

# Effectiveness Monitoring Committee Full Project Proposal Form

**Full Project Proposals will be requested directly from Applicants by email with the due date clearly identified. In general, applicants will have one (1) month after notification to return the Full Project Proposal.**

Project #:  Date Submitted:

Project Title:

Principal Investigator(s), Affiliation(s), and Contact Information (email, phone):

Collaborator(s) and Affiliation(s):

Project Duration and Dates (MM/YY - MM/YY):

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## **Written Proposal Requirements:**

*Please build upon the information provided in the Initial Concept Proposal, addressing each of the following for consideration by the EMC. For further information please see the Request for Proposals or consult sections 2.4, 4.0, and 5.0 of the EMC's Strategic Plan. Include figures, tables, or photos as needed.*

- 1. Project Description**
  - a. Background and Justification**
  - b. Research Questions, including Objectives and Scope**
- 2. Research Methods**
- 3. Scientific Uncertainty and Geographic Application, including monitoring locations**

*Please consult section 4.4 of the EMC's Strategic Plan for further information. Indicate the specific geographic locations, counties, or regions of the state to which this project may have benefits; if benefits are anticipated to apply across the state, indicate "Statewide". If the benefits are also anticipated to occur outside of the state, please explain.*
- 4. Critical Questions and Forest Practice Regulations Addressed**

*Please identify the Critical Questions by number and letter (as identified in the EMC's Strategic Plan), and any associated regulations by number. Please also describe how your project will address these questions and assess the efficacy of each regulation.*
- 5. Roles, Collaborations, and Project Feasibility**

*Please describe the roles of the Principal Investigators and collaborators and how the collaboration and affiliations will benefit the project and increase project feasibility.*

# Decay Rates and Fire Behavior of Woody Debris in Coastal Redwood Forests

## 1. Project Description

### a. Background and Justification

The historical fire return interval for coast redwoods, *Sequoia Sempervirens*, is widely debated and probably depends on spatial patterns. The southern part of the range could be anywhere between 6 and 27 years while the moister norther parts of the range, the return interval can be up to 500-600 years (Agee, 1993; Brown and Baxter, 2003; Stephens and Fry, 2005; and Jones and Russell, 2015). Prior to western contact, fires were typically started by Native American tribes for a variety of purposes or lightning (Agee, 1993). Since the mid-1800's the redwood region has witnessed extensive timber harvests, fire exclusion that has altered stand structures and the climate has become hotter and drier over the last few decades (Prichard et al., 2021). All of these variables have changed stand conditions and therefore fire behavior is different than what it was historically.

California has seen an increase in destructive wildfires that have triggered a movement of forest and vegetation management throughout the state, as well as re-examining how current practices might need to be altered to better address fuel reduction and fire hazard risk. The National Park Service and other groups define hazard fuel reduction treatments as a practice that will reduce surface and ladder fuels to modify fuel structure. (NSP, 2017; Agee et al. 2000). These treatments and practices are not meant to stop fires or prevent ignitions, but rather to slow and change the fire behavior (Stratton, 2004). Treatments can be as extreme as using Silvicultural harvests to manipulate stand densities to mastication, prescribed fire, lop and scatter treatments.

Fuel reduction treatments to create more resilience are based on trying to keep ground fires from becoming canopy fires (Agee and Skinner, 2005). For dry forests, there were 4 different 'principles of fire resistance,' two of which included reducing surface fuels and increasing height to live crown; while the others are decreasing crown density and keeping larger trees (Stephens, 1998; Agee, 2002, Hessburg and Agee, 2003, and Agee and Skinner, 2005). In respect to the Forest Practice Rules, slash treatments after a timber harvest plan restricts the height of the fuel bed to be no more than 30 inches, along with requiring the woody debris to be touching the ground to start the decomposition process in order to further reduce the surface fuels. The act of lop and scattering wood debris can increase the height to live crown when paired with a selection harvest silviculture.

Slash, the woody byproducts of timber harvest operations, can be a cause for concern, specifically in respect to fire risk, if not dealt with properly. During the August 2022 Board of Forestry (Board) meeting, the Forest Practice Committee (Committee) discussed slash disposal after CALFIRE brought the issue to the attention of the Board as a suggested Forest Practice Rule (FPR). modification. The Committee did discuss that region within the State would have different results which would potentially factor into any changes of the FPRs. Currently the Committee is just beginning a general discussion of slash treatments, how they relate to fire hazards, if the current rules need to be change or updated. The Committee decided to continue the discussion at the September 2022 meeting in the field at La Tour Demonstration State Forest where the Board observed slash from harvest and shaded fuel break operations. The September Forest Practice Committee meetings came up with Draft Amendments to the text of the slash treatment rules.

The Sierra Nevada's has extensive research and evidence that indicates increased fuel loads can result in stand replacing fires (Stephens et al., 2009; Fule et al., 2012; Martinson and Omi, 2013; Kalies and Yocom Kent, 2016). This theory might be true within the coast redwood region as well as is evidenced by the 2020 fires in Sonoma County, specifically Wallbridge fire and Myers Grade fire (personal communications Michael Jones, 2022). Due to the different vegetation types, climates and other variables, theories that are based on evidence from the Sierra Nevada's typically need to be modified for the coastal redwood region and usually has very little research to back it.

