featherriver.org

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	Cal Poly - SLO
Name of Primary Contact	Christopher Surfleet
Name of Secondary Contact	Jay Francis
Mailing Address	NRES Dept., One Grand Ave., Cal Poly, San Luis Obispo, CA 93407
E-mail	csurflee@calpoly.edu
Phone	62743
Other Cooperating Agencies / Organizations / Stakeholders	Collins Almanor Forest
Is your agency/organization committed to the project through completion? If not, please explain	yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-1: Marian Meadow
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ■ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	To date there are few studies which quantify the hydrologic response of meadow restoration due to vegetation or conifer removal. Quantifying the response of meadow restoration assists forest, range, and agricultural land managers determine the effect of their investment in meadow restoration. This study is using a before after control intervention (BACI) study design to study the hydrologic change conifer removal from a historic meadow (Marian Meadow). We hypothesize that the conifer removal will create soil hydric characteristics which will promote a wet meadow system. We have instrumented two sites 1) a restored meadow and 2) our historic meadow with soil moisture sensors, shallow groundwater wells, and a surface

	water level recorder. We have been measuring soil moisture, groundwater levels, and soil hydric characteristics for two years prior to meadow restoration and currently have funding for study one year following meadow restoration. This application is requesting funding to increase the length of study by two years. A longer duration will provide greater certainty in before and after and control and treatment site comparisons of the hydrologic response of the conifer removal. The longer duration ensures that if we get 1 bad winter post restoration our study design will not be lost, we will have additional years to ensure completion and appropriate comparisons.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	Marian Meadow is located within the Upper Feather River Watershed (UFRW). Marian Meadow is approximately 5 miles west on highway 36 from Chester, CA. The control meadow used for study purposes is located approximately 4 miles directly west from Marian Meadow.
Latitude:	40.262406
Longitude:	-121.313083

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	■ Yes ☐ N/A	The removal of conifers encroached on historic meadows is hypothesized to restore hydrologic conditions conducive to maintaining meadow habitat.	45 acres of historic meadow has been restored in this study.
Reduce potential for catastrophic wildland fires in the Region.	■ Yes ☐ N/A	The interruption of continuous conifers will help to create a fuel break.	
Build communication and collaboration among water	■ Yes	The results of the research on meadow restoration will be	

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
resources stakeholders in the Region.	☐ N/A	shared by presentations with local watershed groups, The Upper Feather River IRWM, and the monitoring study group of the Ca. Dept. of Forestry. We anticipate 3-4 scientific journal articles will be published from the study.	
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☐ Yes ■ N/A		
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☐ Yes ■ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ■ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ■ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	■ Yes ☐ N/A	This project will quantify the effect restoring a historic meadow and thinning the upland forest around the meadow has on the ground and surface water in the restored meadow.	
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ■ N/A		
Coordinate management of recharge areas and protect groundwater resources.	■ Yes ☐ N/A	Meadows are identified as important storage areas of Sierra Nevada precipitation and water. This study is attempting to	

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		quantify this change in hydrology due to restoring the meadow and thinning the upslope forest.	
Improve coordination of land use and water resources planning.	☐ Yes ■ N/A		
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ■ N/A		
Effectively address climate change adaptation and/or mitigation in water resources management.	■ Yes ☐ N/A	We hypothesize that restoration of meadows encroached by conifers and thinning of the forest surrounding the meadows will create greater resiliency in maintenance of meadow habitat in a changing climate. Actively managing forests for increased water yield to maintain meadow habitat in the Sierra Nevada might be required with changing precipitation predicted due to climate change.	
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ■ N/A		
Enhance public awareness and understanding of water management issues and needs.	■ Yes ☐ N/A	Results from the study will be shared in public forums through presentations and published scientific articles.	
Address economic challenges of agricultural producers.	☐ Yes ■ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☐ Yes ■ N/A		

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	■ N/A	
b. Disadvantaged Communities[1]	☐ N/A	The people who conduct the work on these types of projects typically live in the communities of Chester, Westwood or Greenville. All three of these towns have been designated as Disadvantaged Communities.
c. Environmental Justice[2]	■ N/A	
d. Drought Preparedness	■ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐	Restoring hydrologic functions of meadows will create greater resiliency in maintenance of meadow habitat in a changing climate. We hypothesize that the result will demonstrate improved hydrologic conditions conducive to maintaining meadow habitat. This type of active management will likely be required in a changing climate.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	These multiproduct harvests have been calculated to have net reduction in greenhouse gasses by sequestering carbon in long-term form of solid wood products and using the sub-merchantable material to generate electricity thereby reducing the need for fossil fuels.
g. Other expected impacts or benefits that are not already mentioned elsewhere		Scientific evidence of benefits of removing encroached conifers and thinning upland forests toward maintaining meadow ecosystems and hydrologic functions.

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .
[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.
[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ■ N/A	g. Drinking water treatment and distribution	☐ Yes ■ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ■ N/A	h. Watershed protection and management	■ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	■ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ■ N/A
d. Non-point source pollution reduction, management and monitoring	■ Yes ☐ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ■ N/A
e. Groundwater recharge and management projects	■ Yes ☐ N/A	k. Ecosystem and fisheries restoration and protection	■ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ■ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ■ No	
Urban water use efficiency	☐ Yes ■ No	
Improve Flood Management		
Flood management	☐ Yes ■ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ■ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
System reoperation	☐ Yes ■ No	
Water transfers	☐ Yes ■ No	
Increase Water Supply		
Conjunctive management	☐ Yes ■ No	
Precipitation Enhancement	☐ Yes ■ No	
Municipal recycled water	☐ Yes ■ No	
Surface storage – regional/local	■ Yes ☐ No	Restoring meadow hydrology slows the timing of water delivery dissipating surface water peakflows (downstream flooding). It further increases the volume of sub-surface/groundwater decreasing sediment and naturally filtering water for improved water quality.
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ■ No	
Groundwater remediation/aquifer remediation	■ Yes ☐ No	Restoring meadow conditions and hydrology allows more precipitation to enter the ground water supply and less evapotranspiration of this water.
Matching water quality to water use	☐ Yes ■ No	
Pollution prevention	☐ Yes ■ No	
Salt and salinity management	☐ Yes ■ No	
Urban storm water runoff management	☐ Yes ■ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ■ No	
Ecosystem restoration	■ Yes ☐ No	Meadow habitat has decreased in the Sierra Nevada over the last century. Climate change, fire suppression, and minimal forest management of Federal forest lands make managing meadow ecosystems in the Sierra Nevada imperative to ensure this ecosystem does not disappear.
Forest management	■ Yes ☐ No	Managing forests for improvements in water yield has been a focus of research for many decades. With predicted changes in hydrology due to climate change managing forests to improve hydrologic processes will become extremely important. Managing forests to improve meadow hydrology is one aspect of managing forests for future ecosystem values.
Land use planning and management	■ Yes ☐ No	
Recharge area protection	☐ Yes ■ No	
Sediment management	☐ Yes ■ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Watershed management	■ Yes ☐ No	Meadows and wetlands are important features within watersheds. They store water altering timing of runoff, create areas of low flow surface water, and seasonal ponding useful for wildlife habitat. Understanding how the interactions of land/forest management can improve meadow habitat will be useful information to assist in decisions of how to best reconcile human interactions with their watersheds.
People and Water		
Economic incentives	☐ Yes ■ No	
Outreach and engagement	☐ Yes ■ No	
Water and culture	■ Yes ☐ No	The dissemination of the research on forest management improvements to meadow habitat hopefully will help to demonstrate to people the importance of managing Sierra Nevada forest toward not only economic but also environmental goals.
Water-dependent recreation	■ Yes ☐ No	This project area drains to Butt Lake, an important water-dependent recreation site in the Feather River watershed. Increased water yields will help promote & sustain recreation.
Wastewater/NPDES	☐ Yes ■ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☐ Yes ■ No
Funding Match Waiver request?: ☐ Yes ■ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**				
b.	**Land Purchase/Easement**				
c.	**Planning/Design/Engineering / Environmental**				
d.	**Construction/Implementation**				
e.	**Environmental Compliance/ Mitigation/Enhancement**				
f.	**Construction Administration**				
g.	**Other Costs (labor and supplies for restach)**	55,000	45,000	45,000	145,000
h.	**Construction/Implementation Contingency**				
i.	**Grand Total (Sum rows (a) through (h) for each column)**	***55,000***	***45,000***	***45,000***	***145,000***

j.	**Can the Project be phased? ☐ Yes ■ No** If **yes**, provide cost breakdown by phases			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1			
	Phase 2			
	Phase 3			
	Phase 4			

k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**	
l.	**Has a Cost/Benefit analysis been completed?**	☐ **Yes** ■ **No**
m.	**Describe what impact there may be if the project is not funded (300 words or less)**	Currently the research has funding to study 1 year following meadow restoration and 1 additional year following the meadow restoration with upland forest thinning included. We are seeking funds to increase the study for 2 additional years to ensure that we are getting a longer and accurate result on the restoration effects. Without the additional funds the

		uncertainty in our current study results will be large. One very wet or very dry winter could reduce our ability to interpret the meadow restoration results. For the research to be effective a longer study duration is needed, the current funding for the study only funds projects for set durations requiring additional support to complete the restoration study.

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☐ Yes ■ No ☐ N/A	We have been evaluating research results as we collect them, but final evaluation will completed once all field measurements are completed.	06/16	06/18
b. Final Design	☐	☐ Yes ☐ No ■ N/A			
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☐ No ■ N/A			
d. Permitting	☐	☐ Yes ☐ No ■ N/A			
e. Construction Contracting	☐	☐ Yes ☐ No ■ N/A			
f. Construction Implementation	☐	☐ Yes ☐ No ■ N/A			
Provide explanation if more than one project stage is checked as current status					

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	The improvement of meadow habitat is important for a variety of regulatory concerns. Meadow habitat assists in maintenance of water quality, regulated by the Clean Water Act and, in California, the Porter Cologne Act. Meadows are habitat for many endangered and threatened species, regulated by the Endangered Species Act. Timing of peak flows and water storage within watersheds fall under the jurisdiction of many state and federal agencies, including Army Corp of Engineers, California Dept. of Water Resources, and Bureau of Reclamation.
b. List technical reports and studies supporting the feasibility of this project.	There are many studies documenting the decline of meadow habitat in the Sierra Nevada and research methods that support this work. The list below is just a couple of resources, more can be provided. Aylward, B. and A. Merrill. 2012. An economical analysis of Sierra meadow restoration. A report for Environmental Defense Fund under the National Fish and Wildlife Foundations Sierra Meadows Initiative. Access online December 16, 2013 at: http://www.fs.fed.us/r5/hfqlg/monitoring/resource_reports/socioeconomics/Economic%20Analysis%20of%20Meadow%20Restoration%202012.pdf California Department of Fish and Game (CDFG). 2012. Aspen restoration. Accessed on internet Dec. 2012 at: https://r1.dfg.ca.gov/portal/ConservationPermitting/Timber/Wildlife/WildlifeHabitats/AspenRestoration/tabid/924/Default.aspx Ratliff, Raymond D. 1985. Meadows in the Sierra Nevada of California: state of knowledge. Pacific Southwest Forest and Range Experiment Station, U.S. Department of Agriculture Forest Service, Berkeley, CA. Gen. Tech. Rep. PSW-84. 52 p. University of California at Davis (UC Davis), Natural Heritage Institute, US Forest Service, and Department of Fish and Game. 2007. Final Report Sierra Meadows: Historical Impact, Current Status and Trends, and Data Gaps. Final Report of USEPA Contract CD96911501 June 19, 2007. Accessed on internet Dec. 2012 at: http://watershed.ucdavis.edu/pdf/SierraMeadows-2007.pdf
c. Concisely describe the scientific basis (e.g. how much research has	Meadows create a number of important hydrologic functions in watersheds. Meadows can: 1) dissipate stream energy from high flows, reducing erosion and improving water quality; 2) filter sediment and capture bedload, aiding floodplain development; 3) enhance floodwater retention and groundwater recharge; and 4) support root masses that stabilize streambanks against cutting action (UC Davis et

been conducted) **of the proposed project in 300 words or less.**	al, 2007). Stable, well vegetated streams with functioning meadows, aquifers and uplands are critical to reducing erosion and modifying potentially destructive runoff patterns (UC Davis et al., 2007). The recognition of the importance of meadows in the ecology of the Sierra Nevada Mountains and the deterioration of meadow distribution, size, and quality has prompted restoration efforts and changes to land management policies. Restoration efforts have focused on restoring degraded stream channels by altering the grade of the watercourse and on removing encroaching forest vegetation and restoring the hydrologic processes which promote and maintain meadow habitat. There has been quantification of the hydrologic benefits of meadow restoration by grading stream channels, but little quantification on removal of conifer encroachment. The funds requested in this proposal are to characterize and measure the hydrologic response of shallow groundwater and soil water due to meadow restoration by encroaching conifer removal. Both private forest and agricultural landowners have spent considerable resources to restore meadow habitat on their lands. Providing better understanding of the hydrologic response to meadow restoration will attempt to quantify the benefits the meadow restoration and mitigation efforts have produced. University of California at Davis (UC Davis), Natural Heritage Institute, US Forest Service, and Department of Fish and Game. 2007. Final Report Sierra Meadows: Historical Impact, Current Status and Trends, and Data Gaps. Final Report of USEPA Contract CD96911501 June 19, 2007. Accessed on internet Dec. 2012 at: http://watershed.ucdavis.edu/pdf/SierraMeadows-2007.pdf
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ Yes ☐ No ■ N/A If yes, please describe.
e. Are you an Urban Water Supplier[1]?	☐ Yes ■ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ■ No ☐ N/A
g. Is the project related to groundwater?	■ Yes ☐ No ☐ N/A If yes, please indicate which groundwater basin. Upper Feather River Watershed

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-1: Marian Meadow

Project applicant: Collins Pine Company

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☒ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

☐ Not applicable
☒ Increasing catastrophic wildfires
☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
☐ Water treatment facility operations
☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

☐ Not applicable
☐ Aging critical flood protection
☒ Wildfires
☐ Critical infrastructure in a floodplain

☐ Insufficient flood control facilities

More resilient through less risk of "fire, flood, and mud" effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

☐ Not applicable
☐ Climate-sensitive fauna or flora
☐ Recreation and economic activity
☐ Quantified environmental flow requirements
☒ Erosion and sedimentation
☐ Endangered or threatened species
☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

☒ Not applicable
☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

Upper Feather River IRWMP

Project Assessment - GHG Emissions Analysis

UF-1: Marian Meadow

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Excavators	2	10	9
Rubber Tired Dozers	1	10	10
Excavators	1	10	4
Other Construction Equipment	1	10	1
			0
			0
			0
			0
			0
			0
		Total Emissions	**24**

[ ] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
		0

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-1: Marian Meadow

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
45	**-284**

*A negative value indicates GHG reductions

☒ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
45	**-195**

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	24 $MTCO_2e$
In a given year, operation of the project will result in:	-478 $MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	Collins Pine Company
Name of Primary Contact	Jay Francis
Name of Secondary Contact	Eric O'Kelley
Mailing Address	PO Box 796 Chester CA 96020
E-mail	JFrancis@collinsco.com
Phone	(530) 258-4401
Other Cooperating Agencies / Organizations / Stakeholders	Cal Poly - SLO
Is your agency/organization committed to the project through completion? If not, please explain	Yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-2: Rock Creek Meadow Restoration
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	To date there are few studies which quantify the hydrologic response of meadow restoration due to vegetation or conifer removal. Quantifying the response of meadow restoration assists forest, range, and agricultural land managers determine the effect of their investment in meadow restoration. This study will use a before/after control intervention (BACI) study design to study the hydrologic change conifer removal from a historic meadow (Rock Creek Meadow). We hypothesize that the conifer removal will create soil hydric characteristics which will promote a wet meadow system. We will instrument two sites 1) a restored meadow and 2) our historic meadow with soil moisture sensors, shallow groundwater wells, and a surface water level recorder. We will be measuring soil moisture, groundwater levels, and soil hydric characteristics for two years prior to meadow restoration and two years following meadow restoration.

Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	Rock Creek Meadow is located within the Upper Feather River Watershed (UFRW). It is approximately 7 miles east on Highway 36 from Chester, CA.
Latitude:	40 19.840
Longitude:	-121 5.252

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	The removal of conifers encroached on historic meadows is hypothesized to restore hydrologic conditions conducive to maintaining meadow habitat.	75 acres
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	The interruption of continuous conifers will help to create a fuel break.	
Build communication and collaboration among water resources stakeholders in the Region.	☒ Yes ☐ N/A	The results of the research on meadow restoration will be shared by presentations with local watershed groups, The Upper Feather River IRWM, and the monitoring study group of the Ca. Dept. of Forestry. We anticipate 3-4 scientific journal articles will be published from the study.	
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and	☐ Yes ☒ N/A		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
environmental benefits to the Region.			
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☐ Yes ☒ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	This project will quantify the effect restoring a historic meadow and thinning the upland forest around the meadow has on the ground and surface water in the restored meadow.	
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☒ N/A		
Coordinate management of recharge areas and protect groundwater resources.	☒ Yes ☐ N/A	Meadows are identified as important storage areas of Sierra Nevada precipitation and water. This study is attempting to quantify this change in hydrology due to restoring the meadow and thinning the upslope forest.	
Improve coordination of land use and water resources planning.	☒ Yes ☐ N/A	Prior to the conifer removal, it is somewhat difficult to delineate the boundaries of the actual historical meadow.	
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate change adaptation and/or mitigation in water resources	☒ Yes ☐ N/A	We hypothesize that restoration of meadows encroached by conifers and	

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
management.		thinning of the forest surrounding the meadows will create greater resiliency in maintenance of meadow habitat in a changing climate. Actively managing forests for increased water yield to maintain meadow habitat in the Sierra Nevada might be required with changing precipitation predicted due to climate change.	
Improve efficiency and reliability of water supply and other water-related infrastructure.	☒ Yes ☐ N/A	The water drafting site on Rock Creek at Hwy 36 is an important source of water for dust abatement for projects in the area. Increased water flows will allow this site to be used later into the season.	
Enhance public awareness and understanding of water management issues and needs.	☒ Yes ☐ N/A	Results from the study will be shared in public forums through presentations and published scientific articles.	
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☐ Yes ☒ N/A		

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☒ N/A	
b. Disadvantaged Communities[1]	☐ N/A	The people who conduct the work on these types of projects typically live in the communities of Chester, Westwood or Greenville. All three of these towns have been designated as Disadvantaged Communities.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☒ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	Restoring hydrologic functions of meadows will create greater resiliency in maintenance of meadow habitat in a changing climate. We hypothesize that the result will demonstrate improved hydrologic conditions conducive to maintaining meadow habitat. This type of active management will likely be required in a changing climate.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	These multiproduct harvests have been calculated to have net reduction in greenhouse gasses by sequestering carbon in long-term form of solid wood products and using the sub-merchantable material to generate electricity thereby reducing the need for fossil fuels.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☐ N/A	Scientific evidence of benefits of removing encroached conifers and thinning upland forests toward maintaining meadow ecosystems and hydrologic functions.

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .

[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions

(e.g. water supply, flooding, sanitation) in an area of racial minorities.
[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☒ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☒ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☒ Yes ☐ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A
e. Groundwater recharge and management projects	☒ Yes ☐ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ☒ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Surface storage – regional/local	☒ Yes ☐ No	Restoring meadow hydrology slows the timing of water delivery dissipating surface water peakflows (downstream flooding). It further increases the volume of sub-surface/groundwater decreasing sediment and naturally filtering water for improved water quality.
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ☒ No	
Groundwater remediation/aquifer remediation	☒ Yes ☐ No	Restoring meadow conditions and hydrology allows more precipitation to enter the ground water supply and less evapotranspiration of this water.
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☐ Yes ☒ No	
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Meadow habitat has decreased in the Sierra Nevada over the last century. Climate change, fire suppression, and minimal forest management of Federal forest lands make managing meadow ecosystems in the Sierra Nevada imperative to ensure this ecosystem does not disappear.
Forest management	☒ Yes ☐ No	Managing forests for improvements in water yield has been a focus of research for many decades. With predicted changes in hydrology due to climate change managing forests to improve hydrologic processes will become extremely important. Managing forests to improve meadow hydrology is one aspect of managing forests for future ecosystem values.
Land use planning and management	☐ Yes ☒ No	
Recharge area protection	☒ Yes ☐ No	Improving forest conditions through management to improve hydrologic processes will help protect recharge areas and processes.

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Sediment management	☒ Yes ☐ No	Improved meadow ecosystems and water yield will help manage sediments
Watershed management	☒ Yes ☐ No	Meadows and wetlands are important features within watersheds. They store water altering timing of runoff, create areas of low flow surface water, and seasonal ponding useful for wildlife habitat. Understanding how the interactions of land/forest management can improve meadow habitat will be useful information to assist in decisions of how to best reconcile human interactions with their watersheds.
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☒ Yes ☐ No	We plan to continue to host public and agency tours to educate the public and resource professionals of the benefits of meadow restoration projects.
Water and culture	☒ Yes ☐ No	The dissemination of the research on forest management improvements to meadow habitat hopefully will help to demonstrate to people the importance of managing Sierra Nevada forest toward not only economic but also environmental goals.
Water-dependent recreation	☒ Yes ☐ No	This project area drains to Lake Almanor, an important water-dependent recreation site in the Feather River watershed. Increased water yields will help promote & sustain recreation.
Wastewater/NPDES	☐ Yes ☒ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☒ Yes ☐ No
Funding Match Waiver request?: ☐ Yes ☒ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**	$10,000	$10,000		$20,000
b.	**Land Purchase/Easement**				
c.	**Planning/Design/Engineering / Environmental**	$15,000	$15,000		$30,000
d.	**Construction/Implementation**				
e.	**Environmental Compliance/ Mitigation/Enhancement**				
f.	**Construction Administration**	$15,000	$15,000		$30,000
g.	**Other Costs**				
h.	**Construction/Implementation Contingency**	$140,000			$140,000
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$180,000	$40,000		$220,000

j.	**Can the Project be phased?** ☒ Yes ☐ No If **yes**, provide cost breakdown by phases			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1	$50,000	$12,000	2 years of pre-treatment study and recording baseline data
	Phase 2	$50,000	$6,000	Actual conifer removal of meadow area
	Phase 3	$50,000	$12,000	2 years of post-treatment study and recording data
	Phase 4			

k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**	Post-harvest and post-study costs should be minimal. Collins Pine Company will continue to monitor and record changes to the project area via photo monitoring points at their own expense.
l.	**Has a Cost/Benefit analysis been completed?**	☐ Yes ☒ No
m.	**Describe what impact there may be if the project is not funded (300 words or less)**	The project will probably not be implemented. It has been determined to be cost-ineffective for the past 5 years since the biomass powerplant in Westwood shut down.

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☒	☐ Yes ☒ No ☐ N/A	The Rock Creek area has been surveyed to determine the feasibility of placing a meadow enhancement project.	04/15	07/15
b. Final Design	☐	☐ Yes ☒ No ☐ N/A		09/15	12/15
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☒ No ☐ N/A		10/15	04/16
d. Permitting	☐	☐ Yes ☒ No ☐ N/A		04/16	06/16
e. Construction Contracting	☐	☐ Yes ☒ No ☐ N/A		06/16	07/16
f. Construction Implementation	☐	☐ Yes ☒ No ☐ N/A		07/16	10/16
Provide explanation if more than one project stage is checked as current status					

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	The improvement of meadow habitat is important for a variety of regulatory concerns. Meadow habitat assists in maintenance of water quality, regulated by the Clean Water Act and, in California, the Porter Cologne Act. Meadows are habitat for many endangered and threatened species, regulated by the Endangered Species Act. Timing of peak flows and water storage within watersheds fall under the jurisdiction of many state and federal agencies, including Army Corp of Engineers, California Dept. of Water Resources, and Bureau of Reclamation.
b. List technical reports and studies supporting the feasibility of this project.	There are many studies documenting the decline of meadow habitat in the Sierra Nevada and research methods that support this work. The list below is just a couple of resources, more can be provided. Aylward, B. and A. Merrill. 2012. An economical analysis of Sierra meadow restoration. A report for Environmental Defense Fund under the National Fish and Wildlife Foundations Sierra Meadows Initiative. Access online December 16, 2013 at: http://www.fs.fed.us/r5/hfqlg/monitoring/resource_reports/socioeconomics/Economic%20Analysis%20of%20Meadow%20Restoration%202012.pdf California Department of Fish and Game (CDFG). 2012. Aspen restoration. Accessed on internet Dec. 2012 at: https://r1.dfg.ca.gov/portal/ConservationPermitting/Timber/Wildlife/WildlifeHabitats/AspenRestoration/tabid/924/Default.aspx Ratliff, Raymond D. 1985. Meadows in the Sierra Nevada of California: state of knowledge. Pacific Southwest Forest and Range Experiment Station, U.S. Department of Agriculture Forest Service, Berkeley, CA. Gen. Tech. Rep. PSW-84. 52 p. University of California at Davis (UC Davis), Natural Heritage Institute, US Forest Service, and Department of Fish and Game. 2007. Final Report Sierra Meadows: Historical Impact, Current Status and Trends, and Data Gaps. Final Report of USEPA Contract CD96911501 June 19, 2007. Accessed on internet Dec. 2012 at: http://watershed.ucdavis.edu/pdf/SierraMeadows-2007.pdf
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the**	Meadows create a number of important hydrologic functions in watersheds. Meadows can: 1) dissipate stream energy from high flows, reducing erosion and improving water quality; 2) filter sediment and capture bedload, aiding floodplain development; 3) enhance floodwater retention and groundwater recharge; and 4) support root masses that stabilize streambanks against cutting action

proposed project in 300 words or less.	(UC Davis et al, 2007). Stable, well vegetated streams with functioning meadows, aquifers and uplands are critical to reducing erosion and modifying potentially destructive runoff patterns (UC Davis et al., 2007). The recognition of the importance of meadows in the ecology of the Sierra Nevada Mountains and the deterioration of meadow distribution, size, and quality has prompted restoration efforts and changes to land management policies. Restoration efforts have focused on restoring degraded stream channels by altering the grade of the watercourse and on removing encroaching forest vegetation and restoring the hydrologic processes which promote and maintain meadow habitat. There has been quantification of the hydrologic benefits of meadow restoration by grading stream channels, but little quantification on removal of conifer encroachment. The funds requested in this proposal are to characterize and measure the hydrologic response of shallow groundwater and soil water due to meadow restoration by encroaching conifer removal. Both private forest and agricultural landowners have spent considerable resources to restore meadow habitat on their lands. Providing better understanding of the hydrologic response to meadow restoration will attempt to quantify the benefits the meadow restoration and mitigation efforts have produced. University of California at Davis (UC Davis), Natural Heritage Institute, US Forest Service, and Department of Fish and Game. 2007. Final Report Sierra Meadows: Historical Impact, Current Status and Trends, and Data Gaps. Final Report of USEPA Contract CD96911501 June 19, 2007. Accessed on internet Dec. 2012 at: http://watershed.ucdavis.edu/pdf/SierraMeadows-2007.pdf
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ Yes ☐ No ☒ N/A If yes, please describe.
e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☒ Yes ☐ No ☐ N/A If yes, please indicate which groundwater basin. Upper Feather River Watershed

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.
[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-2: Rock Creek Meadow Restoration project

Project applicant: Collins Pine Company

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☒ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☐ Not applicable
- ☐ Aging critical flood protection
- ☒ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

More resilient through less risk of “fire, flood, and mud” effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☒ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☒ Not applicable
- ☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

Upper Feather River IRWMP
Project Assessment - GHG Emissions Analysis

UF-2: Rock Creek Meadow Restoration

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Excavators	2	20	17
Rubber Tired Dozers	1	20	19
Excavators	1	20	9
Other Construction Equipment	1	20	2
			0
			0
			0
			0
			0
			0
		Total Emissions	**47**

[ ] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
		0

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-2: Rock Creek Meadow Restoration

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
100	**-630**

*A negative value indicates GHG reductions

☒ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
100	**-433**

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	47	$MTCO_2e$
In a given year, operation of the project will result in:	-1,063	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	Plumas National Forest
Name of Primary Contact	Ryan Tompkins
Name of Secondary Contact	Ryan Bauer
Mailing Address	159 Lawrence Street, Quincy, CA 95971
E-mail	rtompkins@fs.fed.us; rbauer@fs.fed.us
Phone	530-283-7841, 530-283-7832
Other Cooperating Agencies / Organizations / Stakeholders	Potential Opportunity to work with local Contractors or tribal governments/organizations
Is your agency/organization committed to the project through completion? If not, please explain	Yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-6: Round Valley/Keddie Handthin
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	The project includes 375 acres of handthinning, piling and burning to reduce hazardous ladder and surface fuels in and around the Round Valley Reservoir and the Wildland urban interface east of the reservoir proximate to the community of Greenville. The areas proposed for treatment include NFS lands within the Greenville Municipal Water District (near Round Valley Reservoir) and within the lower Wolf Creek watershed which is a Plumas NF priority watershed classified as "Functioning at Risk" watershed. High densities of small and intermediate-sized trees and heavy fuel loads within forested stands contribute to hazardous accumulations of surface, ladder, and canopy fuels within the project area. These conditions are highly susceptible to crown

	fire initiation and spread under fire weather conditions, and increase the potential for high-severity stand-replacing fire events. This potential fire behavior leads to increased risk to communities and forest and riparian ecosystems within and adjacent to the Round Valley reservoir watershed, the municipal water supply for the community of Greenville.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	The work would be performed in and around Round Valley Reservoir and the wild land urban interface proximate to the Greenville community. Please see the attached map. As shown, this project would complement currently ongoing work through timber sales and already completed work in the project area through past service contracts. Cumulatively, these projects provide connectivity of fuel breaks around Round Valley Reservoir, the municipal watershed for the community of Greenville, and the wildland urban interface surrounding the community of Greenville. In addition these fuel breaks are adjacent to protected activity centers (PACs) for sensitive species including the Calif. Spotted Owl and the Northern Goshawk.
Latitude:	Various - Please see the attached map
Longitude:	Various -Please see the attached map

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	The proposed handthinning treatment will substantially reduce the density of small shade tolerant trees which will restore forest density and structure. This is important to restoring natural hydrologic function for three primary reasons. By reducing the density of trees the treatment would: 1) reduce transpiration	An estimated 375 acres of forest upland enhanced

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
		from the site and make water more available to more dominant fire tolerant trees. 2) Reduce water interception and evaporation. Thinned stands may be more effective in increasing water yield (Woods et al 2006; Sun et al. 2015), 3) Reduce the potential for high severity stand replacing fire	
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	These fuel treatments will be focused on reducing surface fuels and ladder fuel accumulations that can contribute to high severity fire (Agee and Skinner 2005). The fuels treatments proposed have demonstrated effectiveness of reducing the risk of high severity, stand-replacing fire. Lands around and adjacent to Round Valley Reservoir were strategically place to mitigate the threat of high severity wildfire and associated negative effects on water quality.	An estimated 375 acres of forest upland enhanced
Build communication and collaboration among water resources stakeholders in the Region.	☒ Yes ☐ N/A	As shown in the attached map, this project would complement currently ongoing work through timber sales and already completed work in the project area through past service contracts. This project has had multiple stakeholder involvement through its inception and could serve a good example of how the accretion of smaller projects and efforts can create a large positive cumulative effect on a watershed scale.	
Work with DWR to develop strategies and actions for the	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☒ N/A		
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☐ Yes ☒ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	Through project planning, Round Valley Reservoir was identified as a resource of concern due to its municipal water supply status. This project aims to improve the forest conditions within the municipal watershed and immediately surrounding the reservoir. The fuel treatments were designed to reduce hazardous fuels accumulations and the potential for catastrophic fire and associated negative effects within the municipal watershed.	
Address water resources and wastewater needs of DACs and Native Americans.	☒ Yes ☐ N/A	This project is focused on improving the conditions within the Greenville municipal watershed and adjacent WUI. These areas fall within those designated as disadvantaged communities by the DWR.	
Coordinate management of	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
recharge areas and protect groundwater resources.	☒ N/A		
Improve coordination of land use and water resources planning.	☒ Yes ☐ N/A	The fuel reduction priorities of this project are driven by the nexus of watershed risk and forest conditions. This project is focused on protecting and improving water quality and water supply reliability by improving the health of forest conditions within the municipal watershed and adjacent lands within the lower Wolf Creek watershed (a USFS priority watershed designated through the Watershed Condition Assessment process).	
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate change adaptation and/or mitigation in water resources management.	☒ Yes ☐ N/A	The project planning recognizes that under changing climate precipitation form/patterns, vegetation communities will change in concert with more active fire. This project is designed to mitigate negative effects of future fire on watershed health and water resources.	
Improve efficiency and reliability of water supply and other water-related infrastructure.	☒ Yes ☐ N/A	This project is designed to mitigate negative effects of future fire on watershed health, water supply and quality, water resources.	
Enhance public awareness and understanding of water management issues and needs.	☐ Yes ☒ N/A		
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for	☒ Yes	These units have gone through the federal NEPA process under the Keddie Ridge Hazardous	

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
actual administration and implementation of grant funding.	☐ N/A	Fuels Reduction Project Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) signed December 7, 2011. Since this is a Forest Service Project and followed the federal NEPA process, the project record may have to be reviewed for CEQA compliance. The units have been flagged and mapped and all ready to be solicited for service contract. The service contract to hand thin and pile hazardous fuels would ideally be solicited and awarded in the Spring of 2016. Handpiles would be burned by Forest Service crews between the Fall/Winter 2016/2017/2018 pile burn seasons, as conditions permit.	

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☐ N/A	Heritage resources within the project area will be protected according to Heritage input from the project. Local tribal governments and organizations were scoped during the development of the project.
b. Disadvantaged Communities[1]	☒ N/A	This project is focused on improving the conditions within the Greenville municipal watershed and adjacent WUI . These areas fall within those designated as disadvantaged communities by the DWR.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☐ N/A	Thinning overly dense forest stands improve residual tree and forest stand resistance to future drought and increases of insects and disease.
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	Thinning overly dense forest stands improve residual tree and forest stand resistance to future drought, insects and disease, and fire – all of which are disturbances which are predicted to become more frequent under a changing climate (Westerling and Bryant 2008; Merriam et al 2013, McDowell and Allen 2015)..
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☒ N/A	
g. Other expected impacts or benefits that are not already mentioned elsewhere	☒ N/A	

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .

[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.

