

EXHIBIT A PROPOSAL COVER PAGE

Proposal Type

X Concept Proposal for Demonstration Projects and Processes

Organization Name (LeadApplicant)

Sonoma Ecology Center

Organization Type

Federally recognized Indian Tribe
California State Indian Tribe
Public agency
Local or state agency/special district
Resource Conservation District X Non-profit organization
Public utility
Other:

Contact Name/Title

Name: Raymond Baltar

Title: Biochar Projects Manager

Email: <u>Raymond@sonomaecologycenter.org</u>

Phone Number (include area code): 707 291-3240. Cell.

Organization Address (City, County, State, Zip Code):

P.O. Box 1486. Eldridge, CA. 95431

Authorized Representative (if different from the contact name)

Name: Richard Dale

Title: Executive Director

Email: <u>Richard@sonomaecologycenter.org</u>

Phone Number (include area code): 707 996-0712. Office

Certification of Authority

By signing below, the person executing the certificate on behalf of the proposer affirmatively represents that s/he has the requisite legal authority to do so on behalf of the proposer. Both the person executing this proposal on behalf of the proposer and proposer understand that the NCRP is relying on this representation in receiving and considering this proposal. The person signing below hereby acknowledges that s/he has read the entire Request for Proposals document and has complied with all requirements listed therein.

Official Authorized to Sign for Proposal

Signature

May 18, 2020

Date



Statement of Qualifications

North Coast Resource Partnership Grant -- Round 2 ConceptProposalto DemonstrateUse of Portable Field Kilns to Process Biomass and Make Biochar

Sonoma Ecology Center (SEC), Grant Applicant

www.sonomaecologycenter.org

Sonoma Ecology Center (SEC) is a California 501(c)3 with a successful 30-year track record in environmental education, restoration and research activities, as well as grants management.

SEC works to address challenges related to water supply and quality, open space, rural character, biodiversity, energy, climate change, and a better quality of life for all residents. Since 1990, we've worked to increase appreciation and stewardship of Sonoma Valley's natural heritage and create measurable benefits in areas of land, water, climate change and biodiversity.

Vision

We envision a future where people, land, water, and wildlife thrive.

Mission

Our mission is to work with our community to identify and lead actions that achieve and sustain ecological health in Sonoma Valley, often as effective models for other areas.

Sonoma Ecology Center staff, including Richard Dale (Executive Director), Jason Mills (Restoration and Fire Ecologist), Steven Lee (Research and Restoration Program Manager), and Caitlin Cornwall (Senior Project Manager) collectively have decades of watershed restoration experience, from project development and community engagement to implementation, representing millions of dollars of restoration for critical habitat supporting state and federally listed species, including steelhead trout, Chinook salmon, California freshwater shrimp, and others. SEC also developed a regionally significant wildlife corridor across the watershed, resulting in special designation in Sonoma County's general plan, recognition as a Critical Linkage by Bay Area Open Space Council, and thousands of acres of land protection in collaboration with private and public partners throughout the region.

Proposed administrative expenses: 11% of total grant

Raymond Baltar, MBA Sustainable Enterprise

Biochar Projects Manager, Sonoma Ecology Center Director, Sonoma Biochar Initiative raymond@sonomaecologycenter.org www.sonomaecologycenter.org P.O. Box 1486 Eldridge, CA. 95431 707 996-0712 707 291-3240 Cell

Raymond has served as SEC Biochar Projects Manager since 2015, and as Director of the Sonoma Biochar Initiative since 2012. He consulted and managed biochar projects for Redwood Forest Foundation (RFFI) from 2016 to 2018 and is currently helping manage a CalFire-funded biomass power/biochar production project in collaboration with Mendocino County RCD and All Power Labs. Raymond co-managed an NRCS Conservation Innovation Grant project in 2013-2014 and is currently Project Manager for a California Department of Water Resources grant on *Using Biochar to Conserve Water in California Agriculture*.

Billing rate: \$85/Hour

Partial list of SEC projects related to biochar and biomass management:

