322,848,478
North Coast		0	1	1	0	2,943	1,503	2,628	4,339	4,424,774	7,734,541	12,771,147
North Coast		0	1	1	1	134	1,827	5,372	10,016	245,423	721,552	1,345,350
North Coast		1	0	0	0	13,128	1,504	2,628	4,340	19,743,953	34,505,490	56,968,714
North Coast		1	0	1	0	62	1,504	2,628	4,340	93,321	163,093	269,267
North Coast		1	1	0	0	4,244	1,504	2,628	4,340	6,383,637	11,156,354	18,419,189
North Coast		1	1	0	1	8,349	1,828	5,372	10,016	15,260,481	44,854,568	83,627,145
North Coast		1	1	1	0	11	1,504	2,628	4,340	17,059	29,813	49,221
North Coast	Cropland	1	0	0	0	5,535	175	366	557	966,069	2,023,285	3,080,502
North Coast		1	0	0	1	8	175	366	557	1,397	2,926	4,456
North Coast		1	0	1	0	103	175	366	557	18,048	37,799	57,551
North Coast		1	1	0	0	4,828	175	366	557	842,642	1,764,786	2,686,930
North Coast		1	1	0	1	99	175	366	557	17,311	36,255	55,199
North Coast		1	1	1	0	71	175	366	557	12,420	26,013	39,605
North Coast	Deciduous Forest	0	0	0	0	200,366	1,481	2,625	4,190	296,704,799	525,973,181	839,597,032
North Coast		0	0	0	1	120	1,805	3,953	6,529	215,916	472,914	781,192
North Coast		0	0	1	0	8,026	1,481	2,625	4,190	11,884,355	21,067,580	33,629,619
North Coast		0	0	1	1	0.2	1,805	3,953	6,529	401	879	1,452
North Coast		0	1	0	0	11,217	1,481	2,625	4,190	16,609,841	29,444,522	47,001,509
North Coast		0	1	0	1	306	1,805	3,953	6,529	551,831	1,208,656	1,996,541
North Coast		0	1	1	0	567	1,481	2,625	4,190	839,779	1,488,689	2,376,355
North Coast		0	1	1	1	23	1,805	3,953	6,529	40,936	89,660	148,107
North Coast		1	0	0	0	5,267	1,482	2,626	4,191	7,802,887	13,829,354	22,073,160
North Coast		1	0	1	0	117	1,482	2,626	4,191	173,639	307,747	491,198
North Coast		1	1	0	0	1,505	1,482	2,626	4,191	2,229,961	3,952,245	6,308,215
North Coast		1	1	1	0	41	1,482	2,626	4,191	60,955	108,033	172,432
North Coast	Fresh Herbaceous Wetland	0	0	0	0	211	240	10,649	24,395	50,615	2,247,504	5,148,570
North Coast		0	0	1	0	22	18,025	29,509	44,330	400,871	656,275	985,881
North Coast		0	1	0	0	112	240	10,649	24,395	26,774	1,188,880	2,723,480
North Coast		0	1	1	0	6	18,025	29,509	44,330	116,253	190,320	285,905

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
North Coast	Grassland	0	0	0	0	82,676	66	168	264	5,437,601	13,881,218	21,804,345
North Coast		0	0	0	1	288	509	611	707	146,772	176,207	203,829
North Coast		0	0	1	0	1,327	66	168	264	87,264	222,769	349,921
North Coast		0	0	1	1	0.2	509	611	707	113	136	157
North Coast		0	1	0	0	50,680	65	164	264	3,307,824	8,312,532	13,365,899
North Coast		0	1	0	1	1,600	509	607	707	814,143	972,180	1,131,753
North Coast		0	1	1	0	487	24,435	29,814	50,947	11,890,038	14,507,307	24,790,951
North Coast		0	1	1	1	8	4,406	19,799	50,947	35,278	158,518	407,895
North Coast		1	0	0	0	10,827	66	168	264	712,079	1,817,808	2,855,378
North Coast		1	0	1	0	59	66	168	264	3,905	9,970	15,660
North Coast		1	1	0	0	12,646	65	164	264	825,407	2,074,239	3,335,214
North Coast		1	1	0	1	745	509	607	707	379,013	452,585	526,872
North Coast		1	1	1	0	52	24,435	29,814	50,947	1,266,169	1,544,882	2,639,987
North Coast	Lake	0	0	1	0	301	100	6,735	13,369	30,093	2,027,922	4,025,751
North Coast		0	1	1	0	370	100	6,735	13,369	36,983	2,492,217	4,947,452
North Coast		0	1	1	1	28	100	6,735	13,369	2,845	191,709	380,573
North Coast		1	0	1	0	22	100	6,735	13,369	2,200	148,275	294,350
North Coast		1	1	1	0	2,875	100	6,735	13,369	287,310	19,361,115	38,434,920
North Coast	Marine	0	1	0	0	149	5,327	5,342	5,358	793,753	796,031	798,310
North Coast		0	1	0	1	2	5,327	5,342	5,358	10,662	10,693	10,724
North Coast		0	1	1	0	4	5,327	5,342	5,358	18,955	19,010	19,064
North Coast	Mixed Forest	0	0	0	0	180	1,414	2,484	3,674	254,171	446,342	660,242
North Coast		0	0	0	1	44	1,659	3,983	7,487	73,055	175,407	329,678
North Coast		0	0	1	0	8	1,414	2,484	3,674	10,695	18,782	27,782
North Coast		0	0	1	1	1	1,659	3,983	7,487	1,845	4,429	8,325
North Coast	Pasture	1	0	0	0	2,229	218	253	289	486,855	565,093	643,332
North Coast		1	0	0	1	8	218	253	289	1,748	2,029	2,310
North Coast		1	0	1	0	97	1,823	1,858	1,893	176,374	179,769	183,164
North Coast		1	1	0	0	9,202	218	253	289	2,009,538	2,332,475	2,655,411
North Coast		1	1	1	0	149	1,823	1,858	1,893	272,062	277,299	282,536
North Coast	Reservoir	0	0	1	0	7	865	12,506	40,284	6,154	89,000	286,686
North Coast		0	0	1	1	1	865	12,506	40,284	769	11,125	35,836
North Coast		0	1	1	0	19	865	12,506	40,284	16,730	241,967	779,427
North Coast		0	1	1	1	0.4	865	12,506	40,284	385	5,562	17,918
North Coast		1	0	1	0	26	865	12,506	40,284	22,307	322,623	1,039,236
North Coast	River	0	0	1	0	1,468	5	6	6	7,351	8,167	8,984
North Coast		0	0	1	1	73	5	6	6	365	406	446
North Coast		0	1	1	0	1,259	5	6	6	6,305	7,006	7,706
North Coast		0	1	1	1	65	5	6	6	326	362	399
North Coast		1	0	1	0	26	5	6	6	132	147	162
North Coast		1	1	1	0	349	5	6	6	1,748	1,942	2,136
North Coast	Saline Herbaceous Wetland	0	0	0	1	19	3,840	18,823	37,355	71,732	351,637	697,843
North Coast		0	0	1	1	2	3,840	18,823	37,355	7,686	37,675	74,769
North Coast		0	1	0	0	347	3,865	18,942	37,577	1,342,471	6,580,042	13,053,587
North Coast		0	1	1	0	18	3,865	18,942	37,577	67,897	332,793	660,201
North Coast		1	1	0	0	353	3,865	18,942	37,577	1,364,817	6,689,569	13,270,869

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
North Coast	Shrubland	0	0	0	0	51,030	146	146	146	7,457,392	7,457,392	7,457,392
North Coast		0	0	0	1	124	146	146	146	18,070	18,070	18,070
North Coast		0	0	1	0	1,210	224	413	767	270,661	499,607	927,867
North Coast		0	0	1	1	3	224	413	767	696	1,285	2,387
North Coast		0	1	0	0	11,011	146	146	146	1,609,097	1,609,097	1,609,097
North Coast		0	1	0	1	71	146	146	146	10,335	10,335	10,335
North Coast		0	1	1	0	320	224	413	767	71,656	132,268	245,647
North Coast		1	0	0	0	66	146	146	146	9,685	9,685	9,685
North Coast		1	0	1	0	2	18,411	18,600	18,954	28,661	28,956	29,506
North Coast		1	1	0	0	793	146	146	146	115,897	115,897	115,897
North Coast		1	1	1	0	6	18,411	18,600	18,954	114,645	115,823	118,026
North Coast Total						1,878,354				2,587,872,693	4,625,351,608	7,626,962,733
Russian Bodega	Bay/Estuary	0	1	0	0	12	13,042	13,091	13,140	156,622	157,213	157,804
Russian Bodega		0	1	0	1	804	13,042	13,091	13,140	10,479,160	10,518,702	10,558,244
Russian Bodega		0	1	1	1	0.2	13,042	13,091	13,140	2,900	2,911	2,922
Russian Bodega	Beach	0	1	0	0	79	122,626	122,626	122,626	9,708,651	9,708,651	9,708,651
Russian Bodega		0	1	0	1	4	6,398	543,121	2,123,622	28,456	2,415,747	9,445,650
Russian Bodega		0	1	1	0	1	122,626	122,626	122,626	136,357	136,357	136,357
Russian Bodega	Coniferous Forest	0	0	0	0	131,118	1,503	2,628	4,339	197,107,874	344,546,190	568,909,003
Russian Bodega		0	0	0	1	11,183	1,827	5,372	10,016	20,432,305	60,071,607	112,004,883
Russian Bodega		0	0	1	0	4,856	1,503	2,628	4,339	7,300,626	12,761,554	21,071,669
Russian Bodega		0	0	1	1	159	1,827	5,372	10,016	290,932	855,350	1,594,819
Russian Bodega		0	1	0	0	6,241	1,503	2,628	4,339	9,382,125	16,400,032	27,079,463
Russian Bodega		0	1	0	1	13	1,827	5,372	10,016	23,973	70,483	131,417
Russian Bodega		0	1	1	0	109	1,503	2,628	4,339	163,819	286,356	472,827
Russian Bodega		1	0	0	0	12,128	1,504	2,628	4,340	18,240,110	31,877,302	52,629,564
Russian Bodega		1	0	0	1	2,259	1,828	5,372	10,016	4,128,728	12,135,418	22,625,351
Russian Bodega		1	0	1	0	157	1,504	2,628	4,340	236,815	413,869	683,300
Russian Bodega		1	0	1	1	15	1,828	5,372	10,016	26,828	78,856	147,019
Russian Bodega		1	1	0	0	1	1,504	2,628	4,340	1,003	1,754	2,895
Russian Bodega	Cropland	1	0	0	0	44,746	175	366	557	7,809,248	16,355,284	24,901,320
Russian Bodega		1	0	0	1	38,130	175	366	557	6,654,739	13,937,340	21,219,941
Russian Bodega		1	0	1	0	1,436	175	366	557	250,658	524,965	799,272
Russian Bodega		1	0	1	1	405	175	366	557	70,602	147,865	225,128
Russian Bodega		1	1	0	0	18,588	175	366	557	3,244,153	6,794,386	10,344,619
Russian Bodega		1	1	1	0	326	175	366	557	56,901	119,170	181,439
Russian Bodega	Deciduous Forest	0	0	0	0	268,800	1,481	2,625	4,190	398,042,417	705,615,942	1,126,356,004
Russian Bodega		0	0	0	1	12,133	1,805	3,953	6,529	21,895,842	47,957,704	79,219,828
Russian Bodega		0	0	1	0	10,202	1,481	2,625	4,190	15,107,131	26,780,644	42,749,232
Russian Bodega		0	0	1	1	493	1,805	3,953	6,529	889,752	1,948,793	3,219,149
Russian Bodega		0	1	0	0	1,179	1,481	2,625	4,190	1,746,082	3,095,306	4,940,955
Russian Bodega		0	1	1	0	68	1,481	2,625	4,190	100,115	177,475	283,299
Russian Bodega		1	0	0	0	66,705	1,482	2,626	4,191	98,826,352	175,153,718	279,564,463
Russian Bodega		1	0	0	1	24,219	1,805	3,953	6,530	43,723,718	95,745,694	158,147,891
Russian Bodega		1	0	1	0	1,216	1,482	2,626	4,191	1,802,288	3,194,264	5,098,395
Russian Bodega		1	0	1	1	264	1,805	3,953	6,530	476,571	1,043,591	1,723,750
Russian Bodega		1	1	0	0	29	1,482	2,626	4,191	43,492	77,083	123,033
Russian Bodega		1	1	1	0	1	1,482	2,626	4,191	988	1,752	2,796