There is evidence to suggest that timber harvesting activities increase the amount of surface fuels directly after timber operations and that these increases in fuel load alter fire behavior. One study testing different fire models in conifer forest found that untreated woody debris from forest management activities increased fire potential by 90% and increased fireline intensity by 160% (Cruz et al, 2014). However, this study found that there was a decrease in crown fire potential due to the management that was done and suggests that treatments to the woody debris would mitigate some of the fireline intensity. The Fire Seragate Study in the Sierra Nevada's found that lop and scatter treatments would increase surface fire intensity until such a time that that woody material had decomposed. Studies conducted in the Santa Cruz Mountains and Humboldt County on treated woody debris, support the idea of an increase in fuel loading directly post-harvest, with decreasing fuel loads as time since harvest increases. (Jacobson and Dicus, 2003; Dicus, 2003; and Glebocki, 2015). Analysis on the fire effects of a prescribed burn and found that higher fuel loads had an increase in fire intensity (Nives, 1989). Based on these studies and empirical knowledge, foresters assumed that the fuel loads post-harvest will stay elevated for a period of time before the fire risk is reduced due to decomposition of the slash and woody debris. The studies stated above make the assumption while backing it with fire models that show decreased fire behavior with the decrease in fuel loads. However, the fuel models in the Jacobson and Dicus, and Dicus and Glebocki studies were never verified with a 'field fire' and were only simulations. Nives's study found that the fire behavior model actually did a poor job at predicting the fire behavior when compared to the prescribed fire conducted for the study; supporting the current theory that fire models for the redwood region are inaccurate and need to be checked. Based on poor models and a lack of testing the models, there is still uncertainty as to whether the fire risk does decrease.

Fuel loads are just one metric for fire behavior and there is evidence that suggests that decomposed/decaying woody material can cause increased fire flammability, faster ignition rates, higher temperatures during burning and longer smoldering capabilities (Zhao, 2018; Hyde, 2011; Knapp, 2005). These findings run counter to the current assumption that once post-harvest slash treatment decays, the fire hazard risk is mitigated. Currently there is no research on the decay of redwood in regards to fire, and very little research has been on with Douglas-fir (Babrauskas, 2006). The changing climate might be a factor in an increased decay rate in the future, which would leave fuel loads on the landscape for longer periods of time. This proposed study will look at fuel loads, decay rates and the fire behavior associated with both species under the current California Forest Practice Rules (FPRs) for slash treatment within recently harvested timber harvest plans in Sonoma and Mendocino Counties.

#### **b. Research Questions, including Objectives and Scope**

The Scope for this proposed project is to look at the effectiveness of the current FPRs in mitigating the wildfire hazard and risks for "normal" fire scenarios – normal being "conditions in which an initial attack

is more likely to be successful (Plucinski, 2012) or in which fuel treatments have a higher likelihood of being effective” (Cruz et al, 2014). However, “red flag days,” or days in the 97 percentile fire weather conditions, models will be run for comparisons and to look at worst case scenarios. This proposed study will focus on fuel loads, decay rates and the fire behavior association with coast redwood and Douglas-fir under the current California Forest Practice Rules (FPR) for slash treatment within recently (0 to 10 years) single tree selection harvested timber harvest plans (THPs) in Sonoma and Mendocino Counties.

The research questions for this project are: 1. How does the composition of post-harvest fuel loads change over time and affect fire behavior, composition being the make-up of the fuels (fine vs. 1, 10, 100, 1000-hour fuels); 2. How does decayed/decaying redwood and Douglas-fir interact with fire behavior; 3. What are the decay rates for coast redwood and Douglas-fir; and 4. How do the fire models correlate with actual fire behavior?

The study will look at industrial timber lands slash treatments, specifically lop and scatter treatments, along public roads (specifically targeting 14CCR 917.2 and Technical Addendum #2 – Cumulative Impacts, H. Wildfire risk and hazard (2-4)) to determine if the rules are adequate enough to alter fire behavior from the rest of the stand. Lop and scatter treatment is the most common and is assumed to be the most widely utilized at this point in time due to cost of other treatments, such as mastication. 14 CCR 917.2 was targeted due to the public roads – which are typically access roads or county roads that could potentially be used for fire suppression activities, evacuations or be the most likely place for ignitions to take place.

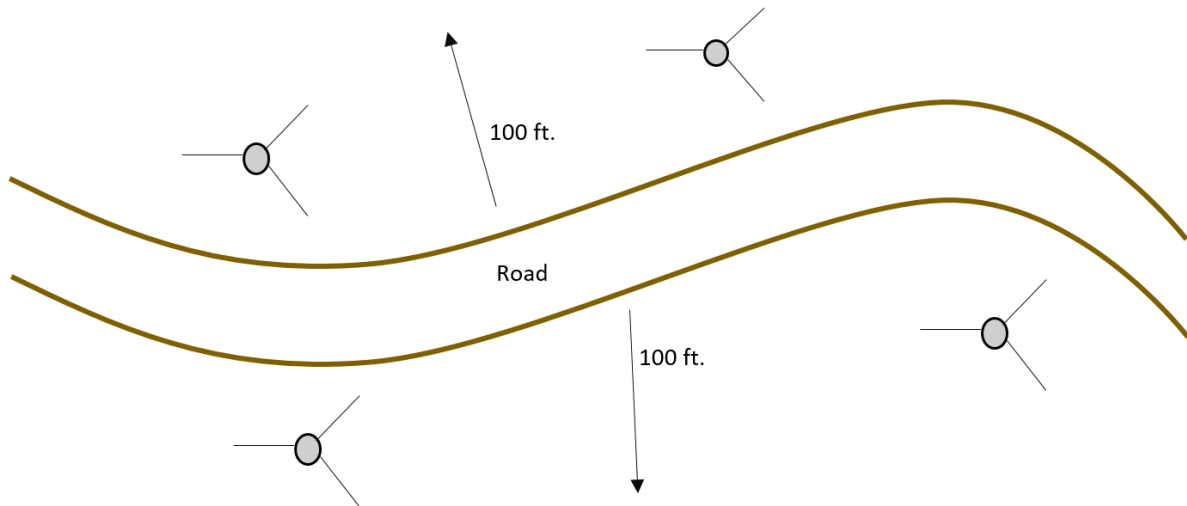
While this project is only looking at industrial timber lands after a timber harvest plan, there are broader implications for this research, especially the many vegetation management and shaded fuel break projects utilizing lop and scatter as a treatment.