- 1) Produced and hosted 2012 USBI Biochar Conference at Sonoma State University
- Reduced pollution and educated groups of farmers and air quality management districts about the advantages of biochar through conservation burn training (Gallo, Constellation Brands, Jackson Family Wines, Cakebread Cellars; South Coast AQMD, Monterey APCD, San Luis Obispo APCD, Santa Barbara APCD);
- 3) Managed USDA NRCS Conservation Innovation Grant (CIG) biochar production and field trials (buying and using California's first specific biochar production unit);
- 4) Managed larger biochar production system for RFFI;
- 5) Researched available pyrolysis and gasification technologies for RFFI;
- 6) Managed CA DWR water conservation grant project;
- 7) Co-founded California Biochar Association;
- 8) Assisted Del Norte County landowner qualify for NRCS Conservation Stewardship program to produce biochar in kilns from fuels reduction materials;
- Assisted local forester select the best technology for his unique situation: Carbonator 500, promoting the machine to local government agencies and land managers;
- Assisting Bay Area tree service company select a technology to convert into biochar woody materials they generate and currently landfill, have written a CalFire grant to fund this innovative project;
- 11) Assisting Mendocino RCD and All Power Labs locate and run 8 25kw gasifiers to convert into electricity and biochar materials burned in Redwood Complex fire;
- 12) Working with CAPCOA on emissions testing protocols for small-scale biochar production techniques; and
- 13) Designing and hosting unique Scaling Biochar Forum in September 2020.

Collaborative Partner: Redwood Forest Foundation, Inc. / Usal Redwood Forest Company

www.rffi.org Linwood Gill Chief Forester linwood@rffi.org 707 357-8371 The Redwood Forest Foundation, Inc. (RFFI) is a remarkable grass-roots organization founded in 1997 by redwood region residents who worked for a decade to transcend conflict and find common ground among neighbors and forest stakeholders. They sought to establish local ownership and control over protection, restoration and use of forest resources within the coast redwood ecosystem. RFFI's mission is to acquire, protect, restore, and manage forestlands and other related resources in the Redwood Region for the long-term benefit of the communities located there. This 501(c)3 organization bought the Usal Redwood Forest in 2007. This area is now managed by RFFI's wholly owned subsidiary, Usal Redwood Forest Company, which conducts sustainable forestry activities and has pioneered in biochar production and policy development on the North Coast since 2011.

Usal Redwood Forest is a 49,636-acre forest covering two watersheds: the majority of the Usal Creek drainage and the South Fork of the Eel River. With its western property boundary formed by the Usal County Road running along Timber Ridge, the forest is separated from the Pacific Ocean by Sinkyone Wilderness State Park and the Intertribal Sinkyone Wilderness. The eastern property boundary is primarily defined by the South Fork of the Eel River drainage and the Highway 101 corridor. The southern property boundary is bisected by State Highway 1. To the north, the Usal Forest is bounded by private property and the Mendocino/Humboldt County line.

RFFI's community-based formation and governance makes it uniquely suited to engage the community in biochar production, promotion and use in the forest. RFFI's North Coast Biochar project is synonymous with forest-based biochar production. This project, initiated by the Mendocino Woody Biomass Working Group, has established strong partnerships with Humboldt State University's Schatz Energy Research Center, Sonoma Biochar Initiative, Mendocino County RCD, and All Power Labs. The team is pursuing incentives for biochar production that includes other local timber companies and the Yurok Tribe.

On Community Outreach Day, RFFI will use the kiln kit in the Usal Redwood Forest to engage community participants in slash processing and biochar production and application. In addition to RFFI's established group of supporters, including those named above, we will invite the Wailaki and Cahto tribes (partners in our Acorn Grove project) and other interested parties. We will promote this event on our website's popular biochar page, our Facebook page (2,400 followers), and in eBlasts to over 2,500 recipients. We will follow up with a video of the day made available via these same online locations.

Services budget from grant: \$42,500 -- see detailed budget spreadsheet for a line item breakdown.

Collaborative Partner: Potter Valley Tribe (PVT)

http://pottervalleytribe.com Gregg Young, M.A. Environmental Director Potter Valley Tribe 2251 S State Street Ukiah, CA 95482 707 462 1213 pvtepadirector@pottervalleytribe.com

Potter Valley Tribe (PVT) is a small-population, federally-recognized tribe in northern California, with properties from coastal Mendocino County to inland Lake County.

The PVT owns and manages 879 acres of forested land in northwestern Mendocino County adjacent to the main stem of the Eel River. PVT is committed to restoration practices and ecological forestry in attempts to improve the health of the forest while continuing to support and enhance numerous beneficial values: outdoor recreation; sustainable forestry; agriculture; natural resources protection; open space preservation; and protection of historic and cultural resources. Pursuit of these goals is assured in accordance with a conservation easement with the Mendocino Land Trust. The forest is to be managed under a Forest Management Plan slated for completion in 2020.

The PVT has expressed strong interest in testing the feasibility of biochar processing and its application in a large forest setting to address the property's heavy fuel loads and improve its forest health. The tribe's five-person crew is available to work with the proposed forest thinning and biochar production/application effort.