[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☒ Yes ☐ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☒ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☐ Yes ☒ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A
e. Groundwater recharge and management projects	☐ Yes ☒ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☒ Yes ☐ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	
Surface storage – regional/local	☐ Yes ☒ No	
Improve Water Quality		
Drinking water treatment and	☐ Yes ☒ No	Treatments are designed to protect water

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
distribution		quality in watershed surrounding municipal water supply.
Groundwater remediation/aquifer remediation	☐ Yes ☒ No	
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☒ Yes ☒ No	Project level mitigations would be used to prevent erosion/sediment delivery to streams and waterbodies. In addition, project purpose, need, and design includes reducing risk of negative watershed, water quality, and water quantity effects of catastrophic wildfire.
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Project is designed to improve the resiliency and sustainability of forested landscapes by restoring forest structure and ecosystem function.
Forest management	☒ Yes ☐ No	Project is designed to reduce stand density and improve forest resistance to drought, and drought related mortality. This includes treating upland and riparian forests to reduce the risk of high severity fire and selective thinning of overly dense smaller trees to reduce evapotranspiration and interception and improve streamflow regimen.
Land use planning and management	☐ Yes ☒ No	
Recharge area protection	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand replacing fire, and improve forest conditions within the priority watershed of lower Wolf Creek.
Sediment management	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand replacing fire, and improve forest conditions within the priority watershed of lower Wolf Creek. BMP's would be implemented as part of the project design features to mitigate potential for erosion and sediment delivery.

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Watershed management	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand replacing fire, and improve forest conditions within the priority watershed of lower Wolf Creek
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☐ Yes ☒ No	
Water and culture	☐ Yes ☒ No	
Water-dependent recreation	☐ Yes ☐ No	Round Valley Reservoir is used for water-based recreation. Project is designed to reduce risk of catastrophic wildfire within the watershed, while meeting visual quality objectives for recreation area surrounding Round Valley Reservoir.
Wastewater/NPDES	☐ Yes ☒ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☒ Yes ☐ No
Funding Match Waiver request?: ☐ Yes ☒ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**	-	$10,000	-	$10,000
b.	**Land Purchase/Easement**	-	-	-	-
c.	**Planning/Design/Engineering / Environmental**	-	-	-	-
d.	**Construction/Implementation**	$169,000	$151,000		$320,000
e.	**Environmental Compliance/ Mitigation/Enhancement**	$20,000			$20,000
f.	**Construction Administration**	-	-	-	-
g.	**Other Costs**	-	-	-	-
h.	**Construction/Implementation Contingency**	-	-	-	-
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$189,000	$161,000	-	$350,000

j.	**Can the Project be phased?** ☐ Yes ☐ No If **yes**, provide cost breakdown by phases			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1			
	Phase 2			
	Phase 3			
	Phase 4			

k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**	Maintenance costs would be very low and project may be maintained by prescribed fire or managed natural fire.
l.	**Has a Cost/Benefit analysis been completed?**	☒ Yes ☐ No (Through NEPA Analysis)
m.	**Describe what impact there may be if the project is not funded (300 words or less)**	

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☒ Yes ☐ No ☐ N/A	Assessments and Evaluations already covered under NEPA Analysis		Completed 12/2011
b. Final Design	☐	☒ Yes ☐ No ☐ N/A	Design already covered under NEPA Analysis		Completed 12/2011
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☒ No ☐ N/A	NEPA Analysis and Record of decision approved 12/07/2011. NEPA analysis would need to be reviewed for CEQA compliance	CEQA compliance could start as early as Fall 2015	NEPA Completed 12/2011 CEQA compliance Incomplete
d. Permitting	☒	☐ Yes ☐ No ☐ N/A	Project has already been submitted (June 2014) on batch consultation with USFWS. Need air quality permitting for burn pile burning	Dependent on burn season	USFWS consultation complete
e. Construction Contracting	☒	☐ Yes ☐ No ☐ N/A	Contract packaging is near completion. Units are laid out, flagged and GPS'ed. Specs are written	Contract can be ready for solicitation with 2-week notification	
f. Construction Implementation	☐	☐ Yes ☐ No ☐ N/A	Handthinning contract could be awarded in Spring 2016. Handpiles could be burned in the fall/winter of 2016, 2017, or 2018 burn pile seasons, as conditions permit		
Provide explanation if more than one project stage is checked as current status			Project is ready to be implemented but will require some CEQA compliance review.		

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	1988 Plumas National Forest LRMP 2004 Sierra Nevada Framework Plan Amendment ROD Plumas County CWPP
b. List technical reports and studies supporting the feasibility of this project.	• Merriam et al. 2013 Plumas, Lassen, Modoc National Forests Climate Change Vulnerability Assessment • Woods et al 2006 Snow accumulation in thinned lodgepole pine stands • Sun et al 2015 Modelling the potential role of forest thinning in maintaining water supplies under a changing climate across the conterminous United States • McDowell and Allen 2015. Darcy's law predicts widespread forest mortality under climate warming • Westerling and Bryant 2008 Climate change and wildfire in California • Agee and Skinner 2005. Basic Principles of forest fuel reduction treatments.
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	Fuel treatment effectiveness in reducing negative effects of high severity fire has been well documented over the past two decades through a large body of fire science literature and case studies, many of which were derived from projects implemented on the Plumas National Forest.
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ Yes ☒ No ☐ N/A If yes, please describe.

e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☒ Yes ☐ No ☐ N/A If yes, please indicate which groundwater basin.

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

UF-6: Round Valley/Keddie Handthin

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Rubber Tired Loaders	2	36	29
Excavators	1	36	16
Excavators	1	36	16
Other Construction Equipment	1	36	3
			0
			0
			0
			0
			0
			0
		Total Emissions	**63**

[X] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
30	105	**5**

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[X] The project is expected to generate GHG emissions for other reasons. If yes, explain:

NOTE: The difference between 3436 MTCO2e (USFS GHG calculation in alternate method doc) and -2636 MTCO2e is partially methodological. The primary difference in the GHG emissions is the open burning of thinned materials instead of processing thinned materials in a biomass electrical generating facility. The difference of 800MTCO2e is the project GHG emission without biomass and using a more forest-specific GHG accounting methodology.

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-6: Round Valley/Keddie Handthin

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
375	**-2,363**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	68	$MTCO_2e$
In a given year, operation of the project will result in:	-2,363	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	USDA – Plumas National Forest
Name of Primary Contact	Joe Hoffman
Name of Secondary Contact	Nancy Francine
Mailing Address	159 Lawrence Street Quincy, CA 95971
E-mail	jahoffman@fs.fed.us
Phone	530-283-7868
Other Cooperating Agencies / Organizations / Stakeholders	CA Regional Water Quality Control Board (Central Valley) Trout Unlimited (Feather River Chapter) Plumas Fire Safe Council
Is your agency/organization committed to the project through completion? If not, please explain	Yes. Plumas National Forest has identified this work as essential projects for 4 priority watersheds. Each year going forward, PNF will be working to implement the needed road improvements using about $60,000 of Forest funds. IRWM grant funds would facilitate implementation of the needed road work much quicker than if only Forest funds are used.

II. GENERAL PROJECT INFORMATION

Project Title	UF-7: U.S. Forest Service Road Improvements
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	More than 4,000 miles of roads and motorized trails exist on Plumas National Forest. The road and trail network is essential to supporting popular recreation activities in the region and is vital for effective forest management and wildfire suppression. However, forest roads have also been frequently identified as the primary source of fine sediment to streams on National Forest System lands. Fortunately, sedimentation issues are not spread equally across all Forest roads so the problem can largely be addressed by cost-effectively treating a small subset of problem road segments.

	This project will reduce road-generated sediment delivery to streams in four priority watersheds on Plumas National Forest by improving drainage along roughly 80 miles of Forest roads or motorized trails. All of the 260 miles of road in the 4 watersheds will be field surveyed and treatments will target problem road segments. Road treatments will generally fall into two types. One, existing road surface and ditch drainage features will be improved, and new drainage structures added, so that road runoff is effectively dispersed and not concentrated in ditches or rills that run directly to streams. Drainage features to be added include roadway dips, ditch relief culverts, and rocked ford crossings. Second, the potential for large scale erosion of road prisms will be reduced by providing emergency overflow dips at existing stream crossing culverts. These "critical dips" will function when a crossing culvert plugs during a flood, assuring that flood flows will flow directly back into the channel, rather than being diverted down the roadway in an uncontrolled fashion. Roads will be graded and rock surfacing will be installed at key stream crossings. No roads or motorized trails will be closed or obliterated with these treatments.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	Roads and trails to be improved are all located in 4 USFS-designated priority watersheds (see attached map). All 4 of these watersheds drain to the "Wild and Scenic" Middle Fork Feather River. Roughly 260 miles of system roads and trails exist in these watersheds. The specific roads to be treated will not be known until all 260 miles are field surveyed and problem spots identified. Past efforts in similar watersheds indicate that roughly 80 miles of road and trail will be improved, with treatments concentrated on problem segments totaling an estimated 60 miles.
Latitude:	See attached map
Longitude:	See attached map

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	Forest roads, particularly mid-slope roads, concentrate hillside runoff and intercept ground water flows. Proposed road treatments will disperse runoff so that hillslope drainage patterns will be closer to natural function.	Drainage improved on 80 miles of Forest road and motorized trail
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	Improving road and trail drainage will substantially reduce rutting and improve road drivability. Future road maintenance costs will be substantially reduced. Smooth and well-maintained road access is integral to performing fuel reduction treatments and fighting wildfire.	Forest access improved in 4 priority watersheds totaling 105,000 acres
Build communication and collaboration among water resources stakeholders in the Region.	☒ Yes ☐ N/A	Local road and motorized trail recreation groups will be consulted so that access to priority roads and trails will be improved. Trout Unlimited will be consulted so that sedimentation will be reduced to priority streams.	Drainage improved on 80 miles of Forest road and motorized trail; sedimentation reduced in roughly 25 miles of perennial streams
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☒ Yes ☐ N/A	The four priority watersheds where road access will be improved all drain to the Wild and Scenic Middle Fork Feather River, including the Nelson Creek watershed, the Little North Fork watershed, and the Middle Fork Feather River near Lakes Basin and Claremont Peak. These are all popular recreation areas.	Forest access improved in 4 priority watersheds totaling 105,000 acres that all drain to the Wild and Scenic Middle Fork Feather River
Encourage municipal service	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
providers to participate in regional water management actions that improve water supply and water quality.	☒ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	The Regional Water Quality Control Board recognizes Forest roads as being the primary source of fine sediment delivery that affects beneficial uses, including spawning habitat, cold freshwater habitat, and wildlife habitat	Fine sediment reduced in roughly 25 miles of perennial streams
Address water resources and wastewater needs of DACs and Native Americans.	☒ Yes ☐ N/A	All of the Plumas County communities within and near the 4 priority watersheds to be treated are classified as DACs. Forest recreation is a very popular, inexpensive recreation opportunity enjoyed by these communities. These recreation opportunities will be enhanced by improving road access and wildlife habitat in these watersheds.	Forest access improved on 80 miles of Forest road and motorized trail; sedimentation reduced in roughly 25 miles of perennial streams
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☒ N/A		
Improve coordination of land use and water resources planning.	☒ Yes ☐ N/A	Improved Forest road access will benefit all agencies involved in fuels reduction efforts in these watersheds	Forest access improved in 4 priority watersheds totaling 105,000 acres
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate	☒ Yes	By enhancing communities'	Forest access

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
change adaptation and/or mitigation in water resources management.	☐ N/A	ability to address forest fuels and wildland fires, heavy carbon inputs from large wildfires will be reduced	improved in 4 priority watersheds totaling 105,000 acres
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☒ N/A		
Enhance public awareness and understanding of water management issues and needs.	☒ Yes ☐ N/A	Public understanding will be enhanced regarding how well-drained roads not only improve Forest access but also improve aquatic habitat	Drainage improved on 80 miles of Forest road and motorized trail in 4 popular watersheds
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☒ Yes ☐ N/A	IRWM grant funds for USFS road improvements will greatly enhance the Forest's limited funding for maintaining and improving Forest access	Drainage improved on 80 miles of Forest road and motorized trail in 4 priority watersheds

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☒ N/A	
b. Disadvantaged Communities[1]	☐ N/A	All of the Plumas County communities within and near the 4 priority watersheds to be treated are classified as DACs. Forest recreation is a very popular, inexpensive recreation opportunity enjoyed by these

		communities. These recreation opportunities will be enhanced by improving road access and wildlife habitat in these watersheds.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☒ N/A	
e. Assist the region in adapting to effects of climate change[3]	☒ N/A	
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	By enhancing communities' ability to address forest fuels and wildland fires, heavy carbon inputs from large wildfires will be reduced
g. Other expected impacts or benefits that are not already mentioned elsewhere	☐ N/A	Improved Forest access Improved aquatic habitat Reduced road maintenance costs

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .
[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.
[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☒ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☒ Yes ☐ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☒ Yes ☐ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A

e. Groundwater recharge and management projects	☐ Yes ☒ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☒ Yes ☐ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	
Surface storage – regional/local	☐ Yes ☒ No	
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ☒ No	
Groundwater remediation/aquifer remediation	☐ Yes ☒ No	
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☒ Yes ☐ No	Forest road construction and management to reduce delivery of fine sediment
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Curtailing nonpoint source pollution (fine sediment) to aquatic habitats
Forest management	☒ Yes ☐ No	Road management for erosion control
Land use planning and	☒ Yes ☐ No	Improving road and trail access for forest

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
management		management and recreation
Recharge area protection	☐ Yes ☒ No	
Sediment management	☒ Yes ☐ No	Preventing movement of sediment into waterways from forest roads
Watershed management	☒ Yes ☐ No	Improving water quality and aquatic habitat in streams
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☒ Yes ☐ No	Engaging recreation groups to improve the Forest transportation system
Water and culture	☒ Yes ☐ No	Enhanced communication with forest recreation groups
Water-dependent recreation	☒ Yes ☐ No	Improving recreation access; improving fisheries and aquatic habitat
Wastewater/NPDES	☒ Yes ☐ No	Curtailing nonpoint source pollution (fine sediment)

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☒ Yes ☐ No
Funding Match Waiver request?: ☐ Yes ☒ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**		$15,000 (USFS)		$15,000
b.	**Land Purchase/Easement**				
c.	**Planning/Design/Engineering / Environmental**	$90,000(eng, contract prep)	$80,000 (USFS survey & NEPA)		$170,000
d.	**Construction/Implementation**	$800,000			$800,000
e.	**Environmental Compliance/ Mitigation/Enhancement**				
f.	**Construction Administration**	$35,000	$25,000 (USFS)		$60,000
g.	**Other Costs**				

h.	**Construction/Implementation Contingency**	$75,000			$75,000
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$1,000,000	$120,000		$1,120,000

j. **Can the Project be phased?** ☒ Yes ☐ No If **yes**, provide cost breakdown by phases

	Project Cost	**O&M Cost**	**Description of Phase**
Phase 1	$80,000		Field Survey / NEPA
Phase 2	$90,000		Engineering / Contract Prep
Phase 3	$475,000		Treat roads in 2 watersheds
Phase 4	$475,000		Treat roads in 2 watersheds

k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**	Road and trail treatments will be maintained using USFS road maintenance funds. Partnerships will be sought to help with maintenance of motorized trails.
l.	**Has a Cost/Benefit analysis been completed?**	☒ Yes ☐ No Formal cost/benefit analysis has not been done. However, the cost effectiveness of improving road drainage to reduce sedimentation and future road maintenance is well established in published literature.
m.	**Describe what impact there may be if the project is not funded (300 words or less)**	Plumas National Forest has designated these watersheds as being 4 of the Forest's 8 priority watersheds. The Forest is committed to completing these road treatments since they are essential projects of the action plans to improve watershed condition. However, Forest funds to implement such road improvements are limited. Beginning in 2016, the Forest will be committing at least $60,000 per year toward this effort. If this IRWM proposal were funded, the treatments could be completed by 2017 or 2018. Without grant funding, the road improvements will take a decade or more to complete.

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☒	☒ Yes ☐ No ☐ N/A	Some road surveys have been completed		Complete by November 2016
b. Final Design	☐	☒ Yes ☐ No ☐ N/A	Engineers will need to design treatments for problem roads		Complete by Nov 2016 (with grant funding) or Nov 2017 (without grant funding)
c. Environmental Documentation (CEQA / NEPA)	☐	☒ Yes ☐ No ☐ N/A	Plumas NF specialists will document NEPA compliance		Complete by Nov 2016 (with grant funding) or Nov 2017 (without grant funding)
d. Permitting	☐	☒ Yes ☐ No ☐ N/A	Will be addressed in the NEPA timeframe		
e. Construction Contracting	☐	☒ Yes ☐ No ☐ N/A	Engineers will develop contract solicitations and secure contractors (four separate contracts)		Complete by Aug 2017 (with grant funding) or Aug 2025 (without grant funding)
f. Construction Implementation	☐	☒ Yes ☐ No ☐ N/A	Four separate construction contracts (one for each watershed)		Complete by Nov 2017 (with grant funding) or Nov 2026 (without grant funding)
Provide explanation if more than one project stage is checked as current status					

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General	- Plumas National Forest Land and Resource Management Plan

Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	- CA RWQCB Central Valley Basin Plan - USFS Ecological Restoration Leadership Intent for Region 5
b. List technical reports and studies supporting the feasibility of this project.	- MacDonald & Coe: "Road sediment production and delivery: processes and management" - USFS, San Dimas Tech Center: "Water / Road Interaction Technology Series" - Bilby, et al: "The generation and fate of road-surface sediment in forested watersheds" - Reid & Dunne: "Sediment Production from forest road surfaces" - USDA PNW-GTR-509: "Forest roads: a synthesis of scientific information"
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	See technical reports and studies above
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ Yes ☒ No ☐ N/A If yes, please describe.
e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☐ Yes ☒ No ☐ N/A If yes, please indicate which groundwater basin.