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Russian Bodega	Fresh Herbaceous Wetland	0	0	0	0	7	240	10,649	24,395	1,600	71,049	162,758
Russian Bodega		0	0	0	1	9	240	11,905	27,863	2,240	111,197	260,256
Russian Bodega		0	0	1	1	1	18,025	30,765	47,798	24,052	41,052	63,781
Russian Bodega		0	1	0	0	35	240	10,649	24,395	8,320	369,453	846,340
Russian Bodega		0	1	0	1	2	240	11,905	27,863	480	23,828	55,769
Russian Bodega		0	1	1	0	5	18,025	29,509	44,330	84,183	137,818	207,035
Russian Bodega		1	0	0	0	116	240	10,465	24,395	27,788	1,212,585	2,826,560
Russian Bodega		1	0	0	1	19	240	11,721	27,863	4,480	218,962	520,512
Russian Bodega		1	0	1	0	14	39,422	50,722	65,727	552,335	710,665	920,891
Russian Bodega		1	0	1	1	12	39,422	51,978	69,195	473,430	624,222	830,986
Russian Bodega		1	1	0	0	16	240	10,465	24,395	3,840	167,574	390,619
Russian Bodega		1	1	1	0	0.4	39,422	50,722	65,727	17,534	22,561	29,235
Russian Bodega	Grassland	0	0	0	0	81,250	66	168	264	5,343,770	13,641,684	21,428,090
Russian Bodega		0	0	0	1	7,332	509	611	707	3,733,614	4,482,411	5,185,051
Russian Bodega		0	0	1	0	1,718	66	168	264	112,963	288,374	452,973
Russian Bodega		0	0	1	1	178	509	611	707	90,826	109,042	126,135
Russian Bodega		0	1	0	0	10,358	65	164	264	676,086	1,698,998	2,731,856
Russian Bodega		0	1	0	1	248	509	607	707	126,036	150,501	175,205
Russian Bodega		0	1	1	0	153	24,435	29,814	50,947	3,749,601	4,574,973	7,817,987
Russian Bodega		0	1	1	1	0.2	4,406	19,799	50,947	980	4,403	11,330
Russian Bodega		1	0	0	0	35,368	66	168	264	2,326,136	5,938,206	9,327,618
Russian Bodega		1	0	0	1	23,345	509	611	707	11,887,814	14,271,983	16,509,184
Russian Bodega		1	0	1	0	401	66	168	264	26,358	67,286	105,692
Russian Bodega		1	0	1	1	94	509	611	707	47,678	57,240	66,213
Russian Bodega		1	1	0	0	5,682	65	164	264	370,841	931,919	1,498,453
Russian Bodega		1	1	0	1	17,198	509	607	707	8,749,207	10,447,552	12,162,410
Russian Bodega		1	1	1	0	99	24,435	29,814	50,947	2,429,089	2,963,787	5,064,696
Russian Bodega	Lake	0	0	1	0	4,931	100	6,735	13,369	492,785	33,207,600	65,922,415
Russian Bodega		0	0	1	1	142	100	6,735	13,369	14,180	955,550	1,896,920
Russian Bodega		0	1	1	0	35	100	6,735	13,369	3,512	236,641	469,770
Russian Bodega		0	1	1	1	8	100	6,735	13,369	845	56,914	112,983
Russian Bodega		1	0	1	0	620	100	6,735	13,369	61,965	4,175,662	8,289,360
Russian Bodega		1	0	1	1	64	100	6,735	13,369	6,357	428,350	850,343
Russian Bodega		1	1	1	0	24	100	6,735	13,369	2,423	163,252	324,082
Russian Bodega	Mixed Forest	0	0	0	0	0.2	1,414	2,484	3,674	315	552	817
Russian Bodega		0	0	0	1	62	1,659	3,983	7,487	102,942	247,164	464,547
Russian Bodega		0	0	1	1	20	1,659	3,983	7,487	33,945	81,502	153,184
Russian Bodega		1	0	0	1	127	1,660	3,984	7,488	210,772	505,937	950,831
Russian Bodega		1	0	1	1	4	1,660	3,984	7,488	6,275	15,063	28,308
Russian Bodega	Pasture	1	0	0	0	35,826	218	253	289	7,824,012	9,081,346	10,338,680
Russian Bodega		1	0	0	1	20,984	218	253	289	4,582,670	5,319,113	6,055,557
Russian Bodega		1	0	1	0	969	1,823	1,858	1,893	1,767,389	1,801,412	1,835,434
Russian Bodega		1	0	1	1	281	1,823	1,858	1,893	512,904	522,777	532,651
Russian Bodega		1	1	0	0	947	218	253	289	206,855	240,097	273,339
Russian Bodega		1	1	1	0	23	1,823	1,858	1,893	42,573	43,393	44,212
Russian Bodega	Reservoir	0	0	1	0	750	865	12,506	40,284	648,428	9,378,326	30,209,519
Russian Bodega		0	0	1	1	218	865	12,506	40,284	188,836	2,731,173	8,797,671
Russian Bodega		0	1	1	0	15	865	12,506	40,284	12,884	186,343	600,248
Russian Bodega		1	0	1	0	451	865	12,506	40,284	389,787	5,637,564	18,159,755
Russian Bodega		1	0	1	1	267	865	12,506	40,284	230,565	3,334,701	10,741,759
Russian Bodega		1	1	1	0	3	865	12,506	40,284	2,692	38,937	125,425

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Russian Bodega	River	0	0	1	0	842	5	6	6	4,214	4,682	5,151
Russian Bodega		0	0	1	1	531	5	6	6	2,659	2,954	3,250
Russian Bodega		0	1	1	0	407	5	6	6	2,036	2,263	2,489
Russian Bodega		1	0	1	0	450	5	6	6	2,254	2,504	2,754
Russian Bodega		1	0	1	1	249	5	6	6	1,247	1,386	1,524
Russian Bodega		1	1	1	0	389	5	6	6	1,945	2,161	2,377
Russian Bodega	Saline Herbaceous Wetland	0	0	0	0	2	3,840	18,823	37,355	9,393	46,048	91,384
Russian Bodega		0	0	1	0	0.2	3,840	18,823	37,355	854	4,186	8,308
Russian Bodega		0	1	0	0	25	3,865	18,942	37,577	97,978	480,234	952,695
Russian Bodega		0	1	0	1	136	3,865	18,942	37,577	525,987	2,578,096	5,114,466
Russian Bodega		0	1	1	0	14	3,865	18,942	37,577	55,865	273,817	543,203
Russian Bodega		0	1	1	1	2	3,865	18,942	37,577	9,454	46,338	91,927
Russian Bodega		1	1	0	0	33	3,865	18,942	37,577	126,340	619,248	1,228,475
Russian Bodega		1	1	1	0	4	3,865	18,942	37,577	14,611	71,614	142,068
Russian Bodega	Shrubland	0	0	0	0	76,085	146	146	146	11,118,958	11,118,958	11,118,958
Russian Bodega		0	0	0	1	652	146	146	146	95,259	95,259	95,259
Russian Bodega		0	0	1	0	1,532	224	413	767	342,615	632,426	1,174,537
Russian Bodega		0	0	1	1	8	224	413	767	1,840	3,396	6,307
Russian Bodega		0	1	0	0	2,922	146	146	146	427,056	427,056	427,056
Russian Bodega		0	1	0	1	255	146	146	146	37,278	37,278	37,278
Russian Bodega		0	1	1	0	109	224	413	767	24,366	44,977	83,530
Russian Bodega		1	0	0	0	2,049	146	146	146	299,492	299,492	299,492
Russian Bodega		1	0	0	1	217	146	146	146	31,688	31,688	31,688
Russian Bodega		1	0	1	0	30	18,411	18,600	18,954	560,942	566,704	577,483
Russian Bodega		1	0	1	1	12	18,411	18,600	18,954	221,101	223,372	227,621
Russian Bodega		1	1	0	0	290	146	146	146	42,413	42,413	42,413
Russian Bodega		1	1	1	0	4	18,411	18,600	18,954	69,606	70,321	71,659
Russian Bodega Total						995,765				950,932,974	1,760,566,892	2,875,801,146
Trinity	Coniferous Forest	0	0	0	0	1,507,787	1,503	2,628	4,339	2,266,638,587	3,962,102,947	6,542,159,226
Trinity		0	0	0	1	1,216	1,827	5,372	10,016	2,222,219	6,533,392	12,181,659
Trinity		0	0	1	0	55,020	1,503	2,628	4,339	82,711,341	144,580,107	238,728,295
Trinity		0	0	1	1	8	1,827	5,372	10,016	14,628	43,006	80,186
Trinity		1	0	0	0	292	1,504	2,628	4,340	439,513	768,114	1,268,159
Trinity		1	0	1	0	12	1,504	2,628	4,340	17,728	30,982	51,151
Trinity	Cropland	1	0	0	0	770	175	366	557	134,373	281,423	428,473
Trinity		1	0	0	1	70	175	366	557	12,149	25,443	38,738
Trinity		1	0	1	0	25	175	366	557	4,425	9,267	14,109
Trinity	Deciduous Forest	0	0	0	0	121,662	1,481	2,625	4,190	180,159,277	319,371,134	509,803,667
Trinity		0	0	0	1	1,563	1,805	3,953	6,529	2,819,755	6,176,011	10,201,960
Trinity		0	0	1	0	4,524	1,481	2,625	4,190	6,698,473	11,874,486	18,954,927
Trinity		0	0	1	1	119	1,805	3,953	6,529	215,515	472,035	779,740
Trinity		1	0	0	0	1,262	1,482	2,626	4,191	1,869,833	3,313,976	5,289,468
Trinity		1	0	1	0	6	1,482	2,626	4,191	9,555	16,935	27,030
Trinity	Fresh Herbaceous Wetland	0	0	0	0	1,988	240	10,649	24,395	476,820	21,172,483	48,501,810
Trinity		0	0	1	0	294	18,025	29,509	44,330	5,295,503	8,669,388	13,023,482
Trinity	Grassland	0	0	0	0	18,685	66	168	264	1,228,933	3,137,244	4,927,921
Trinity		0	0	0	1	145	509	611	707	73,612	88,376	102,229
Trinity		0	0	1	0	944	66	168	264	62,106	158,544	249,038
Trinity		0	0	1	1	0.4	509	611	707	226	272	315
Trinity		1	0	0	0	22	66	168	264	1,433	3,659	5,748
Trinity		1	0	1	0	1	66	168	264	59	149	235
Trinity	Lake	0	0	1	0	17,364	100	6,735	13,369	1,735,349	116,941,015	232,146,681
Trinity		0	0	1	1	7	100	6,735	13,369	733	49,425	98,117
Trinity		1	0	1	0	7	100	6,735	13,369	733	49,425	98,117