The PVT has identified a specific location near a future fuels reduction site where a crew could operate our mobile kilns to process excess fuel from the hazardous fuels being thinned from over-dense forest stands. This 14-acre site is a former lumber mill, with areas in need of soil amendments and re-vegetation. PVT also has an alternative possible site, a property four miles to the south, in the town of Potter Valley. This site has a 4-acre pasture and 1-acre community garden. Biochar produced from the kilns could be applied at either of these sites, mixed with compost from a nearby facility (Cold Creek Compost) and buried with the intent of increasing soil fertility and its waterholding capability.

The PVT is able to provide an in-kind match towards the costs of this project. This help would consist of equipment available for hire at a reduced cost (5-yard dump truck, back hoe) and assistance with project supervision and review, laboratory analyses, and reporting by the Tribal Environmental Office. The tribe's Environmental Director is a Certified Professional Agronomist and California Certified Crop Advisor with 40(+) years working with soil analysis interpretation, compost production, and local crops. The Tribal Administration could also assist with bookkeeping and review of activities for the PVT's portion of the project. Finally, PVT is also ready to help plan, host and organize workshop(s) with the 15-member Mendocino, Lake, Sonoma, Tribal Environmental Programs group to which they belong.

Services budget from grant: \$35,000 -- see budget spreadsheet for a line item breakdown.

Collaborative Partner: Scott River Watershed Council (SRWC)

https://www.scottriverwatershedcouncil.com/ Alexis Robertson Project Manager (530)680 6849 <u>alexis@scottriverwatershedcouncil.com</u>

Originally established in 1992, the Scott River Watershed Council (SRWC) in Siskiyou County became a nonprofit in 2011. This group cooperatively seeks solutions to enhance local resources and facilitate community collaboration on watershed issues. SRWC provides leadership to support science-based restoration in Scott Valley. The group brings research, education and discussion on natural resource issues to the community, and implements restoration projects based on community and ecosystem needs. Note: SRWC is also applying for a NCRP grant to demonstrate biomass processing and biochar production on an industrial scale using the Carbonator 500 machine. The line item budget allocation in our grant for our proposed collaboration with them is included in our "Scaled NCRP Budget" section. If funded, a two-person crew from Sonoma Ecology Center would take the mobile kiln kit up to Siskiyou County for a Community Outreach Day to demonstrate two different forestry biomass processing techniques at different scales: (1) the Conservation Burn pile burning technique and the flame-cap kilns. Funding this part of the grant would leverage NCRP's grant investment by educating farmers and foresters in this part of the state about biochar and available low-cost biomass processing techniques.

NCRP DEMONSTRATION PROJECT AND PROCESSES CONCEPT PROPOSAL BUDGET AND SCHEDULE

Sonoma Ecology Center Project Name: Use of Portable Field Kilns to Process Biomass and Make Biochar

Major Tasks	Task Description	NCRP Task Budget	Funding Match *	Total Task Budget	Scaled NCRP Budget **	Start Date	End Date
Project Administration	Sonoma Ecology Center will sign sub-grantee agreement(s) for work to be completed on this project, develop invoices with support documentation, conduct ongoing fiscal oversight, do quarterly billing	\$15,241.82	\$0.00	\$15,241.82		8/15/20	8/15/21
Project Management	General project oversight, arrange all trainings, coordinate project, assist and conduct trainings, reporting, 250 hrs@\$85	\$21,250.00	\$0.00	\$21,250.00		8/15/20	8/15/21
Purchase Kilns	Fabricate 6 Ring of Fire kilns. (\$1,000 each plus delivery)	\$7,000.00	\$0.00	\$7,000.00	1	8/1/20	10/1/20
Purchase Trailer	Purchase 5 Star Brand, 5' X 10' trailer to haul kilns	\$6,800.00	\$0.00	\$6,800.00		10/1/20	10/1/20
Purchase Water Tank and Trailer	Purchase trailer-mounted water tank and sprayer hose, including shipping. https://www.water-storage- containers.com/water-trailers-for-sale.html	\$11,757.00	\$0.00	\$11,757.00	I	9/15/20	9/15/20
Project Reporting	Data collection, performance measures, and project reporting of outcomes/lessons learned (\$2,000 each partner)	\$4,000.00	\$0.00	\$4,000.00		12/1/20	8/15/21
Kiln Training	Train crews in kiln use/ Wilson Associates, Cuauhtemoc Villa	\$4,000.00	\$0.00	\$4,000.00		11/15/20	11/15/20
UFRC Biomass Harvest and Staging	Harvest, Prepare and stage Materials near Kilns	\$15,000.00	\$5,000.00	\$20,000.00	J	9/1/20	10/1/20
Process Forest Slash with the Kilns/Community Demo Day RFFI	1 Month of Use/ Redwood Forest Foundation, Usal Forest	\$20,000.00	\$5,000.00	\$25,000.00	I	12/1/20	1/15/21
Distribute Biochar UFRC	Spread Biochar in Forest	\$7,500.00	\$0.00	\$7,500.00		1/15/21	5/1/21
Potter Valley Tribe PVT Biomass Harvest and Staging	Harvest, Prepare and Stage Materials near Kilns	\$15,000.00	\$0.00	\$15,000.00		9/1/20	10/1/20
Process Forest Slash with the Kilns/Tribal Community Demo Day PVT	1 Month of Use, Potter Valley Tribe Reservation	\$15,000.00	\$5,000.00	\$20,000.00		1/20/21	2/20/21