## **2. Research Methods**

The study will look at post-harvest lop and scatter treatments pre-harvest, 0-, 1-, 5-, and 10-years post-harvest to establish a chrono sequence of fuel load composition over time on the collaborators’ lands. The sites will be located within 100 feet of public roads and will have lop and scatter treatment from the harvest. Slope and aspect will be standardized across all sites and plots. Weather information will be pulled from the nearest RAW station.

### **a. Fuel Loading Measurements**

At least three sites per year category, with 4 plots each for a total of 12 plots per year category (60 plots total). Each plot will have 3 Brown’s transects from plot center, as is illustrated in Figure 1, that are 15-25 feet long, depending on slash. Data collection will follow the FIREMON fuel loading protocol (Lutes, 2006).



3. *Figure 1: Example of plot layout along the Public Road*

### **b. Wood Decay Measurements**

Since there is little literature on decay rates of coast redwood, Douglas-fir, and tanoak, two methods will be used. For each age category, 3 samples of woody debris, duff and litter will be removed from the site and brought back to the lab for weighing. The samples will be proportionally categorized by using Zhao et al. (2018) method which referenced Fogel et al. (1973) decay stages. Zhao et al.'s categories were freshly dead (Fogel's Class 1), partly decomposed (Fogel's Class 2 and 3) and strongly decomposed (Class 4).

The second method will measure dead fuel moisture by bagging the same samples from Method 1, and taking them to the lab for weighing and drying. The samples will be weighed pre-drying, then placed in a box with a fan to allow them to air-dry until there is no further water loss. The dry samples will then be weighed again, giving a dry mass weight that can be correlated to amount of decay when compared to the rest of the samples. The dead fuel moisture will be used within the fire behavior modeling to help fine tune the rate of spread, flame length and fire intensity.

### **c. Fire Behavior Modeling**

Information collected from the Brown's Transects, weather data from either local RAW stations or through a pocket weather monitor, fuel moisture for 10-hour fuels collected during sampling and periodic times during the summer will all be used as variables for the fire model. Behave or the Fire and Fuels Extension of the Forest Vegetation Simulator (FFE FVS) will be utilized for the fire modeling. The proportionate decay categories, the dead fuel moisture, and fuel loading data will help determine the fuel model (Scott and Burgan, 2005) and help tweak the fuel moisture levels to try and get a more accurate model reading. Stand data will be collected on a 20 BAF variable radius plot around each plot center. Models will be run for "normal" fire season weather and "red flag day" fire season weather, to determine the effectiveness the treatment to withstand the different fires California has been seeing.

A few of the plots will be burned using prescribed burning (Figure 1), to get baseline data to help fine tune the models, especially in areas that are showing more decay (i.e. 5-10 years post-harvest sites). During the prescribed burn, weather data will be taken at hour increments, and 10-hr fuel moisture stick will be on site and will be measured prior to the burn. Flame lengths and rate of spread will be observed during the burn and an attempt to compare them with the models will be made. All the variables would be put into the fire model to compare the model results with what was experienced in the field.



Figure 2: Parlin 17 Prescribed Burn 10/19/2022 within the Parlin 17 THP. Fire backing down slope to the control line.

Since fire is a natural part of the California ecosystem and these rules are not ensuring no fire will be present after treatment, it is assumed that fire will eventually occur. One of the metrics to determine effectiveness of the rules will be to look at Fireline intensity or fire intensity. Fire intensity is defined by Jon Keeley as “the physical combustion process of energy release from organic matter, or the representation of energy released during the various stages of the fire” (Keeley, 2009). Since there are many different variables to fire intensity, this project will specifically look at flame lengths and conifer scorch height. Using models, comparisons can be done on BTUs of different burning conditions. The premises will be if the fire is too intense, firefighters cannot safely make a stand on the road and control the fire in ‘normal’ conditions, the current rules might be ineffective. However, if the fire intensity is such that firefighters would be able to work in the conditions, the rules may be adequate.

A second metric of determining effectiveness would be the rate of spread. If an ignition point is within the fire hazard reduction zones, rate of spread can determine how quickly or slowly a fire can impact the surrounding stand. In remote, rural areas, fire response times might be hours and the rate of spread can help based the effectiveness of the rules. The final metric of determining effectiveness would be the likelihood of crown fire occurrence. Surface fires are safer and easier to control or manage, so the effectiveness of the rules to keep fire on the ground would be an ideal metric (Cruz et al, 2014; Cruz et al, 2004).

#### **i. Fuel vs. wind-driven fires**

Fuel vs. wind-driven fires will be addressed through modeling. Fuel-driven fires are determined by bottom-up variables such as topography, vegetation patterns, and fuel treatments (i.e. lop and scatter) (Prichard et al. 2019). Wind-driven fires are determined by top-down variables such as fire weather and climate (Prichard et al. 2019). Wind-driven fires are going to be considered the 97 percentile of fires and will be using “Red Flag Day” weather. Per NOAA, red flag days are weather events which may result in extreme fire behavior and the criteria includes 1. relative humidity of 25% or less for several hours 2. sustained surface winds of 15 mph, or frequent gusts of 25 mph or greater, 3. ten-hour fuels of 8% or less (NOAA). Fuels-driven fires can use the same fuels data and vegetation patterns that are collected in the field to determine if 1. the treatments promote fuels-driven fires, and 2. can be put with different topographies to test if there is a change in behavior.

“Red Flag Day” weather data will be obtained in one of two ways. The first way would be by visiting the sites during “red flag days” to collect fuel moisture data, micro-climate fuel data and pull weather data from nearby RAW stations to get an average of weather variables for “red flag days”. This weather and fuel moisture data will be then entered into Behave of FFE FVS to model the fire effects for wind-driven fires. The second way would be taking the known weather from the fires that occurred during the “red flag days” over the last few years (Wallbridge, Meyers grade, etc.) and use that data in the models. The fall prescribed burns can help make adjustments to the model to hopefully get a better representation of what might occur.

The two models can be compared to each other by looking at the outputs. Assuming the fuels treatment (lop and scatter) is effective, neither a fuels or a wind-driven fire should occur during normal conditions.