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

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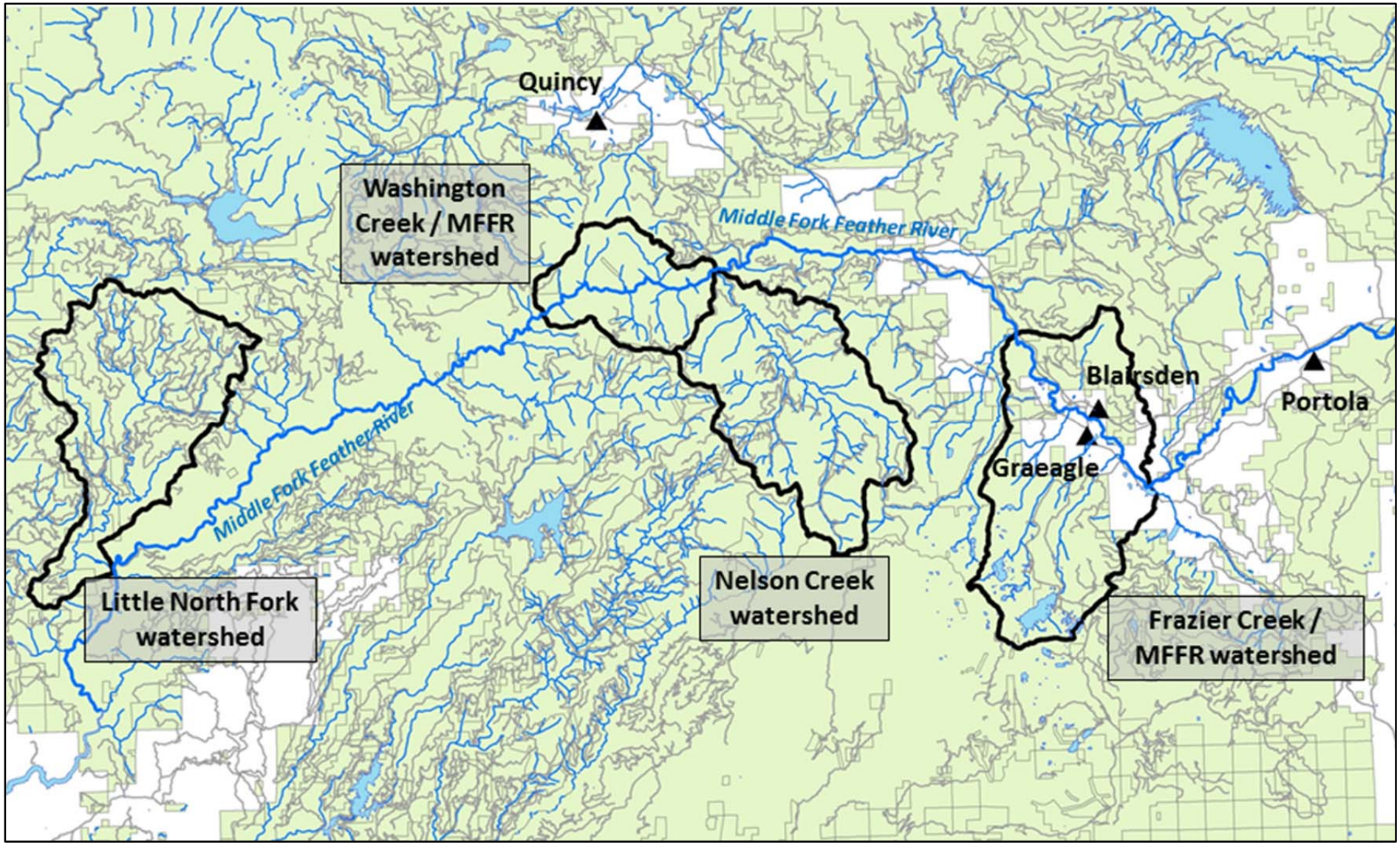
UPPER FEATHER RIVER IRWM
PROJECT INFORMATION FORM

Location Map for IRWM Proposal: U.S. Forest Service Road Improvements Project

Heavy black lines delineate the boundaries of the 4 priority watersheds to be treated. Forest roads and motorized trails are shown with light gray lines.



Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-7: USFS Road Improvements

Project applicant: USDA-Forest Service, Plumas National Forest

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

- ☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.
- ☒ The project requires materials to be transported to the project site.
- ☒ The project requires workers to commute to the project site.
- ☐ The project is expected to generate GHG emissions for other reasons.
- ☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

- ☐ The project requires energy to operate.
- ☐ The project will generate electricity.
- ☒ The project will proactively manage forests to reduce wildfire risk.
- ☐ The project will affect wetland acreage.
- ☐ The project will include new trees.
- ☐ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☒ Not applicable
- ☐ Reduced snowmelt
- ☐ Unmet local water needs (drought)
- ☐ Increased invasive species

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☒ Not applicable
- ☐ Increasing seasonal water use variability
- ☐ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☐ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☐ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☐ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

These road treatments are necessary to implement fuel reduction treatments on Plumas National Forest by satisfying Best Management Practices required by State of California water resource control boards to reduce water quality impacts along forest roads utilized for fuel reduction work. In addition, by improving road access, the capacity to effectively suppress and contain wildfires will be improved.

The additional acreage of forest protected from catastrophic wildfire as a result of these fuel reduction treatments and improved firefighting access is difficult to predict. For the purpose of this assessment, the additional acres protected from catastrophic wildfire are conservatively estimated to be 500 acres.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☒ Not applicable
- ☐ Aging critical flood protection
- ☐ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☒ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☐ Fragmented habitat

The project will reduce erosion from National Forest System Roads and delivery of fine sediment to streams within designated priority watersheds.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☒ Not applicable
- ☐ Reduced hydropower output

UF-7: USFS Road Improvements

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Crawler Tractors	1	80	34
Tractors/Loaders/Backhoes	1	80	22
Dumpers/Tenders	1	80	2
Excavators	1	20	9
Graders	1	80	39
			0
			0
			0
			0
			0
		Total Emissions	**106**

[X] The project requires materials to be transported to the project site. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
100	80	**12**

[X] The project requires workers to commute to the project site. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
10	80	80	**22**

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-7: USFS Road Improvements

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
500	**-3,150**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
0	**0**

*A negative value indicates GHG reductions

☐ Project operations are expected to generate or reduce GHG emissions for other reasons. If yes, explain:

GHG Emissions Summary

Construction and development will generate approximately:	140	$MTCO_2e$
In a given year, operation of the project will result in:	-3,150	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	W.M. Beaty & Associates
Name of Primary Contact	Ryan Hilburn
Name of Secondary Contact	
Mailing Address	P.O. Box 1714
E-mail	ryanh@wmbeaty.com
Phone	(530) 257-7191
Other Cooperating Agencies / Organizations / Stakeholders	Lassen County Fire Safe Council
Is your agency/organization committed to the project through completion? If not, please explain	Yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-8: Goodrich Creek Biomass
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	The project would provide for biomass harvesting to be conducted on approximately 2,800 acres of private forestland that is adjacent to a recently funded pond and plug project on tributaries that flow into Goodrich Creek. The pond and plug project is designed to restore approximately 125 acres of upland meadow to its original hydrologic condition allowing for increased natural water storage. This project will be designed to enhance this work by reducing the density of small understory trees, which will reduce the amount of evapotranspiration and canopy interception providing for increased infiltration into the soil. The expected increase in groundwater will also help to increase stream flow in the area. An additional result of the biomass harvest will be the reduction of fuel loads in the area. This will help to mitigate

	the risk of catastrophic wildfire which can lead to significant decreases in water quality.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	The project is located in the upper portions of the Goodrich Creek Watershed on the lower slopes of Pegleg Mountain. Goodrich Creek is the main tributary to Mountain Meadows Reservoir.
Latitude:	40° 22' 10" North
Longitude:	120° 56' 42" West

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	The biomass harvest will restore the forest to densities similar to what was found prior to fire suppression activities. These decreased densities will result in a decrease in evapotranspiration and interception resulting in a hydrologic function similar to historic hydrologic functions.	2800 acres treated.
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	This project will remove ladder fuels and reduce continuity in the canopy. This will reduce the risk of catastrophic fire in the watershed.	2800 acres treated.
Build communication and collaboration among water resources stakeholders in the Region.	☐ Yes ☒ N/A		
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the	☐ Yes ☒ N/A		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
Region.			
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☒ Yes ☐ N/A	The project could be a demonstration for the use of sound forest management as a tool to provide for increased water supply and improved water quality.	2800 acres treated
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	All timber harvest projects are conducted under a Waiver of Waste Discharge issued by the RWQCB and as such are consistent with the basin plan.	2800 acres treated
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☒ N/A		
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☒ N/A		
Improve coordination of land use and water resources planning.	☐ Yes ☒ N/A		
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate change adaptation and/or mitigation in water resources management.	☐ Yes ☒ N/A		
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☒ N/A		
Enhance public awareness and understanding of water management issues and needs.	☐ Yes ☒ N/A		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☐ Yes ☒ N/A		

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☒ N/A	
b. Disadvantaged Communities[1]	☐ N/A	The project is located in close proximity to the town of Westwood.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☒ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	The project will reduce the risk of catastrophic wildfire.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	This project when considered in regards to the reduced risk of wildfire will result in a net reduction of greenhouse gas emissions.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☒ N/A	

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .
[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.
[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☒ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☒ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☐ Yes ☒ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A
e. Groundwater recharge and management projects	☐ Yes ☒ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ☒ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	
Surface storage – regional/local	☐ Yes ☒ No	
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ☒ No	
Groundwater remediation/aquifer remediation	☐ Yes ☒ No	
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☒ Yes ☐ No	Fuels reduction; reduction in catastrophic fire potential and resultant pollution impacts
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices.
Forest management	☒ Yes ☐ No	The biomass harvest will target those trees that are suppressed and most susceptible to insects and disease. This will help to promote a healthy forest.
Land use planning and management	☐ Yes ☒ No	
Recharge area protection	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices, thereby improving recharge area functionality.
Sediment management	☐ Yes ☒ No	
Watershed management	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand-replacing fire, and improve forest conditions within the watershed
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☐ Yes ☒ No	
Water and culture	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Water-dependent recreation	☐ Yes ☒ No	
Wastewater/NPDES	☐ Yes ☒ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☒ Yes ☐ No
Funding Match Waiver request?: ☐ Yes ☐ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**	$5,000			
b.	**Land Purchase/Easement**	0			
c.	**Planning/Design/Engineering / Environmental**	$1,200			
d.	**Construction/Implementation**	$700,000			
e.	**Environmental Compliance/ Mitigation/Enhancement**	0			
f.	**Construction Administration**	$9,400			
g.	**Other Costs**				
h.	**Construction/Implementation Contingency**				
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$715,600			

j.	**Can the Project be phased?** ☒ Yes ☐ No If **yes**, provide cost breakdown by phases			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1	$178,900		Treatment of approximately 700 acres.
	Phase 2	$178,900		Treatment of approximately 700 acres.
	Phase 3	$178,900		Treatment of approximately 700 acres.

	Phase 4	$178,900		Treatment of approximately 700 acres.
k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**		The forested area will be maintained by the landowner through periodic biomass and timber harvests.	
l.	**Has a Cost/Benefit analysis been completed?**		☐ Yes ☒ No	
m.	**Describe what impact there may be if the project is not funded (300 words or less)**		The timber stands in the watershed will remain in an overstocked condition with fuel levels that are conducive to catastrophic wildfire. A catastrophic wildfire in this area would result in significant adverse impacts to water quality.	

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☒ Yes ☐ No ☐ N/A			
b. Final Design	☒	☒ Yes ☐ No ☐ N/A			
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☒ No ☐ N/A	Completion of appropriate biological and archaeological surveys.	1/16	5/16
d. Permitting	☐	☐ Yes ☒ No ☐ N/A	Preparation of appropriate harvest documents for submittal to CAL FIRE.	5/16	5/16
e. Construction Contracting	☐	☐ Yes ☒ No ☐ N/A	Prepare bid package for contractors and develop an agreement with a purchaser.	6/16	6/16
f. Construction Implementation	☐	☐ Yes ☒ No ☐ N/A	Conduct biomass harvest.	6/16	9/16

Provide explanation if more than one project stage is checked as current status	

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	
b. List technical reports and studies supporting the feasibility of this project.	Bales et al 2011. Forests and Water in the Sierra Nevada. SWEEP, Sierra Nevada Research Institute Report 11.1 Biswell H and J Agee, 1989. Prescribed Burning in California Wildlands Vegetation Management. Univ. of California Press. Bohm, B., 2008. Canopy interception in a coniferous forest in eastern Plumas County, California. Final Technical Summary Report. Prepared for Brian Morris, Plumas County Flood Control and Water Conservation District. Plumas Geo-Hydrology, July 28, 2008. Bosch, J.M. and Hewlett, J.D., 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. J. of Hydrology, 103: 323-333. Dunne, T. and Leopold, L.B., 1978, Water in environmental planning. W.H. Freeman and Company. New York. 814 pages. Miralles et al. 2010. EOS, Vol. 91, No. 43, page 404, 26 Oct., 2010. Pruitt, W.O., Freres, E., Snyder, R.L., 1987, Reference Evapotranspiration (ETo) for California. Agricultural Experiment Station, University of California. Bulletin 1922.

	Sahin V and M J Hall, 1996. The effects of afforestation and deforestation on water yields. Journal of Hydrology 178 (1996) 293-309. Troendle et al 2007 Impacts of Vegetation Management on Water Yield. The Herger-Feinstein Quincy Library Group Project
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	As shown above numerous studies have been conducted that show that a reduction in forest canopy results in reduced interception which increases groundwater recharge and streamflow.
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☒ Yes ☐ No ☐ N/A If yes, please describe. The harvest will result in the production of wood chips which will be transported to a local co-generation plant where it will be burned to generate power.
e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☐ Yes ☒ No ☐ N/A If yes, please indicate which groundwater basin.

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-8: Goodrich Creek Biomass

Project applicant: W. M. Beatty and Associates

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☐ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution

☐ Water treatment facility operations

☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

☐ Not applicable

☐ Aging critical flood protection

☒ Wildfires

☐ Critical infrastructure in a floodplain

☐ Insufficient flood control facilities

More resilient through less risk of “fire, flood, and mud” effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

☐ Not applicable

☐ Climate-sensitive fauna or flora

☐ Recreation and economic activity
☐ Quantified environmental flow requirements
☒ Erosion and sedimentation
☐ Endangered or threatened species
☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

☒ Not applicable
☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

UF-8: Goodrich Creek Biomass

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Rubber Tired Loaders	2	280	226
Excavators	1	280	122
Excavators	1	280	122
Other Construction Equipment	1	280	23
			0
			0
			0
			0
			0
			0
		Total Emissions	**494**

[X] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
2,300	50	**177**

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-8: Goodrich Creek Biomass

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
2,800	**-17,640**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	670 $MTCO_2e$
In a given year, operation of the project will result in:	-17,640 $MTCO_2e$

featherriver.org

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	W.M. Beaty & Associates
Name of Primary Contact	Ryan Hilburn
Name of Secondary Contact	
Mailing Address	P.O. Box 1714
E-mail	ryanh@wmbeaty.com
Phone	(530) 257-7191
Other Cooperating Agencies / Organizations / Stakeholders	Lassen County Fire Safe Council
Is your agency/organization committed to the project through completion? If not, please explain	Yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-10: Greenville Creek Biomass
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	The project would provide for biomass harvesting to be conducted on approximately 1,350 acres of private forestland that is adjacent to a recently funded pond and plug project on Greenville Creek which flows into Mountain Meadows Reservoir. This project will be designed to enhance this work by reducing the density of small understory trees, which will reduce the amount of evapotranspiration and canopy interception providing for increased infiltration into the soil. The project will also reduce fuel levels on the northern slopes of Keddie Ridge reducing the risk of catastrophic wildfire in that area protecting resources such as Deerheart and Homer Lakes. The project can be conducted in phases over a time period of 1 to 5 years.
Project Location Description (e.g., along the south bank of stream/river	The project is located on timberlands adjacent to the south eastern portion of Mountain Meadows Reservoir.

between river miles or miles from Towns/intersection and/or address):	Approximately 7 miles south east of Westwood, CA.
Latitude:	40° 14' 03" North
Longitude:	120° 53' 38" West

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	The biomass harvest will restore the forest to densities similar to what was found prior to fire suppression activities. These decreased densities will result in a decrease in evapotranspiration and interception resulting in a hydrologic function similar to historic hydrologic functions.	1350 acres treated.
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	This project will remove ladder fuels and reduce continuity in the canopy. This will reduce the risk of catastrophic fire in the watershed.	1350 acres treated.
Build communication and collaboration among water resources stakeholders in the Region.	☐ Yes ☒ N/A		
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☐ Yes ☒ N/A		
Encourage municipal service providers to participate in regional water management	☒ Yes ☐ N/A	The project could be a demonstration for the use of sound forest management as a	1350 acres treated