NCRP DEMONSTRATION PROJECT AND PROCESSES CONCEPT PROPOSAL BUDGET AND SCHEDULE

Sonoma Ecology Center Project Name: Use of Portable Field Kilns to Process Biomass and Make Biochar

Major Tasks	Task Description	NCRP Task Budget	Funding Match *	Total Task Budget	Scaled NCRP Budget **	Start Date	End Date
Distribute Biochar PVT	Spread Biochar in Forest/Aglands	\$5,000.00	\$0.00	\$5,000.00		3/5/21	5/1/21
Workshop with Scott River Watershed Council	Co-produce Biochar, Conservation Burn, Flame-Cap Kiln, and Carbonator 500 Workshop showing different scales of small- scale biomass processessing, reducing smoke pollution and biochar production in the Scott Valley area.	\$0.00	\$0.00	\$0.00	\$4,500.00	TBD	TBD
Biochar Testing	Proximate Characterization Analysis of Biochar from Project Locations	\$975.00		\$975.00		12/1/20	3/30/21
Insurance	Equipment Insurance /Annual	\$580.00		\$580.00			
Mileage	Kit Delivery and Return from Sonoma/2 additional trips to Processing Locations/Project Reporting	\$1,000.00	\$0.00	\$1,000.00		11/28/20	1/17/21
Tools	Assortment of Tools, Gloves, Nomex Fire-resistant Shirts for 4	\$1,500.00	\$0.00	\$1,500.00		11/1/20	11/1/20
Project Closeout		\$2,000.00	\$0.00	\$2,000.00		5/1/21	8/15/21
Total NCRP 2020 Demonstr	ation Project Request	\$153,603.82	\$15,000.00	\$168,603.82	\$4,500.00		
 * List the sources and status of matching funds: Redwood Forest Foundation, Inc.: \$5,000 in Match is available from a Weyerhaeuser Family Foundation grant for common oversight and admin;, and \$5,000 from the Usal Redwood Forest Company (URFC) budget for slash processing Potter Valley Tribe: \$5,000 for use of equipment, admin, reporting, and outreach. 							



North Coast Resource Partnership Grant Application

Round 2 Exhibit C

Sonoma Ecology Center Concept Proposal for Biochar Demonstration Use of Portable Field Kilns to Reduce Pollution and Make Biochar

Project Description

This project will purchase and demonstrate use of a mobile "flame-cap kiln processing kit" containing 6 specialized portable metal kilns, called Ring of Fire kilns, to process forest slash onsite -- converting up to 20% of the biomass into biochar that will then be available for improved soil health and carbon sequestration within the forest and on local farms. These kilns significantly reduce smoke pollution compared to typical open burn piles. This proposed mobile system also includes a trailer to haul the kilns from location to location; a tow-behind trailer holding a 1,000-gallon water tank with a hose and sprayer needed to extinguish the fires and additional fire safety; and tools and clothing.

We will train crews from the Cal. Conserv. Corps (CCC) hired by the Usal Redwood Forest Company (URFC), a network of Native American tribes organized and led by the Potter Valley Tribe (PVT), and from the Scott River Watershed Council (SRWC) in the safe use of the kilns and optimal biochar production. Each group will provide feedback on the effectiveness and economics of the use of the kilns compared to standard practices. Below are a few pictures of the kiln in use:





The URFC will use the kilns to process materials thinned from the Usal Forest in Mendo. Co. The PVT will process materials coming from an 850-acre property on their reservation in Mendo. Co. If fully-funded, the SRWC will demonstrate the kilns during a biomass processing project they are planning in the Scott Valley, in Siskiyou Co. SEC will continue to leverage this grant investment by making it available to numerous other organizations within the NCRP coverage area, such as RCD's, Fire Safe Councils, Indian tribes, forestry groups, individual landowners, etc.

We will document the benefits and limitations of these kilns as compared to traditional open burning or other techniques. Collected data will include the labor required, approx. amounts of biomass processed and biochar produced, and information on where and how biochar was applied. We will work with local watershed organizations, RCD's and forestry groups to prioritize the biochar application in areas of the forest with the poorest soil health, with these areas monitored for the duration of the grant period to determine changes, if any, as compared to adjacent areas with no application. Additional funds will be sought to continue this research into additional years.