Models will be the only way this project will be assessing fuels vs. wind-driven fires. There is evidence to suggest that geographical location is one of the factors to indicate fuel vs. wind driven fires (Keeley and Syphard, 2019). Keeley and Syphard suggest that the Sierra Nevada’s will find more fuel driven fires while the more western coastal ranges will be influenced by more wind-driven fires (Keeley and Syphard, 2019). If this is the case, a much larger study area would be needed and is outside of the scope of this project.

### **3. Scientific Uncertainty and Geographic Application, including monitoring locations**

The proposed project attempts to understand the relationship of decaying woody debris and fire behavior specifically in the coast redwood mixed forest. Downed woody material has important ecological functions such as habitat, nutrient cycling, and erosion control. However, woody material and debris can also pose a fire hazard in strategic locations across the landscape, specifically for fire suppression efforts, evacuations and where human- caused ignitions are more likely to start.

The proposed project will take place in Sonoma and Mendocino Counties, within the coastal redwood/Douglas-fir mixed forest type. While theories from this research may be applied outside of this forest type, the theories may need to be tweaked and studied further. It is assumed that while this study is taking place on timber industry lands, the results could translate to fuel reduction/shaded fuel break/vegetation management work for fire prevention done within this forest type. There can be prescribed burn pre-treatment translation as well, as many prescribed burns have manual or mechanical treatments prior to burning.

The monitoring locations will be on Jackson Demonstration State Forest (JDSF) and local timber industry lands (as they will have the space and stands that fit the time since harvest variables needed for the project). Specific monitoring locations are unknown for the timber industries lands at this time due to it being the busy season for operations. JDSF sites are generally known due to the permitting process for the prescribed burns – see Section 5 – Roles, Collaborators, and Project Feasibility for more information on the permitting process.

### **4. Critical Questions and Forest Practice Regulations Addressed**

Theme: Wildfire Hazard

Critical Monitoring Questions:

- 6c: Are the FPRs and associated regulations effective in managing fuel loads, vegetation patterns and fuel breaks for fire hazard reduction?
- 6a: Are the FPRs and associated regulations effective in treating post-harvest slash and slash piles to modify fire behavior?

Rules or Regulations Addressed:

- 14 CCR 917; Hazard Reduction
- 14 CCR 912.9; Cumulative Impacts Assessment Checklist (Wildfire Risk and Hazard)
- Board of Forestry and Fire Protection Technical Rule Addendum No. 2 Cumulative Impacts Assessment (H. Wildfire Risk and Hazard)

The proposed project is focusing on fuel loads (6c) and treating post-harvest slash (6a) that has been lopped and scattered. Slash Piles, vegetation patterns and fuel breaks will not be addressed in this proposed project. To test the effectiveness of the regulations, data will be collected on down woody debris prior to slash treatment occurring. This information will be run through the fire behavior model and the results will be compared to models run for stands with slash treatments. Based on the decay factor that will be found from the decay data collected, the researchers can extrapolate how no slash treatment at different year intervals would behave like.

Another metric of effectiveness testing is to look at the fire line intensity since these regulations (14 CCR 917) specifically targets Public Roads for the 100-foot treatment. Again, Public Roads may be used as access roads, evacuation roads, places for firefighters to hold and perform suppression or management activities, and they are also the most likely places for human-caused fires to ignite. Fire line intensity is a good effectiveness indicator because if the area is not tenable for firefighters to do suppression or management activities – in ‘normal’ fire conditions, then the treatments are not effective.

The Cumulative Impacts Assessment – specifically, H. Wildfire Risk and Hazard, is being address more as a general board concept. Currently many people discuss the different hazard mitigations that will be utilized, the road access, what emergency response is in place and that the harvest might lead to an increase in fire hazard for a few years, but decrease after a few years. Most of the information talked about might be from personal experience or from different stand/climatic conditions. This research will shed light on the relationship between decaying woody material and fire behavior over time and therefore can hopefully be used to address long term cumulative impacts of land management.

## **5. Roles, collaborators, and Project Feasibility**

Collaborators will be UC Cooperative Extensions Advisors [REDACTED] (Fire Advisor) and [REDACTED] (Forestry Advisor), CALFIRE’s Jackson Demonstration State Forest (JDSF), and industrial landowners throughout the Sonoma and Mendocino Region – one being Mendocino Redwood Company (MRC). Please see the Letters of Support from JDSF and MRC in the attachments.



UCCE collaborators will be the principal investigators and their roles include coordinating and facilitating the research which will include the data collection, analysis, and dissemination. UCCE will also advise the grad student and hire technicians to help with the data collection and analysis. The industrial landowners will provide research sites as well as access for the UCCE team during the dry season months and when timber operations allow safe access to the sites. JDSF will provide additional research sites that can be burned with prescribed fire, the expertise to burn the plots as well as the CEQA for the prescribed burn.

The feasibility of prescribed burning happening within the timeframe of the grant on JDSF is pretty high. JDSF has conducted two prescribed burns (Figures 2, 3 and 4) on the Forest in the last two years, one of which was a fall burn (October 17-28<sup>st</sup>, 2022). This proposed project would be conducted in the fall for the following reasons: 1. fires traditionally burned in the fall, 2. conditions are usually drier which could result in increased fire behavior – this leads to a better representation of burn affects to compare to a model that is not well suited for redwood/Douglas-fir mixed forests, and 3. spring in the redwood/Douglas-fir mixed forests are typically wetter longer and therefore produces more smoldering fires. JDSF is currently in the process of completing two CalVTPs for the burns where this proposed project would be located. One of the burns will take place in Fall of 2023 and the other will take place in Fall of 2024 in multiple locations across the Forest. JDSF is also actively look at opportunities to burn during the next several winters, which might provide opportunities for further burns that could be compared to models in other seasons if desired. The Mendocino CALFIRE Unit (MEU) will be assisting with all the burns on JDSF, are collaborating on the CalVTP burns to create the burn plan and determine if extra resources need to be called in to assist the Unit in these burns.