WMA	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum ($/year)	Average ($/year)	High($/year)
Trinity	Mixed Forest	0	0	0	0	58	1,414	2,484	3,674	82,732	145,282	214,905
Trinity		0	0	0	1	36	1,659	3,983	7,487	60,511	145,286	273,067
Trinity		0	0	1	0	1	1,414	2,484	3,674	1,573	2,762	4,086
Trinity		0	0	1	1	0.4	1,659	3,983	7,487	738	1,772	3,330
Trinity		1	0	0	0	20	1,415	2,485	3,675	28,011	49,178	72,739
Trinity	Pasture	1	0	0	0	728	218	253	289	158,966	184,512	210,058
Trinity		1	0	1	0	8	1,823	1,858	1,893	13,786	14,051	14,316
Trinity	Reservoir	0	0	1	0	25	865	12,506	40,284	21,922	317,061	1,021,318
Trinity	River	0	0	1	0	2,266	5	6	6	11,345	12,606	13,867
Trinity		0	0	1	1	68	5	6	6	340	377	415
Trinity		1	0	1	0	3	5	6	6	17	19	20
Trinity	Shrubland	0	0	0	0	128,882	146	146	146	18,834,565	18,834,565	18,834,565
Trinity		0	0	0	1	14	146	146	146	1,983	1,983	1,983
Trinity		0	0	1	0	2,938	224	413	767	656,886	1,212,532	2,251,907
Trinity		1	0	0	0	12	146	146	146	1,788	1,788	1,788
Trinity Total						1,868,855				2,572,718,037	4,626,793,013	7,662,078,845

Table 14. Detailed valuation results ($/acre/year) by county

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Del Norte	Bay/Estuary	0	1	0	0	8	13,042	13,091	13,140	101,514	101,897	102,280
Del Norte	Beach	0	1	0	0	164	122,626	122,626	122,626	20,153,632	20,153,632	20,153,632
Del Norte		0	1	0	1	7	6,398	543,121	2,123,622	44,106	3,744,408	14,640,757
Del Norte	Coniferous Forest	0	0	0	0	491,798	1,503	2,628	4,339	739,313,667	1,292,326,389	2,133,868,079
Del Norte		0	0	0	1	17,368	1,827	5,372	10,016	31,731,936	93,292,872	173,946,690
Del Norte		0	0	1	0	19,823	1,503	2,628	4,339	29,799,272	52,089,373	86,009,115
Del Norte		0	0	1	1	34	1,827	5,372	10,016	62,168	182,777	340,792
Del Norte		0	1	0	0	15,582	1,503	2,628	4,339	23,424,054	40,945,439	67,608,435
Del Norte		0	1	0	1	206	1,827	5,372	10,016	377,074	1,108,610	2,067,029
Del Norte		0	1	1	0	149	1,503	2,628	4,339	224,331	392,133	647,483
Del Norte		0	1	1	1	9	1,827	5,372	10,016	17,066	50,174	93,551
Del Norte		1	0	0	0	5,044	1,504	2,628	4,340	7,586,109	13,257,852	21,888,772
Del Norte		1	1	0	0	449	1,504	2,628	4,340	675,659	1,180,814	1,949,529
Del Norte		1	1	1	0	2	1,504	2,628	4,340	3,010	5,261	8,686
Del Norte	Cropland	1	0	0	0	429	175	366	557	74,871	156,807	238,742
Del Norte		1	0	0	1	8	175	366	557	1,397	2,926	4,456
Del Norte		1	0	1	0	7	175	366	557	1,164	2,439	3,713
Del Norte		1	1	0	0	1,931	175	366	557	337,018	705,833	1,074,648
Del Norte		1	1	1	0	29	175	366	557	5,123	10,730	16,337
Del Norte	Deciduous Forest	0	0	0	0	38,466	1,481	2,625	4,190	56,960,400	100,974,582	161,183,045
Del Norte		0	0	0	1	120	1,805	3,953	6,529	215,916	472,914	781,192
Del Norte		0	0	1	0	2,877	1,481	2,625	4,190	4,260,808	7,553,201	12,056,974
Del Norte		0	0	1	1	0	1,805	3,953	6,529	401	879	1,452
Del Norte		0	1	0	0	6,368	1,481	2,625	4,190	9,429,237	16,715,353	26,682,275
Del Norte		0	1	0	1	270	1,805	3,953	6,529	488,019	1,068,891	1,765,668
Del Norte		0	1	1	0	119	1,481	2,625	4,190	176,518	312,917	499,501
Del Norte		0	1	1	1	22	1,805	3,953	6,529	39,732	87,023	143,751
Del Norte		1	0	0	0	83	1,482	2,626	4,191	123,557	218,985	349,524
Del Norte		1	1	0	0	780	1,482	2,626	4,191	1,155,837	2,048,534	3,269,683
Del Norte		1	1	1	0	15	1,482	2,626	4,191	22,076	39,125	62,448
Del Norte	Fresh Herbaceous Wetland	0	0	0	0	91	240	10,649	24,395	21,708	963,893	2,208,080
Del Norte		0	0	1	0	18	18,025	29,509	44,330	320,697	525,020	788,704
Del Norte		0	1	0	0	40	240	10,649	24,395	9,654	428,660	981,972
Del Norte		0	1	1	0	6	18,025	29,509	44,330	116,253	190,320	285,905
Del Norte	Grassland	0	0	0	0	1,194	66	168	264	78,517	200,439	314,846
Del Norte		0	0	0	1	19	509	611	707	9,853	11,829	13,683
Del Norte		0	0	1	0	42	66	168	264	2,735	6,983	10,968
Del Norte		0	0	1	1	0	509	611	707	113	136	157
Del Norte		0	1	0	0	3,467	65	164	264	226,281	568,643	914,333
Del Norte		0	1	0	1	331	509	607	707	168,576	201,299	234,340
Del Norte		0	1	1	0	66	24,435	29,814	50,947	1,624,827	1,982,488	3,387,794
Del Norte		0	1	1	1	5	4,406	19,799	50,947	20,579	92,469	237,939
Del Norte		1	0	0	0	93	66	168	264	6,114	15,608	24,517
Del Norte		1	1	0	0	957	65	164	264	62,445	156,925	252,323
Del Norte		1	1	1	0	7	24,435	29,814	50,947	179,329	218,803	373,904
Del Norte	Lake	0	0	1	0	93	100	6,735	13,369	9,268	624,552	1,239,836
Del Norte		0	1	1	0	336	100	6,735	13,369	33,605	2,264,563	4,495,521
Del Norte		0	1	1	1	17	100	6,735	13,369	1,689	113,827	225,965
Del Norte		1	1	1	0	2,846	100	6,735	13,369	284,398	19,164,913	38,045,428
Del Norte	Marine	0	1	0	0	49	5,327	5,342	5,358	260,635	261,383	262,132
Del Norte		0	1	0	1	2	5,327	5,342	5,358	10,662	10,693	10,724
Del Norte		0	1	1	0	1	5,327	5,342	5,358	4,739	4,752	4,766

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Del Norte	Mixed Forest	0	0	0	0	190	1,414	2,484	3,674	268,327	471,200	697,012
Del Norte		0	0	0	1	44	1,659	3,983	7,487	73,055	175,407	329,678
Del Norte		0	0	1	0	8	1,414	2,484	3,674	10,695	18,782	27,782
Del Norte		0	0	1	1	1	1,659	3,983	7,487	1,845	4,429	8,325
Del Norte	Pasture	1	0	0	0	626	218	253	289	136,819	158,806	180,793
Del Norte		1	0	1	0	36	1,823	1,858	1,893	65,279	66,535	67,792
Del Norte		1	1	0	0	8,254	218	253	289	1,802,683	2,092,378	2,382,072
Del Norte		1	1	1	0	143	1,823	1,858	1,893	261,520	266,554	271,589
Del Norte	Reservoir	0	1	1	0	3	865	12,506	40,284	2,500	36,156	116,466
Del Norte	River	0	0	1	0	1,380	5	6	6	6,906	7,674	8,441
Del Norte		0	0	1	1	50	5	6	6	251	278	306
Del Norte		0	1	1	0	1,410	5	6	6	7,061	7,846	8,630
Del Norte		1	1	1	0	331	5	6	6	1,658	1,842	2,026
Del Norte	Saline Herbaceous Wetland	0	1	0	0	345	3,865	18,942	37,577	1,333,017	6,533,703	12,961,661
Del Norte		0	1	1	0	18	3,865	18,942	37,577	67,897	332,793	660,201
Del Norte		1	1	0	0	353	3,865	18,942	37,577	1,364,817	6,689,569	13,270,869
Del Norte	Shrubland	0	0	0	0	32,892	146	146	146	4,806,720	4,806,720	4,806,720
Del Norte		0	0	0	1	124	146	146	146	18,070	18,070	18,070
Del Norte		0	0	1	0	959	224	413	767	214,470	395,886	735,237
Del Norte		0	0	1	1	3	224	413	767	696	1,285	2,387
Del Norte		0	1	0	0	3,405	146	146	146	497,647	497,647	497,647
Del Norte		0	1	0	1	71	146	146	146	10,335	10,335	10,335
Del Norte		0	1	1	0	42	224	413	767	9,448	17,440	32,389
Del Norte		1	1	0	0	404	146	146	146	59,053	59,053	59,053
Del Norte		1	1	1	0	0	18,411	18,600	18,954	4,094	4,137	4,215
Del Norte Total						662,940				941,283,215	1,699,885,493	2,822,931,775
Glenn	Coniferous Forest	0	0	0	0	47,014	1,503	2,628	4,339	70,676,358	123,542,857	203,991,933
Glenn		0	0	1	0	1,231	1,503	2,628	4,339	1,850,147	3,234,073	5,340,047
Glenn	Deciduous Forest	0	0	0	0	2,798	1,481	2,625	4,190	4,142,910	7,344,200	11,723,352
Glenn		0	0	1	0	93	1,481	2,625	4,190	138,317	245,196	391,400
Glenn	Fresh Herbaceous Wetland	0	0	0	0	50	240	10,649	24,395	12,054	535,233	1,226,108
Glenn		0	0	1	0	7	18,025	29,509	44,330	124,270	203,445	305,623
Glenn	Grassland	0	0	0	0	1,604	66	168	264	105,503	269,331	423,060
Glenn		0	0	1	0	40	66	168	264	2,633	6,721	10,557
Glenn	Lake	0	0	1	0	10	100	6,735	13,369	1,045	70,393	139,742
Glenn	Shrubland	0	0	0	0	1,223	146	146	146	178,720	178,720	178,720
Glenn		0	0	1	0	18	224	413	767	3,978	7,343	13,638
Glenn Total						54,089				77,235,934	135,637,512	223,744,181
Humboldt	Bay/Estuary	0	1	0	0	26	13,042	13,091	13,140	333,546	334,805	336,064
Humboldt		0	1	1	0	7	13,042	13,091	13,140	89,913	90,252	90,591
Humboldt	Beach	0	1	0	0	2,663	122,626	122,626	122,626	326,603,376	326,603,376	326,603,376
Humboldt		0	1	1	0	57	122,626	122,626	122,626	6,981,502	6,981,502	6,981,502
Humboldt		1	1	0	0	916	122,626	122,626	122,626	112,331,271	112,331,271	112,331,271