Specific Project Goals/Objectives

This project's goals may be summarized as follows:

- demonstrate the differences between traditional ways of managing forest slash (open burn piles) and this new approach using an innovative mobile and replicable type ofkiln;
- document the costs of using these portable kilns to manage forest slash;
- record visual air emissions differences from open burning associated with using kilns for slash management;
- demonstrate the ability to make biochar from forest slash materials within the forests themselves, recording approximate amounts produced;
- test the biochar for quality characteristics; and
- demonstrate application of the biochar within these same forests.

Project Relevance to NCRP Goals and Objectives and Block Grant

NCRP is focused on finding and demonstrating better ways to manage our forests while reducing forest fire risks. This project directly addresses this objective by testing transportable kilns to successfully process slash within the forests from which it has been obtained while achieving "carbon negative" progress by burying the elemental carbon ("biochar") made through kiln pyrolysis. These kilns can be manufactured inexpensively and are a replicable and open source technology that can be used at many forestry cleanup scales. Since they are available right now from a manufacturer in Chico, CA, their use

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could easily be scaled within weeks if they are demonstrated to be cost effective. Such use could sequester additional carbon in the forest environment or in local agricultural settings. In the Pacific Northwest biochar filters are being used to keep water clean for salmon by removing zinc, copper, iron, oil and other pollutants that harm salmon eggs. This use of biochar could be replicated here on the North Coast.

Project Expansion: Scalable, Replicable, Measurable, Innovative, Enhanced Outcomes

<u>Scalable</u>: Once deemed cost effective, these kilns could easily be replicated and scaled for use throughout the NCRP's North Coast focus area. Multiple kiln kits could be made available to reduce large volumes of carbon dioxide and particulate matter that would otherwise be released from traditional open burning activities. A number of additional agencies, including Pepperwood Preserve, Audubon Canyon Ranch, and the Jenner Headlands Preserve have expressed an interest in experimenting with these kilns to reduce pollution and produce biochar. Funding this grant project will allow operational data to be collected by up to 3 different organizations, leading to a more complete picture of the cost effectiveness of using these kilns in California forestry operations. The Sonoma Ecology Center will continue to use the kit after the grant period has concluded and make the kit available to others that could benefit from its use.

<u>Measurable</u>: The project will track its results through a variety of key measures. We will document costs to purchase, move and use the kilns in several different settings; overall labor; time to prepare biomass for the kilns vs. using open burn piles; time to carry out the kiln burns; and time needed to apply the biochar to nearby soils. Visual records, both photographs and short videos, will be taken and included with the final report. Finally, visual differences, if any, between plant life and vigor in biochar-applied areas vs. non-applied areas will be described and recorded. While there are not enough funds in the budget for soil testing we will be looking for opportunities for additional grant funding for this purpose.

<u>Innovative</u>: This effort recognizes that materials once considered wastes have agronomic value and can even increase forest health. While a few kilns like these have been used sporadically to date in Oregon and California, they have never before been tested at the comparative scale proposed here.

<u>Enhanced</u>: Our goals are to enhance the usefulness of, and change the mindset about, low- value materials long considered un-merchantable, and to expand the knowledge in multiple communities about improving forest health while significantly reducing fire risks and sequestering carbon.

Need for Project: Relevance to Forest Health and Climate Change

Improved forest health is vital throughout the US, and especially in California where recent horrific wildfires have occurred with devastating results. Biochar, a stable form of elemental carbon that can persist for centuries in soil without significant degradation, can be made from materials culled from fire-damaged landscapes as well as from slash materials created during fire risk-reduction activities. The United Nations Intergovernmental Panel on Climate Change has recognized biochar production as one of the least expensive and most easily scaled "natural" carbon negative activities, and biochar was similarly recognized in a recent report from the Lawrence Livermore National Laboratory financed by ClimateWorks. See the chart on natural carbon drawdown solutions here: https://www.climateworks.org/carbon-dioxide-removal/.

This demonstration project to gather practical, statistical, and economic feasibility information on the use of these kilns in real-world applications and in a variety of environments could lead to additional investments in these types of low-cost, in-forest materials processing technologies, thereby increasing our overall carbon sequestration actions.