Figure 3: Parlin 17 Prescribed Burn 10/19/2022 within the Parlin 17 THP. Fire moving through about two years post-harvest.



Figure 4: Parlin 17 Prescribed Burn 10/17 – 10/19/2022 within the Parlin 17 THP. Post-fire effects included mosaic burn patterns and consumption of 1 and 10-hour fuels while more charring of 100 and 1000-hour fuels.

## 6. Project Deliverables

Activity or Deliverable	Type		Year 1 (4/22-6/23)				Year 2 (7/23-6/24)				Year 3 (7/24-3/25)				Ongoing				
	Act.	Del.	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
Establish Study sites	x					5-6	7-9	10											
Sampling	x					5-6	7-9	10											
Sample Processing	x					5-6	7-9	10											
Sample Analysis	x								1-3	4-6		11-12	1-3						
Prescribed Burning	x							10-11				10-11							
Project Update to funders/collaborators*		x						10				10							
Project Presentation to funders/collaborators*		x									7		2						
Final Presentation to funders/collaborators*		x													7				
Completed Research Assessment (CRA) Presentation to EMC*		x													7				
CRA Presentation to Board*		x													8				
Conference Presentation(s)		x														10-12	1-3		
Submission of manuscripts to peer-referenced journals		x																	6
Graduate projects(s) report submission		x											12						
<b>Key</b>	A = Fiscal Year (FY) Quarter 1 (Jul 1 - Sept. 30); B = FY Quarter 2 (Oct 1 - December 31); C = FY Quarter 3 (Jan 1 - Mar 31); D = FY Quarter 4 (Apr 1 - Jun 30) Act = Activity; Del. = Deliverable include Month in the cell, if known; identify months as numbers 1-12, Jan-Dec. * REQUIRED CATEGORIES																		

## 7. Requested Funding

COMPOSITE BUDGET: ESTIMATE FOR ENTIRE PROPOSED PROJECT PERIOD							
		04/01/2023	to	03/31/2025			
		From: 4/1/2023	7/1/2023	7/1/2024			
		To: 6/30/2023	6/30/2024	3/31/2025			
BUDGET CATEGORY		Year 1	Year 2	Year 3			TOTAL
PERSONNEL: <i>Salary and fringe benefits.</i>		\$7,736	\$41,375	\$13,561	\$0	\$0	\$62,672
TRAVEL		\$2,000	\$4,500	\$6,000	\$0	\$0	\$12,500
MATERIALS & SUPPLIES		\$850	\$2,850	\$500	\$0	\$0	\$4,200
EQUIPMENT		\$0	\$0	\$0	\$0	\$0	\$0
CONSULTANT		\$0	\$0	\$0	\$0	\$0	\$0
SUBRECIPIENT		\$0	\$0	\$0	\$0	\$0	\$0
OTHER DIRECT COSTS (ODC)							
GAEL		\$0	\$0	\$0	\$0	\$0	\$0
		\$0	\$0	\$0	\$0	\$0	\$0
		\$0	\$0	\$0	\$0	\$0	\$0
		\$0	\$0	\$0	\$0	\$0	\$0
		\$0	\$0	\$0	\$0	\$0	\$0
OTHER DIRECT COSTS (ODC) Not Subject to Indirect Costs							
Off-Campus Rent		\$0	\$0	\$0	\$0	\$0	\$0
Tuition Remission		\$0	\$0	\$0	\$0	\$0	\$0
Participant Support Costs		\$0	\$0	\$0	\$0	\$0	\$0
<b>TOTAL DIRECT COSTS</b>		<b>\$10,586</b>	<b>\$48,725</b>	<b>\$20,061</b>	<b>\$0</b>	<b>\$0</b>	<b>\$79,372</b>
Indirect (F&A) Costs							
<i>Other Sponsored Activity - Off Campus</i>	<b>F&amp;A Base</b>	\$10,586	\$48,725	\$20,061	\$0	\$0	\$79,372
MTDC		15.00%	15.00%	15.00%	15.00%	15.00%	
Indirect (F&A) Costs		\$1,588	\$7,309	\$3,009	\$0	\$0	\$11,906
<b>TOTAL ESTIMATED COSTS PER YEAR</b>		<b>\$12,174</b>	<b>\$56,034</b>	<b>\$23,070</b>			
<b>TOTAL ESTIMATED COSTS FOR PROPOSED PROJECT</b>							<b>\$91,278</b>

### Justification

Personnel: *Salary and fringe benefits* – 2 PIs, 1 grad student and 1 student tech during the summer.

Travel: Travel to field sites, 1 conference, EMC meetings

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## **Attachments**

- A. Letters of Support
  - a. Mendocino Redwood Company
  - b. CALFIRE - Jackson Demonstration State Forest
- B. Nondiscrimination Compliance Statement (STD 19)
- C. Drug-Free Workplace Certification (STD 21)
- D. Payee Data Record (STD 204)
- E. System for Award Management (SAM)



October 21, 2022

Effectiveness Monitoring Committee  
State Board of Forestry and Fire Protection  
P.O. Box 944246  
Sacramento, CA 94244-2460

Re: Effectiveness Monitoring Committee Full Project Proposal: Decay Rates and Fire Behavior of Post-Harvest Slash in Coastal Redwood Forests

Dear EMC,

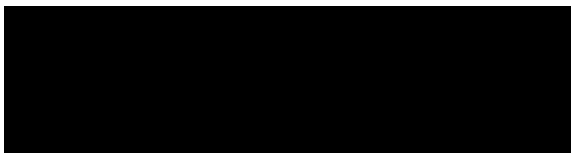
Mendocino Redwood Company writes to you today to support the above referenced project proposal by the UC Cooperative Extension for Sonoma, Napa, and Marin Counties. As an owner of 440,000 acres of forestland in California, we support research intended to inform best management practices in regards to fuel reduction and wildfire-resilient forests.