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Humboldt	Coniferous Forest	0	0	0	0	1,486,538	1,503	2,628	4,339	2,234,695,632	3,906,266,398	6,449,962,835
Humboldt		0	0	0	1	1,806	1,827	5,372	10,016	3,300,212	9,702,726	18,090,955
Humboldt		0	0	1	0	53,335	1,503	2,628	4,339	80,178,171	140,152,104	231,416,850
Humboldt		0	0	1	1	42	1,827	5,372	10,016	77,609	228,173	425,434
Humboldt		0	1	0	0	61,916	1,503	2,628	4,339	93,077,381	162,700,030	268,647,614
Humboldt		0	1	0	1	119	1,827	5,372	10,016	217,793	640,318	1,193,887
Humboldt		0	1	1	0	1,095	1,503	2,628	4,339	1,646,210	2,877,588	4,751,426
Humboldt		1	0	0	0	14,174	1,504	2,628	4,340	21,317,368	37,255,267	61,508,608
Humboldt		1	0	1	0	92	1,504	2,628	4,340	137,808	240,839	397,627
Humboldt		1	1	0	0	229	1,504	2,628	4,340	344,854	602,683	995,032
Humboldt		1	1	1	0	2	1,504	2,628	4,340	2,341	4,092	6,756
Humboldt	Cropland	1	0	0	0	5,993	175	366	557	1,045,909	2,190,497	3,335,085
Humboldt		1	0	0	1	97	175	366	557	16,884	35,361	53,838
Humboldt		1	0	1	0	197	175	366	557	34,428	72,103	109,779
Humboldt		1	0	1	1	2	175	366	557	311	650	990
Humboldt		1	1	0	0	9,220	175	366	557	1,609,210	3,370,246	5,131,282
Humboldt		1	1	0	1	86	175	366	557	15,021	31,459	47,897
Humboldt		1	1	1	0	443	175	366	557	77,394	162,090	246,787
Humboldt		1	1	1	1	2	175	366	557	388	813	1,238
Humboldt	Deciduous Forest	0	0	0	0	266,067	1,481	2,625	4,190	393,995,011	698,441,043	1,114,902,904
Humboldt		0	0	0	1	1,192	1,805	3,953	6,529	2,150,735	4,710,681	7,781,426
Humboldt		0	0	1	0	10,583	1,481	2,625	4,190	15,671,923	27,781,861	44,347,447
Humboldt		0	0	1	1	123	1,805	3,953	6,529	222,739	487,857	805,876
Humboldt		0	1	0	0	8,775	1,481	2,625	4,190	12,994,181	23,034,985	36,770,136
Humboldt		0	1	0	1	159	1,805	3,953	6,529	287,353	629,380	1,039,653
Humboldt		0	1	1	0	244	1,481	2,625	4,190	361,270	640,428	1,022,299
Humboldt		0	1	1	1	4	1,805	3,953	6,529	7,625	16,701	27,589
Humboldt		1	0	0	0	631	1,482	2,626	4,191	934,752	1,656,696	2,644,268
Humboldt		1	0	1	0	33	1,482	2,626	4,191	49,423	87,594	139,810
Humboldt		1	1	0	0	790	1,482	2,626	4,191	1,169,675	2,073,060	3,308,830
Humboldt		1	1	1	0	20	1,482	2,626	4,191	29,324	51,972	82,954
Humboldt	Fresh Herbaceous Wetland	0	0	0	0	70	240	10,649	24,395	16,747	743,642	1,703,531
Humboldt		0	0	1	0	4	18,025	29,509	44,330	68,148	111,567	167,600
Humboldt		0	1	0	0	14	240	10,649	24,395	3,307	146,834	336,366
Humboldt		0	1	1	0	7	18,025	29,509	44,330	128,279	210,008	315,482
Humboldt	Grassland	0	0	0	0	170,650	66	168	264	11,223,600	28,651,830	45,005,734
Humboldt		0	0	0	1	433	509	611	707	220,271	264,447	305,900
Humboldt		0	0	1	0	2,360	66	168	264	155,235	396,286	622,479
Humboldt		0	0	1	1	43	509	611	707	21,857	26,241	30,354
Humboldt		0	1	0	0	38,410	65	164	264	2,506,949	6,299,939	10,129,808
Humboldt		0	1	0	1	848	509	607	707	431,396	515,136	599,691
Humboldt		0	1	1	0	332	24,435	29,814	50,947	8,124,135	9,912,442	16,938,972
Humboldt		0	1	1	1	16	4,406	19,799	50,947	69,576	312,632	804,460
Humboldt		1	0	0	0	2,734	66	168	264	179,837	459,092	721,132
Humboldt		1	0	1	0	56	66	168	264	3,671	9,372	14,722
Humboldt		1	1	0	0	5,792	65	164	264	378,011	949,939	1,527,427
Humboldt		1	1	0	1	0	509	607	707	226	270	315
Humboldt		1	1	1	0	23	24,435	29,814	50,947	554,289	676,300	1,155,702
Humboldt	Lake	0	0	1	0	484	100	6,735	13,369	48,385	3,260,551	6,472,718
Humboldt		0	0	1	1	12	100	6,735	13,369	1,222	82,375	163,528
Humboldt		0	1	1	0	2,530	100	6,735	13,369	252,816	17,036,643	33,820,470
Humboldt		0	1	1	1	34	100	6,735	13,369	3,423	230,650	457,877
Humboldt		1	0	1	0	10	100	6,735	13,369	1,022	68,895	136,768
Humboldt		1	1	1	0	22	100	6,735	13,369	2,245	151,270	300,296

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Humboldt	Marine	0	1	0	0	169	5,327	5,342	5,358	898,007	900,585	903,163
Humboldt		0	1	1	0	5	5,327	5,342	5,358	24,879	24,950	25,022
Humboldt	Mixed Forest	0	0	0	0	71	1,414	2,484	3,674	100,662	176,769	261,482
Humboldt		0	0	0	1	36	1,659	3,983	7,487	60,511	145,286	273,067
Humboldt		0	0	1	0	2	1,414	2,484	3,674	2,831	4,972	7,354
Humboldt		0	0	1	1	0	1,659	3,983	7,487	738	1,772	3,330
Humboldt		1	0	0	0	20	1,415	2,485	3,675	28,011	49,178	72,739
Humboldt	Pasture	1	0	0	0	8,142	218	253	289	1,778,204	2,063,965	2,349,726
Humboldt		1	0	0	1	34	218	253	289	7,431	8,625	9,819
Humboldt		1	0	1	0	463	1,823	1,858	1,893	844,568	860,826	877,084
Humboldt		1	0	1	1	3	1,823	1,858	1,893	4,865	4,959	5,053
Humboldt		1	1	0	0	25,436	218	253	289	5,555,068	6,447,778	7,340,488
Humboldt		1	1	0	1	2,827	218	253	289	617,456	716,683	815,909
Humboldt		1	1	1	0	1,268	1,823	1,858	1,893	2,312,324	2,356,837	2,401,349
Humboldt		1	1	1	1	16	1,823	1,858	1,893	30,004	30,581	31,159
Humboldt	Reservoir	0	0	1	0	16	865	12,506	40,284	13,845	200,249	645,043
Humboldt		0	0	1	1	0	865	12,506	40,284	192	2,781	8,959
Humboldt		0	1	1	0	182	865	12,506	40,284	157,684	2,280,613	7,346,324
Humboldt		0	1	1	1	30	865	12,506	40,284	25,576	369,904	1,191,538
Humboldt		1	1	1	0	8	865	12,506	40,284	6,923	100,124	322,522
Humboldt		1	1	1	1	15,676	865	12,506	40,284	13,554,483	196,040,938	631,488,237
Humboldt	River	0	0	1	0	11,199	5	6	6	56,068	62,298	68,528
Humboldt		0	0	1	1	53	5	6	6	264	293	323
Humboldt		0	1	1	0	2,968	5	6	6	14,857	16,508	18,159
Humboldt		0	1	1	1	4	5	6	6	18	20	22
Humboldt		1	0	1	0	618	5	6	6	3,093	3,437	3,780
Humboldt		1	1	1	0	1,563	5	6	6	7,824	8,693	9,562
Humboldt	Saline Herbaceous Wetland	0	0	0	0	8	3,840	18,823	37,355	32,450	159,074	315,691
Humboldt		0	0	1	0	1	3,840	18,823	37,355	2,562	12,558	24,923
Humboldt		0	1	0	0	1,878	3,865	18,942	37,577	7,256,391	35,566,768	70,557,899
Humboldt		0	1	0	1	140	3,865	18,942	37,577	540,598	2,649,710	5,256,534
Humboldt		0	1	1	0	176	3,865	18,942	37,577	681,549	3,340,572	6,627,077
Humboldt		0	1	1	1	3	3,865	18,942	37,577	11,173	54,763	108,641
Humboldt		1	1	0	0	8	3,865	18,942	37,577	29,222	143,228	284,137
Humboldt		1	1	1	0	8	3,865	18,942	37,577	29,222	143,228	284,137
Humboldt	Shrubland	0	0	0	0	35,552	146	146	146	5,195,490	5,195,490	5,195,490
Humboldt		0	0	0	1	15	146	146	146	2,178	2,178	2,178
Humboldt		0	0	1	0	732	224	413	767	163,749	302,261	561,357
Humboldt		0	1	0	0	7,087	146	146	146	1,035,627	1,035,627	1,035,627
Humboldt		0	1	0	1	57	146	146	146	8,288	8,288	8,288
Humboldt		0	1	1	0	130	224	413	767	29,090	53,697	99,725
Humboldt		0	1	1	1	11	224	413	767	2,536	4,681	8,694
Humboldt		1	0	0	0	316	146	146	146	46,216	46,216	46,216
Humboldt		1	0	1	0	2	18,411	18,600	18,954	32,756	33,092	33,722
Humboldt		1	1	0	0	157	146	146	146	22,978	22,978	22,978
Humboldt Total						2,269,653				3,377,631,647	5,804,657,299	9,574,224,296
Lake	Coniferous Forest	0	0	0	0	114,590	1,503	2,628	4,339	172,261,608	301,114,712	497,195,660
Lake		0	0	1	0	3,481	1,503	2,628	4,339	5,232,500	9,146,453	15,102,472
Lake	Deciduous Forest	0	0	0	0	20,323	1,481	2,625	4,190	30,095,046	53,349,953	85,161,114
Lake		0	0	1	0	846	1,481	2,625	4,190	1,253,082	2,221,358	3,545,895
Lake	Fresh Herbaceous Wetland	0	0	0	0	7	240	10,649	24,395	1,600	71,049	162,758