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Project Location, Size, Communities Served

If fully funded, grant monies will be leveraged in three different communities:

- In northwestern Mendocino County in the Usal Forest: a 49,636-acre community forest managed by the Redwood Forest Foundation, Inc. (RFFI) 2 locations are under consideration for using the kilns: a 20-acre location: Saddle above Julias Opening off of WRP; and Millbank, off Highway One near Leggett. Please refer to Exhibit 1 for a map showing the burn and Community Outreach Day locations. RFFI is well-known from Monterey County to Humboldt County and they have an extensive outreach list and social media presence that would draw many people to the Community Outreach event.
- 2) In central Mendocino County near Ukiah on the Potter Valley Tribe's Reservation: the Tribe owns a 879-acre parcel of forested land adjacent to the main stem of the Eel River, and a 14-acre former mill site near this forest that would be used as the staging area for the kiln burns and Community Outreach Day. Please refer to Exhibit 2 for a map showing these areas. The area shown in Red is the forested property and the area in Orange is the old mill site. The Tribe is a part of the 15-member Mendocino, Lake, Sonoma, Tribal Environmental Program initiative and can pull interested people from this group and through other collaborative relationships to workshops and the Community Outreach Day.
- 3) The Sonoma Ecology Center has established a collaborative relationship with the Scott River Watershed Council and if fully funded we would bring the kiln kit to a Community Outreach Day they are planning in Etna, in Siskiyou County.

Project Partnerships and Local/political support

Usal Redwood Forest Company (URFC) Redwood Forest Foundation, Inc. (RFFI)

RFFI's mission is to acquire, protect, restore, and manage forestlands and other related resources in the Redwood Region for the long-term benefit of the communities located there. RFFI's vision is to establish community-based forests that provide both critical habitat for increased biodiversity and improved regional economic vitality. The Usal Redwood Forest Company is a wholly-owned subsidiary of the Redwood Forest Foundation, Inc. RFFI was incorporated in 1997 in the State of California and is an IRS-recognized 501(c)(3) public benefit nonprofit corporation.

Potter Valley Tribe (PVT)

The Potter Valley Tribe is a federally recognized tribe of Pomo people in Mendocino County, California. They were previously known as the Little River Band of Pomo Indians and Potter Valley Rancheria of Pomo Indians of California. The tribe is descended from the first-known inhabitants of the valley, which the Pomo called Ba-lo Kai. Europeans first settled there, at the headwaters of the East Fork of the Russian River, in 1852.

Scott River Watershed Council (SRWC)

Originally established in 1992, the SRWC became a nonprofit in 2011. They cooperatively seek solutions to enhance local resources and facilitate community collaboration on watershed issues. SRWC provides leadership to support science-based restoration in Scott Valley. SRWC brings research, education and discussion on natural resource issues to the community, and implements restoration projects based on community and ecosystem needs.

Estimated Measurable Benefits from Project

The main goals of this project include:

1) Demonstrating the amounts of biomass that can be processed using each kiln type, and how much biochar is produced. Each kiln can process approximately 7.5 cu yds of biomass per day, yielding 1.5 cu yds of biochar per day. 6 kilns, then, could process up to 45 cubic yards of biomass and 9 cu yds of biochar per day. Over 10 days of operation, we estimate approximately 90

cubic yards of biochar could be produced, or 180 cubic yards over 20 days in a full month of operation at each location.

2) Demonstrating how much C02 could be diverted from the atmosphere and put back into forest soils or local agricultural soil: If we assume the dry weight of a cu yd of biochar is an average of 250 lbs, and that each pound of biochar contains the equivalent of 3 lbs of C02, between 135,000 lbs and 270,000 lbs of C02 could potentially be preserved in the biochar through the use of these kilns at both locations with this grant investment,

3) Demonstrating the costs of using kilns to process forest slash vs. traditional methods of open burn piles or lop-and-scatter.

Relevant Scientific Studies, Plans, and Reports

Effects of biochar application in forest ecosystems on soil properties and greenhouse gas emissions: a review (https://link.springer.com/article/10.1007%2Fs11368-017-1906-y)

Potential carbon storage in biochar made from logging residue: Basic principles and Southern Oregon case studies (https://www.forestry.oregonstate.edu/sites/default/files/Biochar_pone2018.pdf)

Understanding and Using Biochar Practice Guidelines developed by the Umpqua Biochar Education Team (https://drive.google.com/file/d/1qO3PmUJqZNID8wdAJCX-N3xsb5Vtd6dS/view)

Opportunities and Uses of Biochar in Forestry (<u>http://wastetowisdom.com/wp-content/uploads/2018/08/4.6.6-W2W-Report-Opportunities-and-uses-of-biochar-FINAL.pdf</u>)

<u>Approach to Data Collection, Performance Measures and Reporting of Outcomes from Project</u> With the assistance of Sonoma Ecology Center, each organization using the transportable kiln system will keep records of the approximate amounts of biomass processed, biochar produced, and extent of labor and other expenses required to operate the kilns. Each organization will produce a report on their observations and suggestions regarding use of the kilns vs. other traditional methods of biomass processing. They will address whether they recommend further use of this approach and identify which situations are best for such use.