This project will evaluate slash treatments along public roads to determine their effectiveness in decreasing fire behavior. Cal Fire reports that over 90% of wildland fires are caused by humans and maps showing fire starts in Mendocino County reveal many of these occur near public roads. Mendocino Redwood Company has numerous public roads that traverse our ownership, making us a good candidate to participate in this research should UCCE choose to conduct some or all of this research on our ownership.

This research will also inform the efficacy of slash treatments conducted under timber operations in the redwood region as a whole. It may lead to additional research to look at geographic variations in the redwood region as elements such as total annual rainfall and annual temperatures could play a role in the effectiveness of these treatments adjacent to public roads.

For these reasons we support this project proposal and look forward to working with UCCE on this important research.

Sincerely,



Director, Forest Policy  
Humboldt and Mendocino Redwood Companies



**DEPARTMENT OF FORESTRY AND FIRE PROTECTION**

Jackson Demonstration State Forest

Website: [www.fire.ca.gov](http://www.fire.ca.gov)

October 28, 2022

Kristina Wolf  
Effectiveness Monitoring Committee

Dear Ms. Wolf,

Jackson Demonstration State forest strongly supports the project “**Decay Rates and Fire Behavior of Post-Harvest Slash in Coastal Redwood Forests**” and the proposal by: **UC Cooperative Extension [REDACTED]**).

Jackson Demonstration State Forest (JDSF) is a 48,652 acre working forest. On average, JDSF harvest 14.3 million board feet of conifer timber each year which results in varying amount of slash debris in project areas. The project will have immediate benefits to JDSF as it explores options of fuels treatments as part of ongoing forest management. This study will have real time benefits to developing more effective management on JDSF to help safeguard this and other productive forests.

Logging slash is problem in the coastal region of the Pacific Northwest. It constitutes a fire hazard and is costly to eliminate. The treatment by burning is also a source of concern to air pollution. Nonburning treatment of slash on timberlands is preferred options for various landowners in the region. This study will help determine if the current practice is adequate enough to decrease fire behavior.

The Principal Investigators possess both scientific and practical basis for success at JDSF. [REDACTED] is the Forestry Advisor in Mendocino, Lake and Sonoma counties. Because he works with a variety of groups and is a member of the Jackson Advisory Group, he brings insight to outreach and education as well as expertise in forest health and prescribed fire implementation. [REDACTED] is resent employee of JDSF and has extensive knowledge of the land and its management.

The project was designed with input from Jackson Demonstration State Forest to be incorporated with ongoing operations. It will provide critical outreach and education that is the core of JDSF’s mission. Forest visitors and neighbors will gain a better understanding of how slash treatment can protect forest. These benefits could not be addressed by forest staff working alone. For this reason, this proposal has the strong support from JDSF. Please feel free to contact me if you have any questions.

[REDACTED]  
Timber Sale Program Manager  
Jackson Demonstration State Forest




**DRUG-FREE WORKPLACE CERTIFICATION**

STD. 21 (Rev. 10/2019)

**CERTIFICATION**

*I, the official named below, hereby swear that I am duly authorized legally to bind the contractor or grant recipient to the certification described below. I am fully aware that this certification, executed on the date below, is made under penalty of perjury under the laws of the State of California.*

CONTRACTOR/BIDDER FIRM NAME The Regents of the University of California, Agriculture and Natural Resources		FEDERAL ID NUMBER [REDACTED] 6
BY (Authorized Signature)  [REDACTED]		DATE EXECUTED 10/20/2022
PRINTED NAME AND TITLE OF PERSON SIGNING [REDACTED], Associate Director Contracts & Grants		TELEPHONE NUMBER (Include Area Code) ( [REDACTED] ) [REDACTED]
TITLE Decay Rates and Fire Behavior of Woody Debris in Coastal Redwoods		
CONTRACTOR/BIDDER FIRM'S MAILING ADDRESS [REDACTED]		

The contractor or grant recipient named above hereby certifies compliance with Government Code Section 8355 in matters relating to providing a drug-free workplace. The above named contractor or grant recipient will:

1. Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations, as required by Government Code Section 8355(a).
2. Establish a Drug-Free Awareness Program as required by Government Code Section 8355(b), to inform employees about all of the following:
  - (a) The dangers of drug abuse in the workplace,
  - (b) The person's or organization's policy of maintaining a drug-free workplace,
  - (c) Any available counseling, rehabilitation and employee assistance programs, and
  - (d) Penalties that may be imposed upon employees for drug abuse violations.
3. Provide as required by Government Code Section 8355(c), that every employee who works on the proposed contract or grant:
  - (a) Will receive a copy of the company's drug-free workplace policy statement, and
  - (b) Will agree to abide by the terms of the company's statement as a condition of employment on the contract or grant.
4. At the election of the contractor or grantee, from and after the "Date Executed" and until \_\_\_\_\_<sup>(DATE)</sup> (NOT TO EXCEED 36 MONTHS), the state will regard this certificate as valid for all contracts or grants entered into between the contractor or grantee and this state agency without requiring the contractor or grantee to provide a new and individual certificate for each contract or grant. If the contractor or grantee elects to fill in the blank date, then the terms and conditions of this certificate shall have the same force, meaning, effect and enforceability as if a certificate were separately, specifically, and individually provided for each contract or grant between the contractor or grantee and this state agency.