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Lake	Grassland	0	0	0	0	5,249	66	168	264	345,237	881,329	1,384,374
Lake		0	0	1	0	198	66	168	264	13,033	33,270	52,259
Lake	Lake	0	0	1	0	14	100	6,735	13,369	1,445	97,352	193,260
Lake	Reservoir	0	0	1	0	2,233	865	12,506	40,284	1,930,860	27,926,384	89,956,636
Lake	River	0	0	1	0	119	5	6	6	597	663	729
Lake	Shrubland	0	0	0	0	40,573	146	146	146	5,929,318	5,929,318	5,929,318
Lake		0	0	1	0	609	224	413	767	136,151	251,318	466,746
Lake Total						188,243				217,200,476	401,023,158	699,151,221
Marin	Beach	0	1	0	0	0	122,626	122,626	122,626	27,271	27,271	27,271
Marin		0	1	1	0	0	122,626	122,626	122,626	27,271	27,271	27,271
Marin	Cropland	1	0	0	0	78	175	366	557	13,585	28,451	43,318
Marin		1	0	1	0	66	175	366	557	11,489	24,062	36,634
Marin		1	1	0	0	17,837	175	366	557	3,112,924	6,519,548	9,926,171
Marin		1	1	1	0	296	175	366	557	51,583	108,033	164,483
Marin	Deciduous Forest	0	0	0	0	1	1,481	2,625	4,190	1,647	2,919	4,660
Marin		1	0	0	0	481	1,482	2,626	4,191	712,019	1,261,939	2,014,192
Marin		1	1	0	0	10	1,482	2,626	4,191	14,497	25,694	41,011
Marin		1	1	1	0	1	1,482	2,626	4,191	988	1,752	2,796
Marin	Fresh Herbaceous Wetland	0	1	0	0	4	240	10,649	24,395	960	42,629	97,655
Marin		0	1	1	0	2	18,025	29,509	44,330	28,061	45,939	69,012
Marin		1	1	0	0	16	240	10,465	24,395	3,840	167,574	390,619
Marin		1	1	1	0	0	39,422	50,722	65,727	17,534	22,561	29,235
Marin	Grassland	0	0	0	0	1	66	168	264	88	224	352
Marin		0	1	0	0	7	65	164	264	464	1,167	1,877
Marin		0	1	1	0	3	24,435	29,814	50,947	81,513	99,456	169,956
Marin		1	0	0	0	412	66	168	264	27,089	69,153	108,624
Marin		1	0	1	0	2	66	168	264	102	261	411
Marin		1	1	0	0	2,743	65	164	264	179,005	449,837	723,302
Marin		1	1	1	0	59	24,435	29,814	50,947	1,434,630	1,750,425	2,991,230
Marin	Lake	0	1	1	0	3	100	6,735	13,369	311	20,968	41,625
Marin		1	0	1	0	14	100	6,735	13,369	1,445	97,352	193,260
Marin		1	1	1	0	21	100	6,735	13,369	2,111	142,284	282,457
Marin	Pasture	1	0	0	0	1	218	253	289	146	169	193
Marin		1	1	0	0	44	218	253	289	9,714	11,275	12,836
Marin		1	1	1	0	2	1,823	1,858	1,893	3,244	3,306	3,369
Marin	Reservoir	1	0	1	0	6	865	12,506	40,284	5,192	75,093	241,891
Marin		1	1	1	0	3	865	12,506	40,284	2,692	38,937	125,425
Marin	River	0	1	1	0	55	5	6	6	275	306	336
Marin		1	1	1	0	111	5	6	6	558	620	682
Marin	Saline Herbaceous Wetland	0	1	0	0	9	3,865	18,942	37,577	36,097	176,928	350,993
Marin		0	1	1	0	8	3,865	18,942	37,577	30,081	147,440	292,494
Marin		1	1	0	0	19	3,865	18,942	37,577	72,194	353,856	701,985
Marin		1	1	1	0	4	3,865	18,942	37,577	14,611	71,614	142,068
Marin	Shrubland	0	1	0	0	22	146	146	146	3,153	3,153	3,153
Marin		0	1	1	0	0	224	413	767	50	92	170
Marin		1	0	0	0	20	146	146	146	2,860	2,860	2,860
Marin		1	1	0	0	246	146	146	146	35,913	35,913	35,913
Marin		1	1	1	0	3	18,411	18,600	18,954	53,228	53,775	54,798
Marin Total						22,608				6,020,436	11,912,108	19,356,586
Mendocino	Bay/Estuary	0	1	0	0	6	13,042	13,091	13,140	75,411	75,695	75,980
Mendocino		1	1	1	0	1	13,042	13,091	13,140	11,602	11,645	11,689
Mendocino	Beach	0	1	0	0	176	122,626	122,626	122,626	21,571,749	21,571,749	21,571,749
Mendocino		0	1	1	0	12	122,626	122,626	122,626	1,499,932	1,499,932	1,499,932
Mendocino		1	1	0	0	3	122,626	122,626	122,626	381,801	381,801	381,801

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Mendocino	Coniferous Forest	0	0	0	0	984,093	1,503	2,628	4,339	1,479,375,216	2,585,960,081	4,269,894,758
Mendocino		0	0	0	1	2,404	1,827	5,372	10,016	4,392,427	12,913,872	24,078,210
Mendocino		0	0	1	0	33,817	1,503	2,628	4,339	50,836,589	88,862,776	146,728,754
Mendocino		0	0	1	1	132	1,827	5,372	10,016	241,766	710,801	1,325,304
Mendocino		0	1	0	0	112,328	1,503	2,628	4,339	168,860,868	295,170,189	487,380,162
Mendocino		0	1	0	1	31,921	1,827	5,372	10,016	58,321,766	171,467,793	319,705,615
Mendocino		0	1	1	0	2,033	1,503	2,628	4,339	3,056,053	5,342,005	8,820,631
Mendocino		0	1	1	1	125	1,827	5,372	10,016	228,357	671,378	1,251,800
Mendocino		1	0	0	0	10,367	1,504	2,628	4,340	15,591,996	27,249,329	44,988,762
Mendocino		1	0	0	1	163	1,828	5,372	10,016	298,771	878,166	1,637,258
Mendocino		1	0	1	0	55	1,504	2,628	4,340	83,287	145,556	240,313
Mendocino		1	0	1	1	1	1,828	5,372	10,016	1,626	4,779	8,910
Mendocino		1	1	0	0	514	1,504	2,628	4,340	772,325	1,349,752	2,228,447
Mendocino		1	1	1	0	1	1,504	2,628	4,340	1,338	2,338	3,860
Mendocino	Cropland	1	0	0	0	26,257	175	366	557	4,582,600	9,597,559	14,612,518
Mendocino		1	0	0	1	1,774	175	366	557	309,577	648,362	987,147
Mendocino		1	0	1	0	660	175	366	557	115,160	241,185	367,210
Mendocino		1	0	1	1	61	175	366	557	10,674	22,354	34,035
Mendocino		1	1	0	0	2,591	175	366	557	452,217	947,099	1,441,982
Mendocino		1	1	1	0	41	175	366	557	7,181	15,038	22,896
Mendocino	Deciduous Forest	0	0	0	0	538,870	1,481	2,625	4,190	797,964,951	1,414,564,796	2,258,032,247
Mendocino		0	0	0	1	2,227	1,805	3,953	6,529	4,018,933	8,802,530	14,540,624
Mendocino		0	0	1	0	15,803	1,481	2,625	4,190	23,401,842	41,484,807	66,221,097
Mendocino		0	0	1	1	189	1,805	3,953	6,529	341,132	747,169	1,234,225
Mendocino		0	1	0	0	4,807	1,481	2,625	4,190	7,118,033	12,618,247	20,142,173
Mendocino		0	1	0	1	35	1,805	3,953	6,529	63,812	139,765	230,873
Mendocino		0	1	1	0	439	1,481	2,625	4,190	649,429	1,151,253	1,837,715
Mendocino		0	1	1	1	1	1,805	3,953	6,529	1,204	2,637	4,356
Mendocino		1	0	0	0	45,897	1,482	2,626	4,191	67,997,338	120,514,279	192,353,951
Mendocino		1	0	0	1	5,727	1,805	3,953	6,530	10,339,230	22,640,727	37,396,807
Mendocino		1	0	1	0	693	1,482	2,626	4,191	1,026,349	1,819,037	2,903,382
Mendocino		1	0	1	1	25	1,805	3,953	6,530	44,967	98,469	162,645
Mendocino		1	1	0	0	264	1,482	2,626	4,191	390,770	692,577	1,105,429
Mendocino		1	1	1	0	26	1,482	2,626	4,191	38,879	68,907	109,984
Mendocino	Fresh Herbaceous Wetland	0	0	0	0	196	240	10,649	24,395	46,935	2,084,092	4,774,227
Mendocino		0	0	1	0	24	18,025	29,509	44,330	424,923	695,651	1,045,033
Mendocino		0	1	0	0	112	240	10,649	24,395	26,774	1,188,880	2,723,480
Mendocino		0	1	1	0	6	18,025	29,509	44,330	116,253	190,320	285,905
Mendocino	Grassland	0	0	0	0	189,095	66	168	264	12,436,735	31,748,747	49,870,310
Mendocino		0	0	0	1	1,647	509	611	707	838,500	1,006,666	1,164,466
Mendocino		0	0	1	0	3,451	66	168	264	226,965	579,400	910,110
Mendocino		0	0	1	1	77	509	611	707	39,411	47,315	54,732
Mendocino		0	1	0	0	13,538	65	164	264	883,584	2,220,440	3,570,293
Mendocino		0	1	0	1	1,116	509	607	707	567,954	678,202	789,522
Mendocino		0	1	1	0	317	24,435	29,814	50,947	7,738,306	9,441,684	16,134,513
Mendocino		0	1	1	1	3	4,406	19,799	50,947	14,699	66,049	169,956
Mendocino		1	0	0	0	23,030	66	168	264	1,514,653	3,866,637	6,073,638
Mendocino		1	0	0	1	451	509	611	707	229,784	275,868	319,111
Mendocino		1	0	1	0	284	66	168	264	18,693	47,720	74,958
Mendocino		1	0	1	1	2	509	611	707	793	952	1,101
Mendocino		1	1	0	0	7,589	65	164	264	495,311	1,244,711	2,001,398
Mendocino		1	1	1	0	32	24,435	29,814	50,947	793,394	968,038	1,654,241