Main Stem Eel River

ER 14 Land

Main Stem Eel River

lder Creek Land 201 ac

POTTER VALLEY TRIBE - EEL RIVER PROPERTIES



Humboldt County Resource Conservation District

5630 South Broadway Eureka, CA 95503 Phone (707) 442-6058 Ext. 5 hcred@yahoo.com

May 21, 2020

Katherine Gledhill North Coast Resource Partnership

Dear Ms. Gledhill,

I am working as a regional forest health watershed coordinator through the Department of Conservation's Regional Forest and Fire Capacity Program. In my current role I am developing forest health programs that span the entire NCRP territory as well as Marin, Napa, and Lake Counties. The Regional Forest and Fire Capacity program is designed to identify and explore opportunities to increase the pace and scale of forest adaptation work and engage social capacity to achieve the States ambitious climate goals. To achieve this many of us are looking to develop technologies, policy innovation, and community engagement strategies that have the potential to unlock opportunities for active forest stewardship. From my perspective, small scale low tech in situ pyrolization is a tantalizing approach to incentivize distributed forest management.

The Sonoma Ecology Centers proposal to procure and utilize a small fleet of portable kilns is an important demonstration of this promising technology. Partners at the US Forest Service and US Bureau of Land Management are eager to deploy this technology. To achieve this we need operational data that fit into common forest treatments. This project has potential to demonstrate a highly replicable, low cost fuel reduction tool. This approach dramatically changes the emissions resulting from pruning and thinning operations. As carbon offset reserve prices continue to increase over the next decade, the appeal of retaining carbon in soils will continue to improve. Distributed biochar production would be an appropriate alternative to jackpot burning or for these projects.

I am confident that this project will be a highly effective application of the RFFC pilot project program and enthusiastically support its funding.

Sincerely,

Tim Bailey

Tim Bailey

May 21, 2020 Tim Bailey foresthealth.hcrcd@gmail.com Forest Health Watershed Coordinator Humboldt County Resource Conservation District (707) 498-7566 Katherine Gledhill

North Coast Regional Partnership

Re: Portable Field Kiln Technology Demonstration Project: Processing Low-Value Biomass Into Biochar to **Reduce Fire Risk and Smoke Pollution and Increase Soil Health**

Dear Ms. Gledhill,

The Scott River Watershed Council is pleased to write in support of Sonoma Ecology Center's North Coast Resource Partnership grant project to demonstrate use of small-scale, portable "flame-cap" kiln technology to process forest slash being produced during fuels reduction work in the Usal Forest and on land owned by the Potter Valley Tribe, both located in Mendocino County. If fully funded, this project would also include transporting the kilns for use at a community outreach workshop in Siskiyou County organized by the Scott River Watershed Council.

This grant project involves purchase of a "kit" consisting of six "Ring of Fire" kilns that are portable and modular and designed to produce a valuable soil amendment called biochar from forest slash that has long been considered "waste" material. The kit includes a trailer to transport the kilns; a specialized water tank and trailer used in the biochar production process and also available for fire safety; and various tools and fire-safe clothing. These kilns represent an improvement on portable biomass processing technology called "flame-cap carbonization" that has been developed in Oregon over the last few years, and that has gained much interest in the forestry community as an alternative to using standard open burn piles to manage this woody material from fire-reduction efforts in our forests.

After the grant period this "Kiln Kit" would be available for use (with training) by other organizations within the North Coast Resource Partnership coverage area, leveraging the initial investment and continuing to educate a wide range of people about preferable alternatives to open burning and more sustainable use of our resources. Biochar (a form of elemental charcoal) has been a natural part of many forest and rangeland ecosystems created during cyclical fire events throughout history, but through fire suppression efforts over the last 100 years has been missing in many areas. Distributing biochar back into these forest environments could help bring forest soils back into their historically normal state, and can also be used to help in restoration efforts such a decommissioning logging roads or other degraded areas, or as a mitigation strategy in areas polluted by mine tailings.

In conclusion, I enthusiastically support NCRP funding of this important new project as it will bring new technology at various scales to Scott Valley and Siskiyou County to support forest health and long-term resilience to wildfire.

Sincerely,

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Charnna Gilmore **Executive Director, Scott River Watershed Council**

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POTTER VALLEY TRTBE



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Chairperson Salvador Rosales Secretary **Rosemary Rahmaoui** Treasurer Losario Rosales Member-At-Large Appointed Spokesperson Norma Rosales

Raymond Baltar Biochar Projects Manager Sonoma Ecology Center 15000 Arnold Dr, Eldridge, CA 95431

May 13, 2020

Dear Mr. Baltar

Potter Valley Tribe (PVT) would be pleased to partner with the Sonoma Ecology Center's Biochar Project and participate in the *Portable Field Kiln Technology Demonstration Project: Processing Low-Value Biomass Into Biochar to Reduce Fire Risk and Smoke Pollution and Increase Soil Health.*

The Potter Valley is a small-population, federally-recognized tribe in northern California, with properties from coastal Mendocino County to inland Lake County.