**PAYEE DATA RECORD**

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)

STD 204 (Rev. 03/2021)

**Section 1 – Payee Information**

**NAME** (This is required. Do not leave this line blank. Must match the payee's federal tax return)

The Regents of the University of California, Agriculture and Natural Resources

**BUSINESS NAME, DBA NAME or DISREGARDED SINGLE MEMBER LLC NAME** (If different from above)

**MAILING ADDRESS** (number, street, apt. or suite no.) (See instructions on Page 2)

**CITY, STATE, ZIP CODE**

**E-MAIL ADDRESS**

**Section 2 – Entity Type**

**Check one (1) box only that matches the entity type of the Payee listed in Section 1 above.** (See instructions on page 2)

**SOLE PROPRIETOR / INDIVIDUAL**

**SINGLE MEMBER LLC** *Disregarded Entity owned by an individual*

**PARTNERSHIP**

**ESTATE OR TRUST**

**CORPORATION** (see instructions on page 2)

**MEDICAL** (e.g., dentistry, chiropractic, etc.)

**LEGAL** (e.g., attorney services)

**EXEMPT** (e.g., nonprofit)

**ALL OTHERS**

**Section 3 – Tax Identification Number**

Enter your Tax Identification Number (TIN) in the appropriate box. The TIN must match the name given in Section 1 of this form. Do not provide more than one (1) TIN. The TIN is a 9-digit number. **Note:** Payment will not be processed without a TIN.

- For **Individuals**, enter SSN.
- If you are a **Resident Alien**, and you do not have and are not eligible to get an SSN, enter your ITIN.
- Grantor Trusts (such as a Revocable Living Trust while the grantors are alive) may not have a separate FEIN. Those trusts must enter the individual grantor's SSN.
- For **Sole Proprietor or Single Member LLC (disregarded entity)**, in which the sole member is an individual, enter SSN (ITIN if applicable) or FEIN (FTB prefers SSN).
- For **Single Member LLC (disregarded entity)**, in which the sole member is a business entity, enter the owner entity's FEIN. Do not use the disregarded entity's FEIN.
- For all other entities including LLC that is taxed as a corporation or partnership, estates/trusts (with FEINs), enter the entity's FEIN.

**Social Security Number (SSN) or Individual Tax Identification Number (ITIN)**

OR

**Federal Employer Identification Number (FEIN)**

**Section 4 – Payee Residency Status** (See instructions)

**CALIFORNIA RESIDENT** – Qualified to do business in California or maintains a permanent place of business in California.

**CALIFORNIA NONRESIDENT** – Payments to nonresidents for services may be subject to state income tax withholding.

No services performed in California

Copy of Franchise Tax Board waiver of state withholding is attached.

**Section 5 – Certification**

*I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the state agency below.*

**NAME OF AUTHORIZED PAYEE REPRESENTATIVE**

**TITLE**

**E-MAIL ADDRESS**

Associate Director

kdlamar@ucanr.edu

**SIGNATURE**

**DATE**

**TELEPHONE** (include area code)

10/20/2022

**Section 6 – Paying State Agency**

Please return completed form to:

**STATE AGENCY/DEPARTMENT OFFICE**

**UNIT/SECTION**

**MAILING ADDRESS**

**FAX**

**TELEPHONE** (include area code)

**CITY**

**STATE**

**ZIP CODE**

**E-MAIL ADDRESS**

**PAYEE DATA RECORD**

(Required when receiving payment from the State of California in lieu of IRS W-9 or W-7)

STD 204 (Rev. 03/2021)

**GENERAL INSTRUCTIONS**

Type or print the information on the Payee Data Record, STD 204 form. Sign, date, and return to the state agency/department office address shown in Section 6. Prompt return of this fully completed form will prevent delays when processing payments.

Information provided in this form will be used by California state agencies/departments to prepare Information Returns (Form 1099).

**NOTE:** Completion of this form is optional for Government entities, i.e. federal, state, local, and special districts.

A completed Payee Data Record, STD 204 form, is required for all payees (non-governmental entities or individuals) entering into a transaction that may lead to a payment from the state. Each state agency requires a completed, signed, and dated STD 204 on file; therefore, it is possible for you to receive this form from multiple state agencies with which you do business.

Payees who do not wish to complete the STD 204 may elect not to do business with the state. If the payee does not complete the STD 204 and the required payee data is not otherwise provided, payment may be reduced for federal and state backup withholding. Amounts reported on Information Returns (Form 1099) are in accordance with the Internal Revenue Code (IRC) and the California Revenue and Taxation Code (R&TC).

**Section 1 – Payee Information**

**Name** – Enter the name that appears on the payee's federal tax return. The name provided shall be the tax liable party and is subject to IRS TIN matching (when applicable).

- Sole Proprietor/Individual/Revocable Trusts – enter the name shown on your federal tax return.
- Single Member Limited Liability Companies (LLCs) that is disregarded as an entity separate from its owner for federal tax purposes - enter the name of the individual or business entity that is tax liable for the business in section 1. Enter the DBA, LLC name, trade, or fictitious name under Business Name.
- Note: for the State of California tax purposes, a Single Member LLC is not disregarded from its owner, even if they may be disregarded at the Federal level.
- Partnerships, Estates/Trusts, or Corporations – enter the entity name as shown on the entity's federal tax return. The name provided in Section 1 must match to the TIN provided in section 3. Enter any DBA, trade, or fictitious business names under Business Name.

**Business Name** – Enter the business name, DBA name, trade or fictitious name, or disregarded LLC name.

**Mailing Address** – The mailing address is the address where the payee will receive information returns. Use form STD 205, Payee Data Record Supplement to provide a remittance address if different from the mailing address for information returns, or make subsequent changes to the remittance address.