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Mendocino	Lake	0	0	1	0	2,457	100	6,735	13,369	245,570	16,548,384	32,851,198
Mendocino		0	0	1	1	15	100	6,735	13,369	1,511	101,845	202,180
Mendocino		0	1	1	0	52	100	6,735	13,369	5,179	348,970	692,762
Mendocino		0	1	1	1	12	100	6,735	13,369	1,156	77,882	154,608
Mendocino		1	0	1	0	79	100	6,735	13,369	7,846	528,698	1,049,550
Mendocino		1	0	1	1	10	100	6,735	13,369	1,000	67,398	133,795
Mendocino		1	1	1	0	29	100	6,735	13,369	2,912	196,202	389,493
Mendocino	Pasture	1	0	0	0	15,184	218	253	289	3,316,041	3,848,936	4,381,830
Mendocino		1	0	0	1	7,829	218	253	289	1,709,819	1,984,591	2,259,362
Mendocino		1	0	1	0	685	1,823	1,858	1,893	1,249,215	1,273,262	1,297,310
Mendocino		1	0	1	1	153	1,823	1,858	1,893	279,766	285,151	290,537
Mendocino		1	1	0	0	1,070	218	253	289	233,714	271,272	308,830
Mendocino		1	1	1	0	15	1,823	1,858	1,893	27,977	28,515	29,054
Mendocino	Reservoir	0	0	1	0	259	865	12,506	40,284	224,219	3,242,920	10,446,115
Mendocino		0	0	1	1	24	865	12,506	40,284	20,384	294,811	949,647
Mendocino		0	1	1	0	2	865	12,506	40,284	1,923	27,812	89,589
Mendocino		0	1	1	1	0	865	12,506	40,284	385	5,562	17,918
Mendocino		1	0	1	0	136	865	12,506	40,284	117,878	1,704,897	5,491,825
Mendocino		1	0	1	1	36	865	12,506	40,284	31,537	456,123	1,469,265
Mendocino	River	0	0	1	0	2,613	5	6	6	13,083	14,537	15,991
Mendocino		0	0	1	1	13	5	6	6	63	71	78
Mendocino		0	1	1	0	499	5	6	6	2,496	2,774	3,051
Mendocino		0	1	1	1	65	5	6	6	326	362	399
Mendocino		1	0	1	0	55	5	6	6	275	306	336
Mendocino		1	0	1	1	16	5	6	6	82	92	101
Mendocino		1	1	1	0	18	5	6	6	90	100	110
Mendocino	Saline Herbaceous Wetland	0	0	0	1	19	3,840	18,823	37,355	71,732	351,637	697,843
Mendocino		0	0	1	1	2	3,840	18,823	37,355	7,686	37,675	74,769
Mendocino		0	1	0	0	2	3,865	18,942	37,577	9,454	46,338	91,927
Mendocino	Shrubland	0	0	0	0	119,133	146	146	146	17,409,941	17,409,941	17,409,941
Mendocino		0	0	0	1	183	146	146	146	26,748	26,748	26,748
Mendocino		0	0	1	0	2,042	224	413	767	456,538	842,714	1,565,084
Mendocino		0	0	1	1	0	224	413	767	99	184	341
Mendocino		0	1	0	0	3,665	146	146	146	535,607	535,607	535,607
Mendocino		0	1	1	0	190	224	413	767	42,516	78,480	145,752
Mendocino		1	0	0	0	641	146	146	146	93,634	93,634	93,634
Mendocino		1	0	1	0	2	18,411	18,600	18,954	28,661	28,956	29,506
Mendocino		1	1	0	0	373	146	146	146	54,536	54,536	54,536
Mendocino		1	1	1	0	6	18,411	18,600	18,954	110,551	111,686	113,811
Mendocino Total						2,223,094				2,777,232,972	4,958,367,418	8,120,556,655
Modoc	Coniferous Forest	0	0	0	0	246,382	1,503	2,628	4,339	370,383,486	647,433,389	1,069,031,364
Modoc		0	0	1	0	1,065	1,503	2,628	4,339	1,600,742	2,798,110	4,620,193
Modoc		1	0	0	0	16,447	1,504	2,628	4,340	24,735,800	43,229,484	71,372,067
Modoc	Cropland	1	0	0	0	199	175	366	557	34,777	72,835	110,893
Modoc		1	0	0	1	41,649	175	366	557	7,268,808	15,223,414	23,178,021
Modoc		1	0	1	0	102	175	366	557	17,854	37,393	56,932
Modoc	Deciduous Forest	0	0	0	0	31	1,481	2,625	4,190	45,447	80,564	128,603
Modoc		0	0	1	0	2	1,481	2,625	4,190	3,293	5,838	9,319
Modoc	Fresh Herbaceous Wetland	0	0	0	0	3,735	240	10,649	24,395	895,771	39,775,375	91,117,216
Modoc		0	0	1	0	333	18,025	29,509	44,330	6,005,044	9,830,994	14,768,490
Modoc		1	0	0	0	352	240	10,465	24,395	84,484	3,686,632	8,593,609
Modoc	Grassland	0	0	0	0	58,927	66	168	264	3,875,586	9,893,675	15,540,791
Modoc		0	0	1	0	699	66	168	264	45,943	117,284	184,227
Modoc		1	0	0	0	16,568	66	168	264	1,089,700	2,781,807	4,369,608

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Modoc	Lake	0	0	1	0	19,981	100	6,735	13,369	1,996,833	134,561,772	267,126,711
Modoc		1	0	1	0	2,020	100	6,735	13,369	201,897	13,605,351	27,008,805
Modoc	Pasture	1	0	0	0	5,658	218	253	289	1,235,544	1,434,098	1,632,653
Modoc		1	0	1	0	34	1,823	1,858	1,893	62,035	63,229	64,423
Modoc	Shrubland	0	0	0	0	301,602	146	146	146	44,075,685	44,075,685	44,075,685
Modoc		0	0	1	0	874	224	413	767	195,425	360,730	669,947
Modoc		1	0	0	0	33,907	146	146	146	4,955,182	4,955,182	4,955,182
Modoc		1	0	1	0	8	18,411	18,600	18,954	147,401	148,915	151,747
Modoc Total						750,575				468,956,736	974,171,757	1,648,766,485
Siskiyou	Coniferous Forest	0	0	0	0	1,537,895	1,503	2,628	4,339	2,311,900,997	4,041,222,013	6,672,799,327
Siskiyou		0	0	0	1	929	1,827	5,372	10,016	1,696,834	4,988,745	9,301,629
Siskiyou		0	0	1	0	53,759	1,503	2,628	4,339	80,815,058	141,265,387	233,255,084
Siskiyou		0	0	1	1	18	1,827	5,372	10,016	32,100	94,375	175,965
Siskiyou		1	0	0	0	499,056	1,504	2,628	4,340	750,585,631	1,311,759,860	2,165,721,247
Siskiyou		1	0	0	1	7,712	1,828	5,372	10,016	14,095,884	41,431,513	77,245,179
Siskiyou		1	0	1	0	7,140	1,504	2,628	4,340	10,738,626	18,767,344	30,984,966
Siskiyou		1	0	1	1	61	1,828	5,372	10,016	112,191	329,760	614,807
Siskiyou	Cropland	1	0	0	0	54,689	175	366	557	9,544,679	19,989,881	30,435,084
Siskiyou		1	0	0	1	26,258	175	366	557	4,582,716	9,597,803	14,612,890
Siskiyou		1	0	1	0	721	175	366	557	125,756	263,377	400,997
Siskiyou		1	0	1	1	12	175	366	557	2,018	4,227	6,436
Siskiyou	Deciduous Forest	0	0	0	0	84,184	1,481	2,625	4,190	124,661,081	220,988,623	352,758,275
Siskiyou		0	0	0	1	338	1,805	3,953	6,529	610,425	1,336,993	2,208,537
Siskiyou		0	0	1	0	2,963	1,481	2,625	4,190	4,386,940	7,776,796	12,413,893
Siskiyou		0	0	1	1	39	1,805	3,953	6,529	69,832	152,950	252,653
Siskiyou		1	0	0	0	56,449	1,482	2,626	4,191	83,630,788	148,222,040	236,578,564
Siskiyou		1	0	0	1	2,152	1,805	3,953	6,530	3,884,840	8,506,977	14,051,394
Siskiyou		1	0	1	0	893	1,482	2,626	4,191	1,322,886	2,344,602	3,742,240
Siskiyou		1	0	1	1	20	1,805	3,953	6,530	36,536	80,006	132,149
Siskiyou	Fresh Herbaceous Wetland	0	0	0	0	3,973	240	10,649	24,395	952,734	42,304,706	96,911,392
Siskiyou		0	0	0	1	33	240	11,905	27,863	7,947	394,486	923,289
Siskiyou		0	0	1	0	541	18,025	29,509	44,330	9,757,194	15,973,724	23,996,332
Siskiyou		0	0	1	1	7	18,025	30,765	47,798	120,261	205,260	318,904
Siskiyou		1	0	0	0	34,405	240	10,465	24,395	8,251,176	360,058,718	839,303,757
Siskiyou		1	0	0	1	173	240	11,721	27,863	41,602	2,033,217	4,833,327
Siskiyou		1	0	1	0	731	39,422	50,722	65,727	28,800,325	37,056,091	48,017,896
Siskiyou		1	0	1	1	29	39,422	51,978	69,195	1,157,273	1,525,876	2,031,300
Siskiyou	Grassland	0	0	0	0	52,071	66	168	264	3,424,670	8,742,567	13,732,652
Siskiyou		0	0	0	1	762	509	611	707	387,880	465,672	538,668
Siskiyou		0	0	1	0	1,339	66	168	264	88,068	224,822	353,146
Siskiyou		0	0	1	1	22	509	611	707	11,325	13,596	15,728
Siskiyou		1	0	0	0	173,202	66	168	264	11,391,457	29,080,340	45,678,829
Siskiyou		1	0	0	1	10,053	509	611	707	5,119,450	6,146,184	7,109,628
Siskiyou		1	0	1	0	2,473	66	168	264	162,621	415,143	652,098
Siskiyou		1	0	1	1	73	509	611	707	36,919	44,324	51,272
Siskiyou	Lake	0	0	1	0	5,441	100	6,735	13,369	543,793	36,644,883	72,745,973
Siskiyou		0	0	1	1	43	100	6,735	13,369	4,267	287,564	570,860
Siskiyou		1	0	1	0	22,184	100	6,735	13,369	2,216,977	149,396,756	296,576,535
Siskiyou		1	0	1	1	1,521	100	6,735	13,369	152,045	10,245,949	20,339,854
Siskiyou	Mixed Forest	1	0	0	0	1	1,415	2,485	3,675	1,574	2,763	4,086
Siskiyou	Pasture	1	0	0	0	102,581	218	253	289	22,402,792	26,002,964	29,603,135
Siskiyou		1	0	0	1	19,981	218	253	289	4,363,624	5,064,867	5,766,109
Siskiyou		1	0	1	0	2,417	1,823	1,858	1,893	4,405,701	4,490,512	4,575,322
Siskiyou		1	0	1	1	107	1,823	1,858	1,893	194,214	197,953	201,691