The PVT owns and manages 879 acres of forested land in northwestern Mendocino County adjacent to the main stem Eel River. PVT is committed to restoration practices and ecological forestry in attempts to improve the health of the forest while continuing to support and enhance the following Beneficial Values: outdoor recreation; sustainable forestry; agriculture; natural resource protection; open space preservation; and protection of historic and cultural resources. Pursuit of these goals is assured in accordance with a Conservation Easement with the Mendocino Land Trust. The forest will be managed under a Forest Management Plan, to be completed in 2020.

The PVT would be very interested in testing the feasibility of biochar processing and application in a large forest setting to address the heavy fuel loads and forest health on the property. We have a small, 5-person crew available that can work with the forest thinning and organization.

The PVT has a location near a future fuels reduction site where a crew could operate kilns to process excess fuel from the hazardous fuels thinned from over-dense stands. This 14-acre site is a former lumber mill, with areas in need of soil amendments and re-vegetation. We also have a property 4 miles south, in the town of Potter Valley. This site has a 4-acre pasture and 1-acre community garden. Biochar produced from the kilns could be applied to these sites, mixed with compost from a nearby facility (Cold Creek Compost), and applied with the intent of increasing soil fertility and water holding capability.

The PVT is able to provide an in-kind match towards the cost of this project. This would consist of equipment available for hire at a reduced cost (5-yard dump truck, back hoe) and assistance with: project supervision & review, laboratory analyses and reporting from our Tribal Environmental Office. Our Environmental Director is a Certified Professional Agronomist and California Certified Crop Advisor with 40+ years working with soil analysis interpretation, compost production, and local crops. Our Tribal Administration could also assist with bookkeeping and review of activities for the PVT portion of the project. Finally, we would also help plan, host & organize workshop(s) with the 15-member Mendocino, Lake, Sonoma, Tribal Environmental Programs group to which we belong. We would estimate this in-kind donation to be approximately \$5000

We thank you for this opportunity. Salvader Rosales

Salvador Rosales, Tribal Chairman

REDWOOD FOREST FOUNDATION, INC



PO Box 12 Mendocino, California 95460 Phone: 707-593-6150 Email: info@rffi.org www.rffi.org

Raymond Baltar Biochar Projects Manager Sonoma Ecology Center 15000 Arnold Dr, Eldridge, CA 95431

May 18, 2020

Dear Mr. Baltar,

Redwood Forest Foundation, Inc (RFFI) would be pleased to partner with the Sonoma Ecology Center's NCRP grant application and participate in the Portable Field Kiln Technology Demonstration Project: Processing Low-Value Biomass Into Biochar to Reduce Fire Risk and Smoke Pollution and Increase Soil Health.

RFFI, through it's subsidiary, Usal Redwood Forest Company, owns and manages a 49,564 acre redwood forest, in northwestern Mendocino County. Having been intensively managed by industrial timber companies, RFFI is now committed to restoration practices and ecological forestry in attempts to improve the health of Usal Redwood Forest while continuing to support the local community. RFFI would like to test the feasibility of biochar processing and application in a forest setting as a means to retain carbon storage, reduce fuel loads and potentially improve soil conditions.

For this project, RFFI has identified two locations on Usal Redwood Forest within a proposed shaded fuel break to use the kilns to create biochar. Our interest is to test the cost and feasibility of loading the kilns mechanically versus manually. A California Conservation Corps crew will manually load several kilns at one site and distribute biochar back into the forest soils. An excavator will be used to load several kilns at the other site, and the CCC crew will distribute the biochar back into the forest soils. A community demonstration day will be organized to tour the two sites while the crews are working to showcase use of the kilns using the two methods. Our findings on feasibility of loading kilns mechanically vs. manually, as well as overall lessons learned will be shared publicly via our website, social media platforms and newletters, once the project has ended.

REDWOOD FOREST FOUNDATION, INC



PO Box 12 Mendocino, California 95460 Phone: 707-593-6150 Email: info@rffi.org www.rffi.org

RFFI is able to provide a \$5000 match towards the cost of this project and another \$5000 match from our Weyerhauser Family Foundation grant for administration and review of this project's activities on Usal Redwood Forest.

Thank you for this opportunity.

Sincerely,

www.

Linwood Gill Chief Forester linwood@rffi.org (707)357-8371