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
actions that improve water supply and water quality.		tool to provide for increased water supply and improved water quality.	
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	All timber harvest projects are conducted under a Waiver of Waste Discharge issued by the RWQCB and as such are consistent with the basin plan.	1350 acres treated
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☒ N/A		
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☒ N/A		
Improve coordination of land use and water resources planning.	☐ Yes ☒ N/A		
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate change adaptation and/or mitigation in water resources management.	☐ Yes ☒ N/A		
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☒ N/A		
Enhance public awareness and understanding of water management issues and needs.	☐ Yes ☒ N/A		
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☒ N/A		

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☒ N/A	
b. Disadvantaged Communities[1]	☐ N/A	The project is located in close proximity to the town of Westwood.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☒ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	The project will reduce the risk of catastrophic wildfire.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	This project when considered in regards to the reduced risk of wildfire will result in a net reduction of greenhouse gas emissions.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☒ N/A	

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .
[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.
[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☒ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☒ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☐ Yes ☒ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A
e. Groundwater recharge and management projects	☐ Yes ☒ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ☒ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	
Surface storage – regional/local	☐ Yes ☒ No	
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ☒ No	
Groundwater remediation/aquifer remediation	☐ Yes ☒ No	
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☒ Yes ☐ No	Fuels reduction; reduction in catastrophic fire potential and resultant pollution impacts
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices.
Forest management	☒ Yes ☐ No	The biomass harvest will target those trees that are suppressed and most susceptible to insects and disease. This will help to promote a healthy forest while reducing the risk of catastrophic wildfire.
Land use planning and management	☐ Yes ☒ No	
Recharge area protection	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices, thereby improving recharge area functionality.
Sediment management	☐ Yes ☒ No	
Watershed management	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand-replacing fire, and improve forest conditions within the watershed
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☐ Yes ☒ No	
Water and culture	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Water-dependent recreation	☐ Yes ☒ No	
Wastewater/NPDES	☐ Yes ☒ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☐ Yes ☒ No
Funding Match Waiver request?: ☐ Yes ☒ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**	$2,400			$2,400
b.	**Land Purchase/Easement**	0			0
c.	**Planning/Design/Engineering / Environmental**	$1,200			$1,200
d.	**Construction/Implementation**	$337,500			$337,500
e.	**Environmental Compliance/ Mitigation/Enhancement**	0			0
f.	**Construction Administration**	$4,530			$4,530
g.	**Other Costs**				
h.	**Construction/Implementation Contingency**				
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$345,630			$345,630

j. Can the Project be phased? ☒ Yes ☐ No If **yes**, provide cost breakdown by phases

	Project Cost	O&M Cost	Description of Phase
Phase 1	$86,400		Treatment of approximately 340 acres.
Phase 2	$86,400		Treatment of approximately 340 acres.
Phase 3	$86,400		Treatment of approximately 340 acres.
Phase 4	$86,400		Treatment of approximately

				340 acres.
k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**		The forested area will be maintained by the landowner through periodic biomass and timber harvests.	
l.	**Has a Cost/Benefit analysis been completed?**		☐ Yes ☒ No	
m.	**Describe what impact there may be if the project is not funded (300 words or less)**		The timber stands in the watershed will remain in an overstocked condition with fuel levels that are conducive to catastrophic wildfire. A catastrophic wildfire in this area would result in significant adverse impacts to water quality.	
*List all sources of funding. Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).				

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☒ Yes ☐ No ☐ N/A			
b. Final Design	☒	☒ Yes ☐ No ☐ N/A			
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☒ No ☐ N/A	Completion of appropriate biological and archaeological surveys.	1/16	5/16
d. Permitting	☐	☐ Yes ☒ No ☐ N/A	Preparation of appropriate harvest documents for submittal to CAL FIRE.	5/16	5/16
e. Construction Contracting	☐	☐ Yes ☒ No ☐ N/A	Prepare bid package for contractors and develop an agreement with a purchaser.	6/16	6/16
f. Construction Implementation	☐	☐ Yes ☒ No ☐ N/A	Conduct biomass harvest.	6/16	9/16

Provide explanation if more than one project stage is checked as current status	

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	
b. List technical reports and studies supporting the feasibility of this project.	Bales et al 2011. Forests and Water in the Sierra Nevada. SWEEP, Sierra Nevada Research Institute Report 11.1 Biswell H and J Agee, 1989. Prescribed Burning in California Wildlands Vegetation Management. Univ. of California Press. Bohm, B., 2008. Canopy interception in a coniferous forest in eastern Plumas County, California. Final Technical Summary Report. Prepared for Brian Morris, Plumas County Flood Control and Water Conservation District. Plumas Geo-Hydrology, July 28, 2008. Bosch, J.M. and Hewlett, J.D., 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. J. of Hydrology, 103: 323-333. Dunne, T. and Leopold, L.B., 1978, Water in environmental planning. W.H. Freeman and Company. New York. 814 pages. Miralles et al. 2010. EOS, Vol. 91, No. 43, page 404, 26 Oct., 2010. Pruitt, W.O., Freres, E., Snyder, R.L., 1987, Reference Evapotranspiration (ETo) for California. Agricultural Experiment Station, University of California. Bulletin 1922.

	Sahin V and M J Hall, 1996. The effects of afforestation and deforestation on water yields. Journal of Hydrology 178 (1996) 293-309. Troendle et al 2007 Impacts of Vegetation Management on Water Yield. The Herger-Feinstein Quincy Library Group Project
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	As shown above numerous studies have been conducted that show that a reduction in forest canopy results in reduced interception which increases groundwater recharge and streamflow.
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☒ Yes ☐ No ☐ N/A If yes, please describe. The harvest will result in the production of wood chips which will be transported to a local co-generation plant where it will be burned to generate power.
e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☐ Yes ☒ No ☐ N/A If yes, please indicate which groundwater basin.

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-10: Greenville Creek Biomass

Project applicant: W. M. Beatty and Associates

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☐ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☐ Not applicable
- ☐ Aging critical flood protection
- ☒ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

More resilient through less risk of “fire, flood, and mud” effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☒ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☒ Not applicable
- ☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

UF-10: Greenville Creek Biomass

GHG Emissions Analysis

Project Construction Emissions

■ The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Rubber Tired Loaders	2	134	108
Excavators	1	134	59
Excavators	1	134	59
Other Construction Equipment	1	134	11
			0
			0
			0
			0
			0
			0
		Total Emissions	**236**

■ The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
1,104	43	**73**

☐ The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

☐ The project is expected to generate GHG emissions for other reasons. If yes, explain:

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-10: Greenville Creek Biomass

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

■ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
1,350	**-8,505**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	309	$MTCO_2e$
In a given year, operation of the project will result in:	-8,505	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	W.M. Beaty & Associates
Name of Primary Contact	Ryan Hilburn
Name of Secondary Contact	
Mailing Address	P.O. Box 1714
E-mail	ryanh@wmbeaty.com
Phone	(530) 257-7191
Other Cooperating Agencies / Organizations / Stakeholders	Lassen County Fire Safe Council
Is your agency/organization committed to the project through completion? If not, please explain	Yes

II. GENERAL PROJECT INFORMATION

Project Title	UF-11: Mountain Meadows Creek Biomass
Project Category	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☒ **Uplands/Forest**
Project Description (Briefly describe the project, in 300 words or less)	The project would provide for biomass harvesting to be conducted on approximately 1,700 acres of private forestland that is adjacent to Mountain Meadows Reservoir. This project will be designed to decrease the density of small understory trees reducing the amount of evapotranspiration and canopy interception. The project will also reduce fuel levels on lands adjacent to Mountain Meadows Reservoir and Creek decreasing the risk of catastrophic wildfire in those areas. The project can be conducted in phases over a time period of 1 to 5 years.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	The project is located on timberlands adjacent to the south eastern portion of Mountain Meadows Reservoir. Portions of the project area are also located within the upper portions of the Mountain Meadows Creek and Duffy Creek watersheds. Both of which are tributaries to Mountain Meadows

	Reservoir. Approximately 7 miles south east of Westwood, CA.
Latitude:	40° 15' 27" North
Longitude:	120° 53' 37" West

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☒ Yes ☐ N/A	The biomass harvest will restore the forest to densities similar to what was found prior to fire suppression activities. These decreased densities will result in a decrease in evapotranspiration and interception resulting in a hydrologic function similar to historic hydrologic functions.	1700 acres treated.
Reduce potential for catastrophic wildland fires in the Region.	☒ Yes ☐ N/A	This project will remove ladder fuels and reduce continuity in the canopy. This will reduce the risk of catastrophic fire in the watershed.	1700 acres treated.
Build communication and collaboration among water resources stakeholders in the Region.	☐ Yes ☒ N/A		
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☐ Yes ☒ N/A		
Encourage municipal service providers to participate in regional water management	☒ Yes ☐ N/A	The project could be a demonstration for the use of sound forest management as a	1700 acres treated

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
actions that improve water supply and water quality.		tool to provide for increased water supply and improved water quality.	
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☒ N/A		
Address economic challenges of municipal service providers to serve customers.	☐ Yes ☒ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☒ Yes ☐ N/A	All timber harvest projects are conducted under a Waiver of Waste Discharge issued by the RWQCB and as such are consistent with the basin plan.	1700 acres treated
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☒ N/A		
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☒ N/A		
Improve coordination of land use and water resources planning.	☐ Yes ☒ N/A		
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☒ N/A		
Effectively address climate change adaptation and/or mitigation in water resources management.	☐ Yes ☒ N/A		
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☒ N/A		
Enhance public awareness and understanding of water management issues and needs.	☐ Yes ☒ N/A		
Address economic challenges of agricultural producers.	☐ Yes ☒ N/A		
Work with counties/	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☒ N/A		

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☒ N/A	
b. Disadvantaged Communities[1]	☐ N/A	The project is located in close proximity to the town of Westwood.
c. Environmental Justice[2]	☒ N/A	
d. Drought Preparedness	☒ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	The project will reduce the risk of catastrophic wildfire.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	This project when considered in regards to the reduced risk of wildfire will result in a net reduction of greenhouse gas emissions.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☒ N/A	

[1] A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .

[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.

[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☒ N/A	g. Drinking water treatment and distribution	☐ Yes ☒ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☒ N/A	h. Watershed protection and management	☒ Yes ☐ N/A
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☒ Yes ☐ N/A	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ Yes ☒ N/A
d. Non-point source pollution reduction, management and monitoring	☐ Yes ☒ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☒ N/A
e. Groundwater recharge and management projects	☐ Yes ☒ N/A	k. Ecosystem and fisheries restoration and protection	☒ Yes ☐ N/A
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ☒ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☒ No	
Urban water use efficiency	☐ Yes ☒ No	
Improve Flood Management		
Flood management	☐ Yes ☒ No	
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☒ No	
System reoperation	☐ Yes ☒ No	
Water transfers	☐ Yes ☒ No	
Increase Water Supply		
Conjunctive management	☐ Yes ☒ No	
Precipitation Enhancement	☐ Yes ☒ No	
Municipal recycled water	☐ Yes ☒ No	
Surface storage – regional/local	☐ Yes ☒ No	
Improve Water Quality		
Drinking water treatment and distribution	☐ Yes ☒ No	
Groundwater remediation/aquifer	☐ Yes ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable
remediation		
Matching water quality to water use	☐ Yes ☒ No	
Pollution prevention	☒ Yes ☐ No	Fuels reduction; reduction in catastrophic fire potential and resultant pollution impacts
Salt and salinity management	☐ Yes ☒ No	
Urban storm water runoff management	☐ Yes ☒ No	
Practice Resource Stewardship		
Agricultural land stewardship	☐ Yes ☒ No	
Ecosystem restoration	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices.
Forest management	☒ Yes ☐ No	The biomass harvest will target those trees that are suppressed and most susceptible to insects and disease. This will help to promote a healthy forest while reducing the risk of catastrophic wildfire.
Land use planning and management	☐ Yes ☒ No	
Recharge area protection	☒ Yes ☐ No	Biomass harvest will aid in the restoration of the ecosystem to a condition similar to those found prior to current fire suppression practices, thereby protecting recharge area functionality.
Sediment management	☐ Yes ☒ No	
Watershed management	☒ Yes ☐ No	Project is designed to reduce hazardous fuel profiles, reduce risk of high severity stand-replacing fire, and improve forest conditions within the watershed
People and Water		
Economic incentives	☐ Yes ☒ No	
Outreach and engagement	☐ Yes ☒ No	
Water and culture	☐ Yes ☒ No	
Water-dependent recreation	☐ Yes ☒ No	
Wastewater/NPDES	☐ Yes ☒ No	

Other RMS addressed and explanation:

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☐ Yes ☒ No
Funding Match Waiver request?: ☐ Yes ☒ No

	Category	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration**	$3,020			$3,020
b.	**Land Purchase/Easement**	0			0
c.	**Planning/Design/Engineering / Environmental**	$1,510			$1,510
d.	**Construction/Implementation**	$425,000			$425,000
e.	**Environmental Compliance/ Mitigation/Enhancement**	0			0
f.	**Construction Administration**	$5,700			$5,700
g.	**Other Costs**				
h.	**Construction/Implementation Contingency**				
i.	**Grand Total (Sum rows (a) through (h) for each column)**	$435,230			$435,230

j.	**Can the Project be phased?** ☒ Yes ☐ No If **yes**, provide cost breakdown by phases			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1	$108,810		Treatment of approximately 425 acres.
	Phase 2	$108,810		Treatment of approximately 425 acres.
	Phase 3	$108,810		Treatment of approximately 425 acres.
	Phase 4	$108,810		Treatment of approximately 425 acres.

k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**	The forested area will be maintained by the landowner through periodic biomass and timber harvests.
l.	**Has a Cost/Benefit analysis been completed?**	☐ Yes ☒ No
m.	**Describe what impact there may be if the project is not funded (300 words or less)**	The timber stands in the watershed will remain in an overstocked condition with fuel levels that are conducive to catastrophic wildfire. A catastrophic wildfire in this area would result in significant adverse impacts to water quality.

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☒ Yes ☐ No ☐ N/A			
b. Final Design	☒	☒ Yes ☐ No ☐ N/A			
c. Environmental Documentation (CEQA / NEPA)	☐	☐ Yes ☒ No ☐ N/A	Completion of appropriate biological and archaeological surveys.	1/16	5/16
d. Permitting	☐	☐ Yes ☒ No ☐ N/A	Preparation of appropriate harvest documents for submittal to CAL FIRE.	5/16	5/16
e. Construction Contracting	☐	☐ Yes ☒ No ☐ N/A	Prepare bid package for contractors and develop an agreement with a purchaser.	6/16	6/16
f. Construction Implementation	☐	☐ Yes ☒ No ☐ N/A	Conduct biomass harvest.	6/16	9/16
Provide explanation if more than one project stage is checked as current status					

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	
b. List technical reports and studies supporting the feasibility of this project.	Bales et al 2011. Forests and Water in the Sierra Nevada. SWEEP, Sierra Nevada Research Institute Report 11.1 Biswell H and J Agee, 1989. Prescribed Burning in California Wildlands Vegetation Management. Univ. of California Press. Bohm, B., 2008. Canopy interception in a coniferous forest in eastern Plumas County, California. Final Technical Summary Report. Prepared for Brian Morris, Plumas County Flood Control and Water Conservation District. Plumas Geo-Hydrology, July 28, 2008. Bosch, J.M. and Hewlett, J.D., 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. J. of Hydrology, 103: 323-333. Dunne, T. and Leopold, L.B., 1978, Water in environmental planning. W.H. Freeman and Company. New York. 814 pages. Miralles et al. 2010. EOS, Vol. 91, No. 43, page 404, 26 Oct., 2010. Pruitt, W.O., Freres, E., Snyder, R.L., 1987, Reference Evapotranspiration (ETo) for California. Agricultural Experiment Station, University of California. Bulletin 1922. Sahin V and M J Hall, 1996. The effects of afforestation and deforestation on water yields. Journal of Hydrology 178 (1996)

	293-309. Troendle et al 2007 Impacts of Vegetation Management on Water Yield. The Herger-Feinstein Quincy Library Group Project
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	As shown above numerous studies have been conducted that show that a reduction in forest canopy results in reduced interception which increases groundwater recharge and streamflow.
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☒ Yes ☐ No ☐ N/A If yes, please describe. The harvest will result in the production of wood chips which will be transported to a local co-generation plant where it will be burned to generate power.
e. Are you an Urban Water Supplier[1]?	☐ Yes ☒ No ☐ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ Yes ☒ No ☐ N/A
g. Is the project related to groundwater?	☐ Yes ☒ No ☐ N/A If yes, please indicate which groundwater basin.