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Siskiyou	Reservoir	0	0	1	0	11	865	12,506	40,284	9,230	133,499	430,029
Siskiyou		0	0	1	1	10	865	12,506	40,284	9,038	130,718	421,070
Siskiyou		1	0	1	0	190	865	12,506	40,284	164,607	2,380,737	7,668,846
Siskiyou		1	0	1	1	47	865	12,506	40,284	40,383	584,059	1,881,376
Siskiyou	River	0	0	1	0	3,696	5	6	6	18,506	20,562	22,618
Siskiyou		1	0	1	0	620	5	6	6	3,103	3,448	3,793
Siskiyou	Shrubland	0	0	0	0	300,266	146	146	146	43,880,390	43,880,390	43,880,390
Siskiyou		0	0	0	1	1,082	146	146	146	158,082	158,082	158,082
Siskiyou		0	0	1	0	3,591	224	413	767	802,833	1,481,932	2,752,236
Siskiyou		0	0	1	1	14	224	413	767	3,033	5,599	10,399
Siskiyou		1	0	0	0	163,267	146	146	146	23,859,656	23,859,656	23,859,656
Siskiyou		1	0	0	1	11,627	146	146	146	1,699,221	1,699,221	1,699,221
Siskiyou		1	0	1	0	492	18,411	18,600	18,954	9,061,049	9,154,133	9,328,254
Siskiyou		1	0	1	1	31	18,411	18,600	18,954	569,130	574,977	585,914
Siskiyou Total						3,254,393				3,587,109,968	6,800,209,223	11,465,244,982
Sonoma	Bay/Estuary	0	1	0	0	12	13,042	13,091	13,140	156,622	157,213	157,804
Sonoma		0	1	0	1	804	13,042	13,091	13,140	10,479,160	10,518,702	10,558,244
Sonoma		0	1	1	1	0	13,042	13,091	13,140	2,900	2,911	2,922
Sonoma	Beach	0	1	0	0	96	122,626	122,626	122,626	11,754,013	11,754,013	11,754,013
Sonoma		0	1	0	1	4	6,398	543,121	2,123,622	28,456	2,415,747	9,445,650
Sonoma		0	1	1	0	1	122,626	122,626	122,626	109,086	109,086	109,086
Sonoma		1	1	0	0	8	122,626	122,626	122,626	1,009,045	1,009,045	1,009,045
Sonoma	Coniferous Forest	0	0	0	0	162,066	1,503	2,628	4,339	243,632,356	425,871,368	703,191,800
Sonoma		0	0	0	1	10,884	1,827	5,372	10,016	19,886,197	58,466,034	109,011,255
Sonoma		0	0	1	0	6,997	1,503	2,628	4,339	10,518,491	18,386,410	30,359,337
Sonoma		0	0	1	1	156	1,827	5,372	10,016	285,244	838,625	1,563,636
Sonoma		0	1	0	0	15,647	1,503	2,628	4,339	23,521,676	41,116,084	67,890,201
Sonoma		0	1	0	1	121	1,827	5,372	10,016	220,231	647,486	1,207,252
Sonoma		0	1	1	0	541	1,503	2,628	4,339	813,075	1,421,262	2,346,765
Sonoma		1	0	0	0	14,493	1,504	2,628	4,340	21,798,357	38,095,866	62,896,441
Sonoma		1	0	0	1	2,095	1,828	5,372	10,016	3,829,957	11,257,252	20,988,092
Sonoma		1	0	1	0	164	1,504	2,628	4,340	247,184	431,991	713,219
Sonoma		1	0	1	1	14	1,828	5,372	10,016	25,202	74,077	138,109
Sonoma		1	1	0	0	3,282	1,504	2,628	4,340	4,936,657	8,627,542	14,244,109
Sonoma		1	1	0	1	8,349	1,828	5,372	10,016	15,260,481	44,854,568	83,627,145
Sonoma		1	1	1	0	8	1,504	2,628	4,340	12,710	22,213	36,674
Sonoma	Cropland	1	0	0	0	34,066	175	366	557	5,945,382	12,451,700	18,958,018
Sonoma		1	0	0	1	36,357	175	366	557	6,345,162	13,288,978	20,232,794
Sonoma		1	0	1	0	905	175	366	557	158,010	330,928	503,846
Sonoma		1	0	1	1	343	175	366	557	59,928	125,510	191,093
Sonoma		1	1	0	0	991	175	366	557	172,953	362,224	551,495
Sonoma		1	1	0	1	99	175	366	557	17,311	36,255	55,199
Sonoma		1	1	1	0	31	175	366	557	5,395	11,299	17,203
Sonoma	Deciduous Forest	0	0	0	0	170,034	1,481	2,625	4,190	251,788,806	446,349,907	712,496,511
Sonoma		0	0	0	1	10,862	1,805	3,953	6,529	19,600,627	42,930,575	70,915,671
Sonoma		0	0	1	0	7,360	1,481	2,625	4,190	10,899,344	19,321,435	30,842,294
Sonoma		0	0	1	1	407	1,805	3,953	6,529	733,634	1,606,853	2,654,310
Sonoma		0	1	0	0	1,837	1,481	2,625	4,190	2,719,567	4,821,018	7,695,663
Sonoma		0	1	1	0	90	1,481	2,625	4,190	133,377	236,439	377,421
Sonoma		1	0	0	0	43,064	1,482	2,626	4,191	63,800,346	113,075,789	180,481,309
Sonoma		1	0	0	1	18,492	1,805	3,953	6,530	33,384,488	73,104,967	120,751,084
Sonoma		1	0	1	0	882	1,482	2,626	4,191	1,307,071	2,316,572	3,697,501
Sonoma		1	0	1	1	239	1,805	3,953	6,530	431,604	945,122	1,561,105
Sonoma		1	1	0	0	481	1,482	2,626	4,191	712,349	1,262,523	2,015,124

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Sonoma	Fresh Herbaceous Wetland	0	0	0	0	7	240	10,649	24,395	1,600	71,049	162,758
Sonoma		0	0	0	1	9	240	11,905	27,863	2,240	111,197	260,256
Sonoma		0	0	1	1	1	18,025	30,765	47,798	24,052	41,052	63,781
Sonoma		0	1	0	0	31	240	10,649	24,395	7,360	326,824	748,686
Sonoma		0	1	0	1	2	240	11,905	27,863	480	23,828	55,769
Sonoma		0	1	1	0	3	18,025	29,509	44,330	56,122	91,878	138,023
Sonoma		1	0	0	0	116	240	10,465	24,395	27,788	1,212,585	2,826,560
Sonoma		1	0	0	1	19	240	11,721	27,863	4,480	218,962	520,512
Sonoma		1	0	1	0	14	39,422	50,722	65,727	552,335	710,665	920,891
Sonoma		1	0	1	1	12	39,422	51,978	69,195	473,430	624,222	830,986
Sonoma	Grassland	0	0	0	0	56,114	66	168	264	3,690,615	9,421,477	14,799,072
Sonoma		0	0	0	1	6,876	509	611	707	3,501,566	4,203,824	4,862,794
Sonoma		0	0	1	0	966	66	168	264	63,539	162,204	254,786
Sonoma		0	0	1	1	130	509	611	707	66,138	79,402	91,849
Sonoma		0	1	0	0	15,093	65	164	264	985,091	2,475,525	3,980,449
Sonoma		0	1	0	1	400	509	607	707	203,649	243,180	283,095
Sonoma		0	1	1	0	179	24,435	29,814	50,947	4,374,534	5,337,469	9,120,985
Sonoma		0	1	1	1	0	4,406	19,799	50,947	980	4,403	11,330
Sonoma		1	0	0	0	25,308	66	168	264	1,664,491	4,249,145	6,674,474
Sonoma		1	0	0	1	22,894	509	611	707	11,658,031	13,996,115	16,190,072
Sonoma		1	0	1	0	230	66	168	264	15,110	38,572	60,588
Sonoma		1	0	1	1	92	509	611	707	46,885	56,288	65,112
Sonoma		1	1	0	0	4,615	65	164	264	301,225	756,975	1,217,156
Sonoma		1	1	0	1	17,943	509	607	707	9,128,220	10,900,137	12,689,282
Sonoma		1	1	1	0	42	24,435	29,814	50,947	1,016,196	1,239,884	2,118,788
Sonoma	Lake	0	0	1	0	3,192	100	6,735	13,369	319,003	21,496,874	42,674,744
Sonoma		0	0	1	1	140	100	6,735	13,369	13,958	940,572	1,867,187
Sonoma		0	1	1	0	39	100	6,735	13,369	3,934	265,098	526,261
Sonoma		0	1	1	1	8	100	6,735	13,369	845	56,914	112,983
Sonoma		1	0	1	0	551	100	6,735	13,369	55,030	3,708,372	7,361,713
Sonoma		1	0	1	1	54	100	6,735	13,369	5,356	360,952	716,548
Sonoma		1	1	1	0	3	100	6,735	13,369	311	20,968	41,625
Sonoma	Mixed Forest	0	0	0	0	0	1,414	2,484	3,674	315	552	817
Sonoma		0	0	0	1	62	1,659	3,983	7,487	102,942	247,164	464,547
Sonoma		0	0	1	1	20	1,659	3,983	7,487	33,945	81,502	153,184
Sonoma		1	0	0	1	127	1,660	3,984	7,488	210,772	505,937	950,831
Sonoma		1	0	1	1	4	1,660	3,984	7,488	6,275	15,063	28,308
Sonoma	Pasture	1	0	0	0	24,515	218	253	289	5,353,895	6,214,276	7,074,658
Sonoma		1	0	0	1	17,173	218	253	289	3,750,442	4,353,145	4,955,848
Sonoma		1	0	1	0	527	1,823	1,858	1,893	961,340	979,846	998,352
Sonoma		1	0	1	1	175	1,823	1,858	1,893	319,501	325,651	331,801
Sonoma		1	1	0	0	903	218	253	289	197,141	228,822	260,503
Sonoma		1	1	1	0	22	1,823	1,858	1,893	39,329	40,086	40,844
Sonoma	Reservoir	0	0	1	0	559	865	12,506	40,284	483,629	6,994,807	22,531,714
Sonoma		0	0	1	1	196	865	12,506	40,284	169,222	2,447,487	7,883,860
Sonoma		0	1	1	0	29	865	12,506	40,284	25,191	364,342	1,173,620
Sonoma		1	0	1	0	346	865	12,506	40,284	299,407	4,330,383	13,949,057
Sonoma		1	0	1	1	230	865	12,506	40,284	199,028	2,878,579	9,272,495
Sonoma	River	0	0	1	0	898	5	6	6	4,495	4,994	5,494
Sonoma		0	0	1	1	541	5	6	6	2,710	3,011	3,312
Sonoma		0	1	1	0	408	5	6	6	2,041	2,268	2,494
Sonoma		1	0	1	0	412	5	6	6	2,061	2,290	2,519
Sonoma		1	0	1	1	233	5	6	6	1,165	1,294	1,423
Sonoma		1	1	1	0	277	5	6	6	1,387	1,541	1,696