**Section 2 – Entity Type**

If the Payee in Section 1 is a(n)...	THEN Select the Box for...
Individual • Sole Proprietorship • Grantor (Revocable Living) Trust disregarded for federal tax purposes	Sole Proprietor/Individual
Limited Liability Company (LLC) owned by an individual and is disregarded for federal tax purposes	Single Member LLC-owned by an individual
Partnerships • Limited Liability Partnerships (LLP) • and, LLC treated as a Partnership	Partnerships
Estate • Trust (other than disregarded Grantor Trust)	Estate or Trust
Corporation that is medical in nature (e.g., medical and healthcare services, physician care, nursery care, dentistry, etc.) • LLC that is to be taxed like a Corporation and is medical in nature	Corporation-Medical
Corporation that is legal in nature (e.g., services of attorneys, arbitrators, notary publics involving legal or law related matters, etc.) • LLC that is to be taxed like a Corporation and is legal in nature	Corporation-Legal
Corporation that qualifies for an Exempt status, including 501(c) 3 and domestic non-profit corporations.	Corporation-Exempt
Corporation that does not meet the qualifications of any of the other corporation types listed above • LLC that is to be taxed as a Corporation and does not meet any of the other corporation types listed above	Corporation-All Other

**Section 3 – Tax Identification Number**

The State of California requires that all parties entering into business transactions that may lead to payment(s) from the state provide their Taxpayer Identification Number (TIN). The TIN is required by R&TC sections 18646 and 18661 to facilitate tax compliance enforcement activities and preparation of Form 1099 and other information returns as required by the IRC section 6109(a) and R&TC section 18662 and its regulations.

**Section 4 – Payee Residency Status**

**Are you a California resident or nonresident?**

- A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.
- A partnership is considered a resident partnership if it has a permanent place of business in California.
- An estate is a resident if the decedent was a California resident at time of death.
- A trust is a resident if at least one trustee is a California resident.
  - For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.

For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below:

Withholding Services and Compliance Section: 1-888-792-4900

E-mail address: [wscs.gen@ftb.ca.gov](mailto:wscs.gen@ftb.ca.gov)

For hearing impaired with TDD, call: 1-800-822-6268

Website: [www.ftb.ca.gov](http://www.ftb.ca.gov)

**Section 5 – Certification**

Provide the name, title, email address, signature, and telephone number of individual completing this form and date completed. In the event that a SSN or ITIN is provided, the individual identified as the tax liable party must certify the form. Note: the signee may differ from the tax liable party in this situation if the signee can provide a power of attorney documented for the individual.

**Section 6 – Paying State Agency**

This section must be completed by the state agency/department requesting the STD 204.

**Privacy Statement**

Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, state, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it. It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and state law imposes noncompliance penalties of up to \$20,000. You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the state agency(ies) with which you transact that business.

All questions should be referred to the requesting state agency listed on the bottom front of this form.



# REGENTS OF THE UNIVERSITY OF CALIFORNIA, THE

Unique Entity ID [REDACTED]	CAGE / NCAGE [REDACTED]	Purpose of Registration <b>All Awards</b>
Registration Status <b>Active Registration</b>	Expiration Date <b>Dec 9, 2022</b>	
Physical Address [REDACTED] [REDACTED] [REDACTED]	Mailing Address [REDACTED] [REDACTED] [REDACTED]	

## Business Information

Doing Business as <b>Division of Agriculture &amp; Natural Resources</b>	Division Name <b>Division Of Agriculture And Natural Resources</b>	Division Number <b>(blank)</b>
Congressional District <b>California 13</b>	State / Country of Incorporation <b>(blank) / (blank)</b>	URL <b>http://ucanr.org/index.shtml</b>

## Registration Dates

Activation Date <b>Jul 23, 2021</b>	Submission Date <b>Jul 21, 2021</b>	Initial Registration Date <b>Jun 16, 2005</b>
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## Entity Dates

Entity Start Date <b>Jun 12, 1868</b>	Fiscal Year End Close Date <b>Jun 30</b>
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## Immediate Owner

CAGE <b>(blank)</b>	Legal Business Name <b>(blank)</b>
------------------------	---------------------------------------

## Highest Level Owner

CAGE <b>(blank)</b>	Legal Business Name <b>(blank)</b>
------------------------	---------------------------------------

## Executive Compensation

Registrants in the System for Award Management (SAM) respond to the Executive Compensation questions in accordance with Section 6202 of P.L. 110-252, amending the Federal Funding Accountability and Transparency Act (P.L. 109-282). This information is not displayed in SAM. It is sent to USAspending.gov for display in association with an eligible award. Maintaining an active registration in SAM demonstrates the registrant responded to the questions.

## Proceedings Questions

Registrants in the System for Award Management (SAM) respond to proceedings questions in accordance with FAR 52.209-7, FAR 52.209-9, or 2.C.F.R. 200 Appendix XII. Their responses are not displayed in SAM. They are sent to FAPIIS.gov for display as applicable. Maintaining an active registration in SAM demonstrates the registrant responded to the proceedings questions.

## Exclusion Summary

Active Exclusions Records?

**No**

## SAM Search Authorization

I authorize my entity's non-sensitive information to be displayed in SAM public search results:

**Yes**

## Entity Types

### Business Types

Entity Structure <b>U.S. Government Entity</b>	Entity Type <b>US State Government</b>	Organization Factors <b>(blank)</b>
Profit Structure <b>(blank)</b>		

**Socio-Economic Types**

Check the registrant's Reps & Certs, if present, under FAR 52.212-3 or FAR 52.219-1 to determine if the entity is an SBA-certified HUBZone small business concern. Additional small business information may be found in the SBA's Dynamic Small Business Search if the entity completed the SBA supplemental pages during registration.

**Government Types**

U.S. State Government

**Other Entity Qualifiers**

1862 Land Grant College  
Educational Institution

**Financial Information**

Accepts Credit Card Payments  
**No**

Debt Subject To Offset  
**No**

EFT Indicator  
**0000**

CAGE Code  
[REDACTED]

**Points of Contact**

**Electronic Business**

☒  
[REDACTED]

Uc Division Of Agriculture And Natural Resources

[REDACTED]  
[REDACTED]

United States

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
United States

**Government Business**

☒  
[REDACTED]

Uc Division Of Agriculture And Natural Resources

[REDACTED]  
[REDACTED]

United States

[REDACTED]

Uc Division Of Agriculture And Natural Resources  
[REDACTED]  
[REDACTED]  
United States

**Service Classifications**

**NAICS Codes**

Primary NAICS Codes  
**Yes** [REDACTED]

NAICS Title  
**Colleges, Universities, And Professional Schools**

**Disaster Response**

This entity does not appear in the disaster response registry.