[1] Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.
[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: Mountain Meadows Creek Biomass

Project applicant: W. M. Beatty and Associates

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☐ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☐ Not applicable
- ☐ Aging critical flood protection
- ☒ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

More resilient through less risk of “fire, flood, and mud” effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☒ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☒ Not applicable
- ☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

UF-11: Mountain Meadows Creek Biomass

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Rubber Tired Loaders	2	168	136
Excavators	1	168	73
Excavators	1	168	73
Other Construction Equipment	1	168	14
			0
			0
			0
			0
			0
			0
		Total Emissions	**296**

[X] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
1,380	43	**91**

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-11: Mountain Meadows Creek Biomass

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
1,700	**-10,710**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	387	$MTCO_2e$
In a given year, operation of the project will result in:	-10,710	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Agency / Organization	Soper Company
Name of Primary Contact	Ryan J. McKillop
Name of Secondary Contact	Paul A. Violett
Mailing Address	19855 Barton Hill Road, Strawberry Valley, CA 95981
E-mail	rmckillop@soperwheeler.com
Phone	530 675-2343
Other Cooperating Agencies / Organizations / Stakeholders	Upper Feather River IRWM Uplands and Forests workgroup members , including the Sierra Institute, W.M. Beaty and Associates, Inc., Collins Pine Company, USFS – Plumas Nat. Forest, IRWM Tribal Advisory Committee Representatives, etc.
Is your agency/organization committed to the project through completion? If not, please explain	At this point in time we are working with other cooperating agencies, organizations and stakeholders to complete Step 2 of the Project Solicitation, for inclusion into the IRWM Plan Update. The size and scope of the project will require a greater level of time and effort than Soper Company can provide, however we are committed to working towards developing the collaboration needed to move forward. A sufficiently staffed group or organization will bring the project forward from Step 2, and facilitate the design, implementation, effectiveness monitoring and maintenance of the project. The Feather River Stewardship Coalition, is developing a charter and governance structure under their CFRLA-RAC grant that will be a basis for the implementation and governance framework for this proposal.

II. GENERAL PROJECT INFORMATION

Project Title	UF-12: UFR Cooperative Regional Thinning
Project Category **Primarily Uplands and Forests but includes strategies and projects important to Tribal, meadow, and floodplain interests.**	☐ **Agricultural Land Stewardship** ☐ **Floodplains/Meadows/Waterbodies** ☐ **Municipal Services** ☐ **Tribal Advisory Committee** ☐ **Uplands/Forest**
Project Description (Briefly describe the project,	The purpose of the project is to: 1.) Reduce catastrophic wildfire in overstocked forests through forest thinning and 2.

in 300 words or less)	Restore the forest hydrograph by reducing the rate of conifer evapotranspiration and 3. Reduce conifer interception of rain and snow and enhance the infiltration of soil moisture by increasing spacing of dominant and codominant overstory trees. Projects that reduce forest densities closer to historic (pre-fire suppression) levels will be accomplished through a collaboratively developed suite of forest health enhancement projects that implement variable density thinning across the forested portions of the UFR region that increase the amount of groundwater available to retained trees and for downstream water needs, both as surface base and pulse flows, and as enhanced groundwater storage through implementing 7 "fire buffer" thinning strategies. Increasing the retention of snow in targeted critical habitat and key re-charge zones, especially at higher altitudes through appropriate thinning of small conifer encroachment into meadows, wetlands, springs, aspen and oak groves and riparian forests. Thinning on ridgetops to mimic historic fire patterns, for example, has especially significant potential to store snowmelt longer into the summer, when the value of water is greatest and forest ecosystem needs for water are highest. (Woods et al 2006, Sun et al 2015). The phased, cooperative project will be designed and implemented at a broad, multi-ownership, landscape level, thus leading healthier ecosystems and processes, and greater fire and climate change related resiliency that is closer to the historic pre-fire suppression forest structure. (RMS#s 10,21,22,23,24,25,26,27,28,30). In addition, this project addresses and initiates monitoring of the relationship between higher forest densities and declining water yields. Decades of fire suppression, together with the lack of economic feasibility of potential pre-commercial and commercial thinning projects, and subsequent markets for such material, plus the inability to incorporate public benefits such as water resources into forest management regimes, have lead to widespread water stressed forest conditions that are prone to catastrophic wildfire. Dense forests transpire more water from the soil and intercept and evaporate more rain and snow than less dense forests. Variable density thinning allows more rain and snow to reach the forest floor, enhancing water availability by increasing groundwater recharge, decreasing loss from evaporation, and extending the life of the snowpack in these areas by days or even weeks. The Project meets the following UFR IRWM Goals: 1. Protect and improve water quality and water supply reliability. 2. Protect and improve the health of the environment including fish, wildlife and the land. Project meets the following UFR IRWM Objectives: 1. Restore natural hydrologic functions. 2. Reduce potential for catastrophic wildland fires in the Region.

	3. Balance the needs of forest health, habitat preservation, fuels reduction, forest fire prevention, and economic activity in the Upper Feather River Region. 4. Build communication and collaboration among water resources stakeholders in the Region. 5. Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the Basin Plan. 6. Coordinate management of recharge areas and protect groundwater resources. 7. Improve coordination of land use and water resources planning. 8. Address economic challenges of agricultural (forest products and services) producers.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	The Project is located within the Upper Feather River (UFR) Integrated Regional Water Management (IRWM) boundary. The landscape-scale project encompasses some 2.3 million acres of watershed which is a critical headwater source and water supply area for the Sacramento Valley hydrologic basin, which has the capacity to store up to 13.5 million acre feet of water. Of this 2.3 million acre area, approximately 75% or 1.75 million acres are considered forested, and conservatively 50%, or 750,000 to 875,000 acres, could be considered overstocked and thus potentially eligible for active management over the next 10 years under this project proposal.
Latitude:	
Longitude:	The forested portions of UFR Basin is the project area.

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☐ Yes ☐ N/A	Within the last 100 years, suppression of fires has become a primary focus of federal, state and private efforts (Fites-Kaufmann et al. 2007). This factor, coupled with historic logging practices and lack of viable markets for biomass material, has led to large areas of Sierra forests that have become	Unable to quantify at this time. If we assumed up to 850,000 acres of treatment, with an average annual precipitation rate of 40", and a savings of 6.4" (16%), that

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		overly dense, thus prone to catastrophic wildfire, drought, and insect attack. Additionally, the increased stocking levels and the shift to more shade-tolerant species has led to increased rates of evapotranspiration compared to historic conditions. Approximately 24% of total precipitation (rain & snow) is intercepted by forest canopy and thus does not infiltrate into the soil (Bohm 2008). Preliminary UFR forest water water budget isotope data suggests that a minimal percent of winter precipitation is evapotranspired from the soil by forest vegetation in the Sierra Nevada compared to estimates by Dept. of Water Resources in 2005 of 70% summer soil evaporation. Overall, initial estimates for the Sierra Nevada are that thinning treatments will increase soil and groundwater infiltration by from a third of an acre-foot to an additional half an acre foot/acre, (Bohm, 2015)and enhance stream water flows from 8% to 10%. In wet years in snow zones, yields can increase by 16% and snow storage can be extended by days to weeks. (TNC & SWEEP, 2011).	translates to a gross gain of 398,400 acre feet of water.
Reduce potential for catastrophic wildland fires in the Region.	☐ Yes ☐ N/A	Conifer thicket thinning and restoration of meadows, riparian and aspen forests and black oak woodland openings in Sierran forests directly impacts severity and rate of spread of a wildfire and protects key forest habitats. Treated areas have greater crown separation, fewer ladder	

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		fuels and reduced ground fuels, resulting in a reduction in fire intensity, flamelength, rate of spread and spotting activity. Often times, treatment of areas can result in a rapidly moving crown fire dropping to the ground, reducing burn severity and enabling direct attack by fire crews.	
Build communication and collaboration among water resources stakeholders in the Region.	☐ Yes ☐ N/A	As a cooperative, region-wide project, collaboration among forest and water managers and stakeholders is a key element for project durability and success. Collaboration for this project will involve not only working together but also a greater level of outreach, education, project evaluation and adaptive learning thereby leading to a more encompassing and effective the project will become. Therefore, the project includes personnel and financial resources for the development of a science-based framework landscape level learning and adaptive project implementation.	Up to 750,000 acres of forestland within the UFR IRWM
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☐ Yes ☐ N/A	Increased reliability of downstream water supplies and timing of water supplies by reducing flood peaks and enhancing pulse and baseflows are primary objectives for this project. Although other valuable forest ecosystem benefits will accrue within the UFR IRWM region. Downstream SWP reservoir storage, hydroelectric – power generation and water based recreational opportunities will also benefit from an improved forest hydrograph.	Unquantifiable at this time For the Sacramento watershed, the value of agricultural and municipal uses is $36 per acre-foot (AF) of water runoff, and an additional $31 per acre-foot (AF) (average) in hydroelectric revenue (Stewart

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		The Upper Feather River IRWM region is the primary water source for the Oroville Reservoir of the State Water Project, one of two key water supply reservoirs in the Sacramento River Hydrologic Region, that in turn provides essential surface water for the Bay-Delta ecosystem and for water exports to Southern and coastal California. The SWP system provides water for 2.3 million Californians and irrigation water for 775,000 acres of farmland.	1996). More recent studies (Workman and Poulos, 2013) value water @ $450-$650/AF. In the 4 year drought, prices have risen to $1000/AF in Southern California and up to $5000/AF in the Reno, NV. Area. Wills- Personal communication, 2015)
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☐ ☐ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☐	Focused in the North Fork of the Feather River and one topic for IRWM Plan update discussions with PG&E, DWR, and participants in FERC 1962, 2105, 2107, 619 and 2100 relicensing proceedings.	
Address economic challenges of municipal service providers to serve customers.	☐ ☐ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☐ Yes ☐	The project not only has the direct effect of increasing forest ecosystem resiliency in treatment areas, it also has the potential to mitigate the recent rate of forest loss from fire. Negative impacts to water quality resulting from catastrophic wildfire are well documented, long-lasting, and costly.	Unquantified at this time. The latest analysis of land-cover trends by the U.S. Geological Survey (Raumann and Soulard 2007) estimates a nearly tenfold increase during the last

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		Conversion to brushfields reduces soil water moisture (Royce and Barbour, 2001) and (Sahin and Hall, 1995) Increasingly dense forests in a warming climate are predicted to reduce streamflows by 12% (Berghuijs et al., 2014) t0 26% (Goulden et al.,2014)). A key objective of this project to restore the forested watersheds and advance understanding of how this directly contributes to surface and particularly groundwater resources.	decade in the rate at which intact Sierra Nevada forests were converted to an "altered and often unvegetated state" by wildfires.
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☐ N/A	The Upper Feather River Region meets the definition of a "DAC" "region". The project has the potential to address the water needs of both DAC's and Native American groups, through enhancing recharge of groundwater for domestic and community wells serving DAC communities and households. Although no specific projects have been identified, the community (well) recharge area (CRA) fire buffer strategy provides opportunity for integrated projects with the IRWM tribal and municipal workgroups during the upcoming "projects integration workshop".	All of the Upper Feather River (UFR) Region.
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☐ N/A	Coordinating a designed, meaningful and lasting management regime of restored forested areas within identified recharge areas and protection and enhancement of groundwater resources within those same areas is a primary goal of this landscape project. Initially coordination is occurring	

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		at the conceptual stage of this project. It is intended that a collaborative management and financing infrastructure be established that will administer its implementation over a 10 year period. There are several examples on which to build: the Feather River Stewardship Coalition is developing a charter that could prove useful. The Sierra Institute helped launch the The Basins CFLR to the north and led the Burney Gardens CFRLA project that drew multiple private landowners together with agencies to advance multi-jurisdictional landscape work (See Kelly and Kusel 2015). The North Cal-Neva RC&D has also been identified as a potential regional administrative entity.	
Improve coordination of land use and water resources planning.	☐ Yes ☐ N/A	The Upper Feather River Region's recently promulgated memorandum of understanding (MOU) greatly expands the breadth of water interests participating in the IRWM process, which will therefore encourage the development and expansion of regional projects and programs such as this. Entities in the region will be encouraged to sign the MOU throughout the UFR IRWM Plan update process.	
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☐	TBD "Community Recharge Area" project specific.	
Effectively address climate change adaptation and/or mitigation in water resources management.	☐ Yes ☐ N/A	Climate change vulnerability assessments (Merriam et al 2013, Kozcot et al 2012, Westerling and Bryant 2008) indicate that forests within the Feather River Region	Up to 750,000 acres of forestland within the UFR IRWM at a 20,000-60,000 acre/yr.

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		may experience a shift in precipitation from snow to rain which will likely affect forest vegetation by increasing the growing season, increasing summer drought conditions, and increasing fire frequency and severity on the landscape. Trends of uncharacteristically large areas of high severity, stand- replacing fire have already been noted on the Plumas National Forest (Collins and Stephens 2012) and these trends have been increasing across the Sierra Nevada mixed conifer forest (Miller et al 2012). Negative impacts to water quality resulting from high severity stand replacing wildfire are well documented, long-lasting, and costly. Conversion of forest land to shrubfields reduces soil water moisture (Royce and Barbour, 2001, Sahin and Hall, 1995) In addition, increasingly dense forests in a warming climate are predicted to reduce stream flows by 12% (Berghuijs et al., 2014) t0 26% (Goulden et al.,2014). One of the few ways that California can address the negative impacts of climate change on water yield and storage in the Sierra Nevada is through forest restoration.. Targeted thinning of overly dense forests results in a healthier, more fire resilient landscape which also mitigates the effects of climate change by restoring forest density to desired historic conditions, in	annual scale of project implementation Over a 10 year period.

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		which the desired residual trees are less subject to moisture stress and thus less prone to mortality (Sun et al 2015). Landscape level treatments also mitigate the recent trend of loss of forest from catastrophic wildfire and declining summer stream flows. (Freeman 2008-2015)	
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☐	Supply efficiency will improve through reductions in evapotranspiration and increased infiltration into the soil. Reliability of water will improve through the timing of water availability that will extend further into the summer. Reducing flood peaks and delaying flood recharged water yields (not sure what flood recharged water yields mean) until the spring and summer enhances downstream reservoir operational flexibility. As the project progresses over time, more and more treated acres will further increase recharge and surface water supply reliability.	Estimates vary considerably regarding flow augmentation from restored forests, with quite limited understanding of groundwater contribution. While there is potentiatl of up to a 16% improvement in supply from treated acres. Potentially more supply from increased ability to accumulate and hold snowpack in targeted areas this project will advance critically needed restoration work along with improving understanding of the relationship between forest restoration and surface and groundwater supplies..
Enhance public awareness and understanding of water	☐ Yes		

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	Quantification (e.g. acres of streams/wetlands restored or enhanced)
management issues and needs.	☐ N/A		
Address economic challenges of agricultural producers.	☐ Yes ☐ N/A		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☐ Yes ☐ N/A	It is intended that an implementation infrastructure be established and an appropriately scaled and qualified group or entity be identified and/or developed to administer the implementation of this project, including grant funding, over a 10 year period. In the interim, the Sierra Institute, an IRWM MOU entity has agreed to sponsor Step 2 proposal development in partnership with the Uplands and Forests workgroup members.	

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☐ N/A	The UFR IRWM has allocated a seat on the Steering Committee for a tribal representative to ensure Native American water concerns are incorporated throughout the project implementation planning process. The tribal representative also participates in the Uplands and Forest Workgroup (UFW) as a member of the IRWM Tribal Advisory Committee (TAC). There is substantial opportunity for enhancing benefits to tribes as project integration develops between the UFW and the TAC and mutually beneficial projects are identified.

b. Disadvantaged Communities[1]	☐ N/A	Given the potential scope and life of the project, job creation for DAC communities and households s would be expected. Currently, there is not a sufficient infrastructure in place to handle the potential amount of biomass material that could be generated from a regional project like this, but there is the possibility that collaborative efforts like this could help secure a reliable, long term source of material, and thus creating a market for that material, and needed investment in such infrastructure. Tribal members from the Enterprise Rancheria are developing biomass processing facilities that offer Indirect benefits to DACs. By incentivizing projects in DAC areas, the town of Loyalton, a DAC community , would benefit from the reopening of the Loyalton biomass plant through employment opportunities in both the plant and in nearby forest thinning contracts, and the fuel wood production operation in Delleker, another DAC community., would also benefit from thinning projects undertaken in that area.
c. Environmental Justice[2]	☐ N/A	
d. Drought Preparedness	☐ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	The forested areas treated under this project would be better adapted for drier, warmer temperatures, more resilient to fire, and produce more available water. Reducing the density of overstocked forests decreases moisture stress and makes the desirable residual trees less prone to drought and insect caused mortality (McDowell and Allen 2015). Sun et al. 2015 suggests that forest management, specifically thinning, "substantially increase water yield and potentially mitigate the negative drought effects" of future climate change in concert with mitigating fire hazard. Sun et al 2015 discusses "Maintaining low density forest stands through thinning

		and understory control not only helps to produce more water from the soil for groundwater recharge and downstream users, and increase water availability for the remaining trees, but can also have additional benefits to improve wildlife habitats and forest resilience to disturbances (insect and disease and fires) (Grant et al.2013; McNulty et al. 2014)". Region-wide treatments also mitigates the recent trend of loss of forest from catastrophic wildfire. Additionally, forest species composition can be altered or restored, in-line with treatment objectives , to create a more historic species mix, where more shade intolerant and fire adapted species replace the shade tolerant, fire prone, and water guzzling forest thickets that exist in much of the Sierra Nevada today.
f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	GHG emissions from wildfires are by far, the largest sources of GHG emissions in the UFR IRWM region. In general, thinning of overly dense forests can generate carbon emissions in the short-term, primarily from heavy equipment used in harvesting and the trucking of the material, if it is hauled to another destination. "Carbon neutrality" of electrical power generation from biomass material is still being debated, but replacing fossil carbon use with biomass utilization is a "carbon neutral" green source of electricity particularly in the long-term. When increasing use of biomass for thermal uses are advanced, such as the biomass-powered cogeneration facility that is being constructed for the County's Health and Human Service Building and Feather River College, biomass use contributes to improved GHG benefits. This benefit strengthened when such use reduces open pile burning that increases releases of black carbon, PM 2.5 and other pollutants that compromise human health. Additionally, enhanced hydroelectric generation capacity through increased water produced by forest

		thinning in the NFFR portion of the watershed increases green energy in the UFR region.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☐ N/A	

A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .

[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.

[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☐	g. Drinking water treatment and distribution	☐ ☐ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☐	h. Watershed protection and management	☐ Yes ☐
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☐ Yes ☐	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ ☐ N/A
d. Non-point source pollution reduction, management and monitoring	☐ ☐ N/A	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☐
e. Groundwater recharge and management projects	☐ Yes ☐ N/A	k. Ecosystem and fisheries restoration and protection	☐ Yes ☐
f. Water banking, exchange, reclamation, and improvement of water quality	☐ ☐ N/A		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☐	The Community Recharge Areas (CRA) strategy will target thinning projects that may enhance groundwater recharge in the uplands surrounding agricultural operations and community settlements. Changing the timing and volume of municipal and agricultural water availability is a locally important outcome of improved forest water use efficiency.
Urban water use efficiency	☐ Yes ☐	Same as above.
Improve Flood Management		
Flood management	☐ Yes ☐	Flood peak attenuation is a predicted outcome of enhancing groundwater recharge.capacity. (Kavvas, 2008)
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☐	Enhancing groundwater recharge and storage provides additional "passive" conveyance through natural surface and groundwater pathways.
System reoperation	☐ Yes ☐	Flood peak attenuation in combination with pulse and base flow augmentation from large and strategically located thinning projects can enhance flexibility for downstream reservoir and hydroelectric generation operations. This may become an increasingly important adaptation strategy for a more variable precipitation regime. (TNC, 2015)
Water transfers	☐ Yes ☐	In the headwaters, water transfers occur at the interaction zones between surface and groundwater. The Critical Habitat Strategy targets restoration in and around meadows, riparian forests, springs, wetlands, etc. for protection from catastrophic fire.
Increase Water Supply		
Conjunctive management	☐ Yes ☐	Healthy headwaters function as passive conjunctive areas. Projects that enhance groundwater recharge and storage may facilitate opportunities for conjunctive use

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
		projects downslope and downstream from recharged upland groundwater aquifers.
Precipitation Enhancement	☐ No ☒	
Municipal recycled water	☐ No ☒	
Surface storage – regional/local	☐ Yes ☐	Same as system reoperation above.
Improve Water Quality		
Drinking water treatment and distribution	☐ No ☒	
Groundwater remediation/aquifer remediation	☐ No ☒	
Matching water quality to water use	☐ No ☒	
Pollution prevention	☐ No ☒	
Salt and salinity management	☐ No ☒	
Urban storm water runoff management	☐ No ☒	
Practice Resource Stewardship		
Agricultural land stewardship	☐ No ☒	
Ecosystem restoration	☐ Yes ☐	Effects of thinning overly dense forests include improvement of forest health and forest resiliency to damaging fire and water stress, as treated areas are designed to mimic historic hydrologic and fire disturbance conditions and processes once prevalent throughout the Sierra Nevada. The rate of loss of forests and forest related resources to catastrophic wildfire is slowed. Water stress effects from hotter and drier summers are mitigated. In summary, landscape scale thinning buffers forests from accelerating climate change.
Forest management	☐ Yes ☐	The purpose of this project to increase the pace and scale of ecosystem scale forest management for forest ecosystem health, restoration of hydrologic function, and climate resiliency. Overly dense forests would be thinned to reduce catastrophic wildfire and to restore the pre-fire suppression forest hydrograph.
Land use planning and management	☐ Yes ☐	Overlying forest owners and managers under California's groundwater legislation are now the region's largest groundwater managers. Regional land use planning and management will support forest thinning as an effective water management tool for maintaining forest landscapes and land uses and for regional

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
		water reliability.
Recharge area protection	☐ Yes ☐	Possibly. Project Specific
Sediment management	☐ Yes ☐	Possibly. Project specific. Projects with identified pre-existing point source and non-point source sediment issues can address and mitigate those sources of input.
Watershed management	☐ Yes ☐	Forest management is watershed management when forest restoration improves the forest hydrograph and surface and groundwater connectivity. At a landscape scale, integrated forest and watershed management connects forest ecosystem habitats and buffers precipitation extremes by increasing groundwater recharge and extending surface water base and pulse flow yields beyond yearly precipitation totals.
People and Water		
Economic incentives	☐ Yes ☐	The public benefits of integrating wildfire reduction with forest health and forest hydrograph restoration will be evaluated for credible outcomes which, in turn, become the basis for the project's ongoing public/private and landscape scale investment partnerships
Outreach and engagement	☐ Yes ☐ No	This project will continue to be vetted through the UFR IRWM Plan update and include coordination with the IRWM UF workgroup members' ongoing regional forest project development and funding processes
Water and culture	☐ Yes ☐	The project anticipates piloting the tribal ecological knowledge (TEK) consultation protocol in specific projects through Involvement with tribal affiliates.
Water-dependent recreation	☐ Yes ☐	Enhanced baseflows and pulseflows from treated areas could have measurable benefits for adjacent and downstream water-dependent recreation. By increasing spring, summer, and fall stream flows and inflows to waterbodies; forest thinning projects may enhance the timing and availability of recreationally valuable water.
Wastewater/NPDES	☐ ☒ No	

Other RMS addressed and explanation:

The workgroup reviewed and completed the "Other RMS Strategies" assigned by the RWMG.

The Uplands and Forest Workgroup's 7 Fire & Fuels Management Strategies as of 6/30/2015 are:

1. Ridgeline lightning, roadway, and railroad ignitions,
2. Critical habitat buffers,
3. Snow zone management,
4. Fire liability buffers,
5. Wildland-urban interface (WUI) management,
6. Community recharge area management,
7. Landscape-scale management (containing multiple (#1-#6) fire and fuels management strategies)

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: ☐ ☐ Unknown. Project specific
Funding Match Waiver request?: ☐ ☐ Unknown. Project specific

	Category Project expands current forest treated acres/yr from an est. 15,5000 acres/yr to 25,000 to 35,000 acres/yr. assuming additional 30%-50% $ for public benefits	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration @5% (May vary from $0 to >05%)**	$2,520,000.	Project Specific TBD	Project Specific TBD	Project Specific TBD
b.	**Forest treatments @ $1500/acre 18,000 ac./yr. @ $1,500/ac.**	$27,000,000.	Project Specific TBD	Project Specific TBD	Project Specific TBD
c.	**Planning/Design/Engineering / Environmental**	Unknown	Project Specific TBD	Project Specific TBD	Project Specific
d.	**Construction/Implementation**	Unknown	Project Specific	Project Specific	Project
e.	**Environmental Compliance/ Mitigation/Enhancement@$500/ac**	$9,000,000.	Project Specific TBD	Project Specific TBD	Project Specific
f.	**Project partner support @ 05%**	$1,800,000.	Project Specific	Project Specific	Project
g.	**Other Costs: Monitoring and Evaluation @ 10%**	$3,600,000.	Project Specific TBD	Project Specific TBD	Project Specific TBD
h.	**Contingency. Ground burning @ 30 years @ $500/ac.**	$9,000,000.	Project Specific TBD	Project Specific TBD	Project Specific
i.	**Grand Total (Sum rows (a) through (h) for each column) (per year)**	$50,400,000. (w/o a.) to $52,920,000.	Project Specific TBD	Project Specific TBD	Project Specific TBD
j.	**Can the Project be phased?** ☐ **Yes** ☐ Initial projects will include the suite of Step 2 Uplands and				

forest projects, and include Tribal projects and Meadows, floodplains and waterbodies workgroups projects that emerge from the IRWM Project Integration Workshop. Ongoing coordination with regional forest management projects that are CEQA and NEPA ready and which include some of the 7 fire buffer strategies and address issues identified in the Forest Issues and RMS and Forest Issues and Objectives tables will be prioritized for collaborative implementation funding and partnership capacity building. A key component is that this project is by its nature phased but with the important distinction that subsequent phases or actions will be based on lessons learned and adaptive improvement resulting from monitoring and assessment of the previous phases.

	Project Cost	O&M Cost	Description of Phase
Phase 1 (first 2 years)	IRWM Step 2 proposals and currently partially funded or unfunded CEQA and NEPA ready Firesafe Council, RCD, Private Forests, and National Forest Projects	Project Specific TBD	Project Specific TBD
Phase 2 Years 3-5	Scaling up to the appropriate economic and ecological scales. Targets piloting all 7 Fire Buffer Strategies and testing forest hydrograph, forest health and climate resilience metrics	Project Specific TBD	Project Specific TBD
Phase 3 Years 5-7	Includes science review by the science team and includes plans for integration of project monitoring with model development	Project Specific TBD	Project Specific TBD

	Phase 4 Years 7-10	Includes incorporation of prescribed fire as an O&M tool.	Project Specific TBD	Project Specific TBD
k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**		Project Specific TBD	
l.	**Has a Cost/Benefit analysis been completed?**		☐ ☒ **No TBD. Project specific.**	
m.	**Describe what impact there may be if the project is not funded (300 words or less)**		The scale and severity of forest megafires will increase. Key forest ecosystem habitats will continue to decline. Type conversion is a real threat to long-term forest and species health. Hydrologic function and yield will continue to degrade. Moisture stress and forest species mortality will increase and ecosystem richness and resiliency will continue to decline. Without the buffering effects of fully functioning forest and watershed ecosystems, downstream water supply, hydroelectric generation, and flood control infrastructure will increasingly be subjected to precipitation extremes beyond optimal engineering design and historic operating parameters.	

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☐ ☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
b. Final Design	☐	☐ ☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
c. Environmental Documentation (CEQA / NEPA)	☐	☐ ☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
d. Permitting	☐	☐ ☐ No	Project Specific TBD	Project Specific TBD	Project Specific TBD

		☐			
e. Construction Contracting	☐	☐ ☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
f. Construction Implementation	☐	☐ ☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
Provide explanation if more than one project stage is checked as current status			N/A		

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	Project Specific and including: Forest and Land Management Plans, County General Plans, Timber Harvest Plans, Watershed Assessment and Management plans. Carbon conservation and storage plans, GHG reduction plans, Basin Plans, FERC hydroelectric license plans and conditions, Habitat Conservation Plans, and Non-industrial Timber Management Plans etc.
b. List technical reports and studies supporting the feasibility of this project.	See attachments and including: • Bales et al 2011 Forests and Water in the Sierra Nevada: Sierra Nevada Watershed Ecosystem Enhancement Project (SWEEP Proposal) • Woods et al 2006 Snow accumulation in thinned lodgepole pine stands • Sun et al 2015 Modelling the potential role of forest thinning in maintaining water supplies under a changing climate across the conterminous United States • McDowell and Allen 2015. Darcy's law predicts widespread forest mortality under climate warming

c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	Please see the attached lists of references. There is scientific consensus about the threats of catastrophic wildfires to water quality and forest ecosystem health. There is an emerging body of study on effects of forest thinning on water yields and groundwater recharge and storage. See attached memos for further discussion. (Bohm, 2015)
d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ No ☑ N/A If yes, please describe.
e. Are you an Urban Water Supplier[1]?	☐ No ☑ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ No ☑ N/A
g. Is the project related to groundwater?	☐ Yes ☐ ☐ If yes, please indicate which groundwater basin. TBD. Potentially, some or all of the UFR groundwater basins identified in DWR Bulletin 118 and as depicted on UFR IRWM maps.

Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Attachments:

Bohm memos

Uplands and Forest Workgroup Issues and RMS and Issues and Objectives Tables

Memo on biomass costs

Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: UF-12: UFR Cooperative Regional Thinning

Project applicant: Soper Company

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires nonroad or off-road engines, equipment, or vehicles to complete.

☐ The project requires materials to be transported to the project site.

☒ The project requires workers to commute to the project site.

☐ The project is expected to generate GHG emissions for other reasons.

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

☒ The project requires energy to operate.

☐ The project will generate electricity.

☒ The project will proactively manage forests to reduce wildfire risk.

☐ The project will affect wetland acreage.

☐ The project will include new trees.

☒ Project operations are expected to generate or reduce GHG emissions for other reasons.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☒ Reduced snowmelt
- ☒ Unmet local water needs (drought)
- ☐ Increased invasive species

More resilient by improving available soil moisture for surrounding trees, and by enhancing recharge to groundwater aquifers.

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☒ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☒ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

More resilient by creating more availability of groundwater to feed nearby streams and by reducing water stress for water dependent vegetation.

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☒ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☒ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☒ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

More resilient by reductions in catastrophic wildfires and associated reductions in severely burned soils and erosion related impairments to water quality. And more resilient through Increased seasonal low flows to nearby streams and aquifers from reducing fire-prone conifer densities. Reduced forest densities in turn, reduce evapotranspiration competition and water stress levels for retained mature vegetation, including streamside vegetation, during the growing season. And more resilient by making more water available for beneficial uses through enhanced stormwater infiltration and groundwater recharge to forest soils and aquifers during the dormant season. Cold freshwater spawning habitat and wildlife habitat is enhanced by stream cooling in the summer that results from higher inputs of shallow groundwater to nearby streams and through enhanced shading and temperature moderation by well-watered streamside vegetation.

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☐ Not applicable
- ☐ Aging critical flood protection
- ☒ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

More resilient through less risk of "fire, flood, and mud" effects to downslope water bodies from large areas of severely burned forest stands and soils.

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☒ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☒ Fragmented habitat

More resilient from less erosion and sedimentation caused by severe wildfires. More resilient to habitat fragmentation by wildfire that is so severe and extensive that large acreages of mature forest habitats are converted into non-forest conditions, thereby reducing habitat availability and habitat connectivity for the iconic fish and wildlife species that are dependent on connected mosaics of mature forest habitats.

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☒ Not applicable
- ☐ Reduced hydropower output

May be applicable where fuels reduction projects at a landscape scale are effective in enhancing measureable summer flows in hydropower source watersheds (e.g. the North Fork Feather River that drains to Pulga, or in the watersheds draining to Lake Oroville on the Middle Fork of the Feather River below Sierra Valley.

UF-12: UFR Cooperative Regional Thinning

GHG Emissions Analysis

Project Construction Emissions

[X] The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
Rubber Tired Loaders	2	1,960	1,583
Excavators	1	1,960	857
Excavators	1	1,960	857
Other Construction Equipment	1	1,960	158
			0
			0
			0
			0
			0
			0
		Total Emissions	**3,455**

[X] The project requires biomass materials to be transported outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
16,100	100	**2,477**

[ ] The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

[ ] The project is expected to generate GHG emissions for other reasons. If yes, explain:

[ ] The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

UF-12: UFR Cooperative Regional Thinning

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☒ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
18,000	**-113,400**

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
1,800	**-7,794**

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	5,932	$MTCO_2e$
In a given year, operation of the project will result in:	-121,194	$MTCO_2e$

UPPER FEATHER RIVER IRWM

PROJECT INFORMATION FORM

Please submit by 5:00 p.m. on August 3, 2015, to UFR.contact@gmail.com

Please provide information in the tables below:

I. PROJECT PROPONENT INFORMATION

Prepared By:	Zeke Lunder – Deer Creek Resources, LLC - submitted for:
Agency / Organization	Plumas County
Name of Primary Contact	Randy Wilson
Technical Contact	Zeke Lunder
Mailing Address	555 Main St. Quincy, CA 95971
E-mail	randywilson@countyofplumas.com
Phone	(530) 283-7011
Other Cooperating Agencies / Organizations / Stakeholders	Upper Feather River IRWM Uplands and Forests workgroup members , including the Sierra Institute, W.M. Beaty and Associates, Inc., Collins Pine Company, USFS – Plumas Nat. Forest, IRWM Tribal Advisory Committee Representatives, PG&E, Stewardship Council
Is your agency/organization committed to the project through completion? If not, please explain	Deer Creek Resources is committed to seeing this project through to completion. We have long-time ties to the Region, and hope to support restoration and planning work here for as long as possible.

II. GENERAL PROJECT INFORMATION

Project Title	UF-13: UFR Cooperative LiDAR and GIS Support Program
Project Category **Integrated Project -**	**This project will support planning, implementation, and monitoring of any resource management project funded under the IRWM Program.**
Project Description (Briefly describe the project, in 300 words or less)	LiDAR scans the landscape and provides highly accurate information on the terrain and vegetation. The attached examples use LiDAR technology to characterize topography and vegetation for areas around Clio, in Eastern Plumas County. Such data exists for portions of the watershed, but more complete coverage is needed. LiDAR data has been captured for portions of the UFR Region (including the Moonlight and Storrie Fire areas, Meadow Valley and Mohawk Valley). This project will be a collaborative effort between the US Forest Service, Plumas County, and other IRWM signatories to fund acquisition of LiDAR

	topography data for the remainder of the Upper Feather River Watershed. This project will directly support mapping and project-design for a large number of other currently-proposed IRWM projects, and each project could potentially contribute a small portion of their budget to an overall mapping budget for the entire UFR Region.
Project Location Description (e.g., along the south bank of stream/river between river miles or miles from Towns/intersection and/or address):	The project would cover the entire Upper Feather River (UFR) Integrated Regional Water Management (IRWM) boundary, about 2.3 million acres, minus water surfaces on larger reservoirs.
Latitude:	
Longitude:	The entire UFR Basin is the project area.