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Sonoma	Saline Herbaceous Wetland	0	0	0	0	2	3,840	18,823	37,355	9,393	46,048	91,384
Sonoma		0	0	1	0	0	3,840	18,823	37,355	854	4,186	8,308
Sonoma		0	1	0	0	16	3,865	18,942	37,577	61,881	303,305	601,702
Sonoma		0	1	0	1	136	3,865	18,942	37,577	525,987	2,578,096	5,114,466
Sonoma		0	1	1	0	7	3,865	18,942	37,577	25,784	126,377	250,709
Sonoma		0	1	1	1	2	3,865	18,942	37,577	9,454	46,338	91,927
Sonoma		1	1	0	0	14	3,865	18,942	37,577	54,146	265,392	526,489
Sonoma	Shrubland	0	0	0	0	32,075	146	146	146	4,687,378	4,687,378	4,687,378
Sonoma		0	0	0	1	469	146	146	146	68,511	68,511	68,511
Sonoma		0	0	1	0	542	224	413	767	121,084	223,506	415,094
Sonoma		0	0	1	1	8	224	413	767	1,740	3,213	5,966
Sonoma		0	1	0	0	3,188	146	146	146	465,927	465,927	465,927
Sonoma		0	1	0	1	255	146	146	146	37,278	37,278	37,278
Sonoma		0	1	1	0	119	224	413	767	26,604	49,107	91,201
Sonoma		1	0	0	0	1,528	146	146	146	223,278	223,278	223,278
Sonoma		1	0	0	1	217	146	146	146	31,688	31,688	31,688
Sonoma		1	0	1	0	29	18,411	18,600	18,954	536,375	541,885	552,192
Sonoma		1	0	1	1	12	18,411	18,600	18,954	221,101	223,372	227,621
Sonoma		1	1	0	0	44	146	146	146	6,500	6,500	6,500
Sonoma		1	1	1	0	1	18,411	18,600	18,954	16,378	16,546	16,861
Sonoma Total						793,688				824,304,619	1,532,073,171	2,521,099,413
Trinity	Coniferous Forest	0	0	0	0	1,584,329	1,503	2,628	4,339	2,381,703,767	4,163,237,831	6,874,269,839
Trinity		0	0	0	1	164	1,827	5,372	10,016	299,059	879,242	1,639,367
Trinity		0	0	1	0	55,875	1,503	2,628	4,339	83,996,816	146,827,127	242,438,538
Trinity		0	0	1	1	0	1,827	5,372	10,016	406	1,195	2,227
Trinity		1	0	0	0	244	1,504	2,628	4,340	367,264	641,848	1,059,695
Trinity		1	0	1	0	12	1,504	2,628	4,340	17,728	30,982	51,151
Trinity	Cropland	1	0	0	0	431	175	366	557	75,259	157,620	239,980
Trinity		1	0	1	0	23	175	366	557	3,959	8,291	12,624
Trinity	Deciduous Forest	0	0	0	0	155,011	1,481	2,625	4,190	229,541,578	406,911,901	649,542,670
Trinity		0	0	0	1	458	1,805	3,953	6,529	826,743	1,810,786	2,991,181
Trinity		0	0	1	0	4,614	1,481	2,625	4,190	6,832,179	12,111,509	19,333,280
Trinity		0	0	1	1	5	1,805	3,953	6,529	9,231	20,218	33,397
Trinity		1	0	0	0	1,147	1,482	2,626	4,191	1,699,159	3,011,485	4,806,658
Trinity		1	0	1	0	6	1,482	2,626	4,191	9,555	16,935	27,030
Trinity	Fresh Herbaceous Wetland	0	0	0	0	1,990	240	10,649	24,395	477,194	21,189,061	48,539,787
Trinity		0	0	1	0	294	18,025	29,509	44,330	5,307,529	8,689,076	13,053,058
Trinity	Grassland	0	0	0	0	56,601	66	168	264	3,722,619	9,503,176	14,927,403
Trinity		0	0	0	1	5	509	611	707	2,605	3,127	3,617
Trinity		0	0	1	0	1,443	66	168	264	94,928	242,335	380,654
Trinity		1	0	0	0	22	66	168	264	1,433	3,659	5,748
Trinity		1	0	1	0	1	66	168	264	59	149	235
Trinity	Lake	0	0	1	0	18,517	100	6,735	13,369	1,850,522	124,702,236	247,553,950
Trinity		1	0	1	0	0	100	6,735	13,369	44	2,995	5,946
Trinity	Mixed Forest	0	0	0	0	38	1,414	2,484	3,674	53,791	94,461	139,729
Trinity		0	0	1	0	1	1,414	2,484	3,674	1,258	2,210	3,269
Trinity	Pasture	1	0	0	0	153	218	253	289	33,318	38,673	44,027
Trinity		1	0	1	0	2	1,823	1,858	1,893	3,244	3,306	3,369
Trinity	Reservoir	0	0	1	0	24	865	12,506	40,284	21,153	305,936	985,483
Trinity	River	0	0	1	0	2,394	5	6	6	11,983	13,315	14,646
Trinity		0	0	1	1	15	5	6	6	76	84	93
Trinity		1	0	1	0	3	5	6	6	17	19	20

County	Land Cover	Agriculture	Coastal	Riparian	Urban	Acres	Minimum ($/acre/year)	Average ($/acre/year)	High ($/acre/year)	Minimum($/year)	Average($/year)	High($/year)
Trinity	Shrubland	0	0	0	0	132,454	146	146	146	19,356,685	19,356,685	19,356,685
Trinity		0	0	0	1	5	146	146	146	715	715	715
Trinity		0	0	1	0	3,283	224	413	767	734,061	1,354,988	2,516,476
Trinity Total						2,019,564				2,737,055,936	4,921,173,175	8,143,982,547

Table 15. Total asset value of the North Coast

Discount Rate	Low Estimate	Average Estimate	High Estimate
3%	473,271,275,369	835,386,881,868	1,369,815,088,346
Declining Discount Rate	702,154,434,213	1,239,396,164,345	2,032,284,206,525

Table 16. Total asset value by WMA

	3%			Declining	Discount	Rate
WMA	Low	Average	High	Low	Average	High
Eel	92,800,723,319	161,992,819,780	264,266,001,534	137,680,951,218	240,335,686,189	392,070,160,278
Humboldt	40,202,831,324	69,958,546,606	119,317,742,605	59,645,699,521	103,791,855,257	177,022,114,823
Klamath	148,305,960,370	280,785,073,258	471,931,825,925	220,029,596,372	416,578,175,160	700,167,201,065
North Coast	81,773,944,267	146,156,047,625	241,003,673,425	121,321,408,162	216,839,944,168	357,557,719,565
Russian Bodega	30,048,441,032	55,631,986,577	90,872,168,173	44,580,449,332	82,536,693,208	134,819,709,435
Trinity	81,295,073,720	146,201,594,442	242,113,304,113	120,610,946,539	216,907,518,307	359,203,989,155

Table 17. Total asset value by county

	3%			Declining	Discount	Rate
County	Low	Average	High	Low	Average	High
Del Norte	29,743,519,216	53,714,520,781	89,201,553,950	44,128,061,417	79,691,903,801	132,341,153,804
Glenn	2,440,570,979	4,285,996,907	7,070,071,195	3,620,878,393	6,358,788,057	10,489,294,614
Humboldt	106,729,462,666	183,420,816,502	302,535,007,206	158,345,898,795	272,126,677,313	448,846,798,591
Lake	6,863,297,281	12,671,892,796	22,092,413,249	10,182,520,829	18,800,265,682	32,776,732,357
Marin	190,239,199	376,409,570	611,646,938	282,242,562	558,448,531	907,451,249
Mendocino	87,757,521,790	156,678,982,677	256,600,701,024	130,198,759,712	232,451,974,502	380,697,771,920
Modoc	14,818,519,510	30,782,761,119	52,099,216,075	21,985,042,667	45,669,900,841	77,295,406,440
Siskiyou	113,348,748,325	214,879,167,519	362,289,190,867	168,166,399,253	318,798,896,417	537,499,263,264
Sonoma	26,047,123,628	48,411,835,091	79,663,981,690	38,644,017,302	71,824,736,566	118,191,026,800
Trinity	86,487,971,439	155,503,685,325	257,340,933,581	128,315,230,212	230,708,280,578	381,795,995,284

(Footnotes)

1 Verpeet, K. 2001. Protecting Streams and Riparian Habitat—Sonoma County, California. Sonoma County Ecology Center.

2 Bolitzer, B. & Netusil, N.R. 2000. The impact of open spaces on property values in Portland, Oregon. Journal of Environmental Management 59: 185-193. Colby, B. & Wishart, S. 2002. Quantifying the influence of desert riparian areas on residential property values. Appraisal Journal 70(3): online. Available at: http://www.freepatentsonline.com/article/Appraisal-Journal/89943350.html.

3 NOAA. 2012. Definition of State's Coastal Zone. https://coast.noaa.gov/czm/media/StateCZBoundaries.pdf

4 Chaplin-Kramer, R., Tuxen-Bettman, K., & Kremen, C. 2011. Value of Wildland Habitat for Supplying Pollinations Services to Californian Agriculture. Rangelands 33(3): 33-41.

5 Adapted from Liu, S., Costanza, R., Farber, S., Troy, A. 2010. Valuing ecosystem services: Theory, practice, and the need for a transdisciplinary synthesis. Annals of the New York Academy of Sciences 1185: 54-78.

6 Adapted from Liu, S., Costanza, R., Farber, S., Troy, A. 2010. Valuing ecosystem services: Theory, practice, and the need for a transdisciplinary synthesis. Annals of the New York Academy of Sciences 1185: 54-78.