III. APPLICABLE IRWM PLAN OBJECTIVES ADDRESSED

For each of the objectives addressed by the project, provide a one to two sentence description of how the project contributes to attaining the objective and how the project outcomes will be quantified. If the project does not address *any* of the IRWM plan objectives, provide a one to two sentence description of how the project relates to a challenge or opportunity of the Region.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Restore natural hydrologic functions.	☐ Yes ☐	LiDAR data will be useful in identifying areas of overstocked forests where thinning will increase groundwater infiltration and reduce the severity of future wildfires.	Unable to quantify at this time.
Reduce potential for catastrophic wildland fires in the Region.	☐ Yes ☐	LiDAR data can be analyzed to map fuel loading and prioritize specific area for hazard reduction thinning.	All WUI areas in the UFR region will be mapped and assessed for wildfire hazard. This project will update the 2004 Plumas County Hazardous Fuels Assessment and Butte County Community Wildfire Protection Plan.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
Build communication and collaboration among water resources stakeholders in the Region.	☐ Yes ☐	As a cooperative, region-wide project, collaboration among forest and land managers and stakeholders is a key element for project durability and success.	Training for local resource managers on how to use LiDAR at the project and landscape-scale.
Work with DWR to develop strategies and actions for the management, operation, and control of SWP facilities in the Upper Feather River Watershed in order to increase water supply, recreational, and environmental benefits to the Region.	☐ Yes ☐	Increased reliability of downstream water supplies and timing of water supplies by reducing flood peaks and enhancing pulse and baseflows are primary objectives for this project. Downstream SWP reservoir storage, hydroelectric – power generation and water based recreational opportunities will also benefit from an improved forest hydrograph.	Unquantifiable at this time.
Encourage municipal service providers to participate in regional water management actions that improve water supply and water quality.	☐ ☐ N/A		
Continue to actively engage in FERC relicensing of hydroelectric facilities in the Region.	☐ Yes ☐	PG&E's vegetation management coordinator for the UFR Region has expressed a verbal commitment to support this project with technical expertise, and potentially, by contributing PG&E's existing LiDAR data for their power transmission corridors.	LiDAR-based maps will be useful in developing ANY resource management activities within the FERC project areas.
Address economic challenges of municipal service providers to serve customers.	☐ ☐ N/A		
Protect, restore, and enhance the quality of surface and groundwater resources for all beneficial uses, consistent with the RWQC Basin Plan.	☐ Yes ☐	The project will support the Soper forest restoration project also proposed under this solicitation. As such, it will be used to develop projects that mitigate the negative impacts to water quality resulting from	Unquantified at this time.

Upper Feather River IRWM Objectives:	**Will the project address the objective?**	**Brief explanation of project linkage to selected Objective**	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		catastrophic	
Address water resources and wastewater needs of DACs and Native Americans.	☐ Yes ☐	The Tribal Advisory Committee for the UFR effort has identified restoration of spring and wetland areas as being one of the highest priority cultural land management focuses. Data from this project can be interpreted to identify spring areas and areas with topography that supports moist soil conditions.	All of the Upper Feather River (UFR) Region.
Coordinate management of recharge areas and protect groundwater resources.	☐ Yes ☐	Identifying priority watershed enhancement projects requires good, up-to-date information and a collaborative approach. From conceptualization to implementation and monitoring, data from this effort will be useful at all phases of on-the-ground resource management projects in the UFR region.	All of the Upper Feather River (UFR) Region.
Improve coordination of land use and water resources planning.	☐ Yes ☐	This project includes funding to continue to support GIS mapping work done during the UFR IRWM planning process. Maintaining a central GIS database will improve coordination between all parties involved in land and water management.	All of the Upper Feather River (UFR) Region.
Maximize agricultural, environmental and municipal water use efficiency.	☐ Yes ☐	LiDAR can be used to identify areas with the best characteristics for shallow groundwater storage and management.	All of the Upper Feather River (UFR) Region.
Effectively address climate change adaptation and/or mitigation in water resources management.	☐ Yes	One of the few ways that California can address the negative impacts of climate change on water yield and storage in the Sierra Nevada is through forest restoration. This project's data will be instrumental in development of	Up to 750,000 acres of forestland within the UFR IRWM at a 20,000-60,000 acre/yr. annual scale of project implementation

Upper Feather River IRWM Objectives:	Will the project address the objective?	Brief explanation of project linkage to selected Objective	**Quantification** (e.g. acres of streams/wetlands restored or enhanced)
		cross-boundary forest restoration projects. Targeted thinning of overly dense forests results in a healthier, more fire resilient landscape which also mitigates the effects of climate change by restoring forest density to desired historic conditions, in which the desired residual trees are less subject to moisture stress and thus less prone to mortality (Sun et al 2015). Landscape level treatments also mitigate the recent trend of loss of forest from catastrophic wildfire and declining summer stream flows. (Freeman 2008-2015)	Over a 10 year period.
Improve efficiency and reliability of water supply and other water-related infrastructure.	☐ Yes ☐	The LiDAR data is sufficiently detailed to be used in lieu of traditional surveying to conduct meadow, stream, and site surveys necessary to design and implement meadow restoration surface water management infrastructure projects.	
Enhance public awareness and understanding of water management issues and needs.	☐ Yes ☐	LiDAR data is useful in helping the public to visually understand complicated infrastructure and natural resource issues.	
Address economic challenges of agricultural producers.	☐ Yes ☐		
Work with counties/ communities/groups to make sure staff capacity exists for actual administration and implementation of grant funding.	☐ Yes ☐ N/A	This project includes funding to continue to support GIS mapping work done during the UFR IRWM planning process. Maintaining a central GIS database will improve coordination between all parties involved in land and water management.	

If no objectives are addressed, describe how the project relates to a challenge or opportunity for the Region:

IV. PROJECT IMPACTS AND BENEFITS

Please provide a summary of the expected project benefits and impacts in the table below or check N/A if not applicable; **do no leave a blank cell.** Note that DWR encourages multi-benefit projects.

If applicable, describe benefits or impacts of the project with respect to:		
a. Native American Tribal Communities	☐	The Tribal Advisory Committee for the UFR effort has identified restoration of spring and wetland areas as being one of the highest priority cultural land management focuses. Data from this project can be interpreted to identify spring areas and areas with topography that supports moist soil conditions.
b. Disadvantaged Communities[1]	☐	The data from this project will be instrumental in developing public support at the Statewide level for water-related restoration projects that will create jobs while improving public safety for the communities of the Region.
c. Environmental Justice[2]	☐	The Tribal Advisory Committee for the UFR effort has identified restoration of spring and wetland areas as being one of the highest priority cultural land management focuses. Data from this project can be interpreted to identify spring areas and areas with topography that supports moist soil conditions. Tending to the land is at the core of the Maidu way of life. Any project that empowers cultural land management practices increases the environmental justice within the region.
d. Drought Preparedness	☐ N/A	
e. Assist the region in adapting to effects of climate change[3]	☐ N/A	The forested areas treated under this project would be better adapted for drier, warmer temperatures, more resilient to fire, and produce more available water.

f. Generation or reduction of greenhouse gas emissions (e.g. green technology)	☐ N/A	LiDAR is one of the best available technologies for surveying aboveground biomass at the landscape-scale.
g. Other expected impacts or benefits that are not already mentioned elsewhere	☐ N/A	LiDAR provides highly detailed elevation mapping which can be used for floodplain delineation.

A Disadvantaged Community is defined as a community with an annual median household (MHI) income that is less than 80 percent of the Statewide annual MHI. DWR's DAC mapping is available on the UFR website (http://featherriver.org/maps/) .

[2] Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. An example of environmental justice benefit would be to improve conditions (e.g. water supply, flooding, sanitation) in an area of racial minorities.

[3] Climate change effects are likely to include increased flooding, extended drought, and associated secondary effects such as increased wildfire risk, erosion, and sedimentation.

DWR encourages multiple benefit projects which address one or more of the following elements (PRC §75026(a). Indicate which elements are addressed by your project.

a. Water supply reliability, water conservation, water use efficiency	☐ Yes ☐	g. Drinking water treatment and distribution	☐ ☐ N/A
b. Stormwater capture, storage, clean-up, treatment, management	☐ Yes ☐	h. Watershed protection and management	☐ Yes ☐
c. Removal of invasive non-native species, creation/enhancement of wetlands, acquisition/protection/restoration of open space and watershed lands	☐ Yes ☐	i. Contaminant and salt removal through reclamation/desalting, other treatment technologies and conveyance of recycled water for distribution to users	☐ ☐ N/A
d. Non-point source pollution reduction, management and monitoring	☐ Yes ☐	j. Planning and implementation of multipurpose flood management programs	☐ Yes ☐
e. Groundwater recharge and management projects	☐ Yes ☐	k. Ecosystem and fisheries restoration and protection	☐ Yes ☐
f. Water banking, exchange, reclamation, and improvement of water quality	☐ Yes ☐		

V. RESOURCE MANAGEMENT STRATEGIES

For each resource management strategy (RMS) employed by the project, provide a one to two sentence description in the table below of how the project incorporates the strategy. A description of the RMS can be found in Volume 2 of the 2013 California Water Plan (http://featherriver.org/2013-california-water-plan-update/).

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
Reduce Water Demand		
Agricultural Water Use Efficiency	☐ Yes ☐	This project will support the proposed 'Community Recharge Areas (CRA)' project which targets thinning projects that may enhance groundwater recharge in the uplands surrounding agricultural operations and community settlements. Changing the timing and volume of municipal and agricultural water availability is a locally important outcome of improved forest water use efficiency.
Urban water use efficiency	☐ Yes ☐	Same as above.
Improve Flood Management		
Flood management	☐ Yes ☐	LiDAR provides highly detailed elevation mapping which can be used for floodplain delineation.
Improve Operational Efficiency and Transfers		
Conveyance – regional/local	☐ Yes ☐	The LiDAR data is sufficiently detailed to be used in lieu of traditional surveying to conduct meadow, stream, and site surveys necessary to design and implement meadow restoration surface water management infrastructure projects.
System reoperation	☐ ☐ N/A	N/A
Water transfers	☐ ☐ N/A	
Increase Water Supply		
Conjunctive management	☐ ☐ N/A	
Precipitation Enhancement	☐ ☐ No	
Municipal recycled water	☐ ☐ No	
Surface storage – regional/local	☐ ☐ No	
Improve Water Quality		
Drinking water treatment and distribution	☐ ☒ No	
Groundwater remediation/aquifer remediation	☐ ☒ No	

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
Matching water quality to water use	☐ No ☒	
Pollution prevention	☐ No ☒	
Salt and salinity management	☐ No ☒	
Urban storm water runoff management	☐ Yes ☐	LiDAR can be used to analyze flow patterns in the urbanized landscape and design infiltration projects and implement other stormwater management BMPs
Practice Resource Stewardship		
Agricultural land stewardship	Yes	The LiDAR data is sufficiently detailed to be used in lieu of traditional surveying to conduct meadow, stream, and site surveys necessary to design and implement meadow restoration surface water management infrastructure projects.
Ecosystem restoration	Yes	Same as above
Forest management	Yes	LiDAR data can be used to conduct detailed forest inventories. These can identify overly dense forests for thinning to reduce catastrophic wildfire and to restore the pre-fire suppression forest hydrograph.
Land use planning and management	Yes	This project includes funding to continue to support GIS mapping work done during the UFR IRWM planning process. Maintaining a central GIS database will improve coordination between all parties involved in land and water management.
Recharge area protection	Yes	LiDAR can be interpreted to develop detailed mapping of the surface geology and identify important shallow aquifer areas.
Sediment management	Yes	LiDAR can be delivered as a 'bare-earth' model that shows gullies and landslides caused by forest roads or other historic land management – see attached example map.
Watershed management	Yes	LiDAR is the best available technology for mapping natural resources.
People and Water		
Economic incentives	Yes	The public benefits of integrating wildfire reduction with forest health and forest hydrograph restoration will be evaluated for credible outcomes which, in turn, become the basis for the project's ongoing public/private and landscape scale investment partnerships
Outreach and engagement	Yes	LiDAR maps can be used to illustrate any resource management topic or conversation

Resource Management Strategy	Will the Project incorporate RMS?	Description of how RMS to be employed, if applicable * anticipated outcomes assume project implementation at a pace and scale above minimum detection thresholds.
Water and culture	Yes	The Tribal Advisory Committee for the UFR effort has identified restoration of spring and wetland areas as being one of the highest priority cultural land management focuses. Data from this project can be interpreted to identify spring areas and areas with topography that supports moist soil conditions. Waterfowl hunting and fishing are very important parts of local culture also. LiDAR can be used to assess wildlife habitat conditions and develop projects such as duck nesting islands, stream restoration willow planting, or to locate low-lying areas that are good candidates for wetland restoration
Water-dependent recreation	Yes	See above.
Wastewater/NPDES	No	

Other RMS addressed and explanation:

<u>The workgroup reviewed and completed the "Other RMS Strategies" assigned by the RWMG.</u>
LiDAR can be used to support other projects including the Uplands and Forest Workgroup's 7 Fire & Fuels Management:

1. Ridgeline lightning, roadway, and railroad ignitions,
2. Critical habitat buffers,
3. Snow zone management,
4. Fire liability buffers,
5. Wildland-urban interface (WUI) management,
6. Community recharge area management,
7. Landscape-scale management (containing multiple (#1-#6) fire and fuels management strategies)

VI. PROJECT COST AND FINANCING

Please provide any estimates of project cost, sources of funding, and operation and maintenance costs, as well as the source of the project cost in the table below.

PROJECT BUDGET

Project serves a need of a DAC?: YES ☐ Unknown. Project specific
Funding Match Waiver request?: NO ☐ Unknown. Project specific

	Category funding	Requested Grant Amount	Cost Share: Non-State Fund Source* (Funding Match)	Cost Share: Other State Fund Source*	Total Cost
a.	**Direct Project Administration @5%**	$150-200K			$150-200K
b.	**LiDAR Acquisition**	$2M -3M 2 million acres at $1-1.50/acre	50% match from industrial timberland owners, USFS, and potentially Stewardship Council. Donation of existing PG&E and USFS data		$1M-1.5M
c.	**LiDAR Processing and UFR Project Support**	$500K	20% cost share from GIS Contractor		$400K
d.	**Construction/Implementation**	N/A			
e.	**Environmental Compliance/ Mitigation/Enhancement@$500/ac**	N/A			
f.	**Project partner support**				
g.	**Other Costs: Monitoring and Evaluation @ 20%**	N/A			
h.	**GIS Support to integrate LiDAR into UFR Project planning, implementation and monitoring**	$600K	20% cost share from GIS Contractor		$500K
i.	**Grand Total (Sum rows (a) through (h) for each column) (per year for years 1 & 2**	$3M to $4M			$2.05M-$2.55M

j.	**Can the Project be phased? ☐ YES ☐**			
		Project Cost	**O&M Cost**	**Description of Phase**
	Phase 1 (first 2 years)	**LiDAR acquisition and processing**	$2.5-$3.5M	Build LiDAR database and provide data products to UFR project partners
	Phase 2 Years 3-5	**GIS Support to integrate LiDAR into UFR Project planning, implementation and monitoring**	$600K	Project-specific LiDAR analysis – e.g. mapping forest structure, identifying spring areas,
k.	**Explain how operation and maintenance costs will be financed for the 20-year planning period for project implementation (not grant funded).**		Project Specific Future UFR projects will include a data management and mapping line-item in their budgets	
l.	**Has a Cost/Benefit analysis been completed?**		☐ **No** ☐	
m.	**Describe what impact there may be if the project is not funded (300 words or less)**		UFR resource management projects will cost more to implement and be less effective.	

*List all sources of funding.
Note: See Project Development Manual, Exhibit B, for assistance in completing this table (http://featherriver.org/documents/).

VIII. PROJECT STATUS AND SCHEDULE

Please provide a status of the project, level of completion as well as a description of the activities planned for each project stage. If unknown, enter **TBD**.

Project Stage	Check the Current Project Stage	Completed?	Description of Activities in Each Project Stage	Planned/ Actual Start Date (mm/yr)	Planned/ Actual Completion Date (mm/yr)
a. Assessment and Evaluation	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
b. Final Design	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
c. Environmental Documentation (CEQA / NEPA)	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
d. Permitting	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
e. Construction Contracting	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
f. Construction Implementation	☐	☐ No ☐	Project Specific TBD	Project Specific TBD	Project Specific TBD
Provide explanation if more than one project stage is checked as current status			N/A		

IX. PROJECT TECHNICAL FEASIBILITY

Please provide any related documents (date, title, author, and page numbers) that describe and confirm the technical feasibility of the project. See www.featherriver.org/catalog/index.php for documents gathered on the UFR Region.

a. List the adopted planning documents the proposed project is consistent with or supported by (e.g. General Plans, UWMPs, GWMPs, Water Master Plan, Habitat Conservation Plans, TMDLs, Basin Plans, etc.).	Project Specific and including: Forest and Land Management Plans, County General Plans, Timber Harvest Plans, Watershed Assessment and Management plans. Carbon conservation and storage plans, GHG reduction plans, Basin Plans, FERC hydroelectric license plans and conditions, Habitat Conservation Plans, and Non-industrial Timber Management

	Plans etc.
b. List technical reports and studies supporting the feasibility of this project.	Pennypacker, C.R., Marek K. Jakubowski, M. Kelly, M. Lampton, C. Schmidt, S. Stephens, R. Tripp, 2013. "FUEGO—Fire Urgency Estimator in Geosynchronous Orbit—A proposed early-warning fire detection system," in Remote Sensing, 5(10):5173-5192. Marek K. Jakubowski, W. Li, Q. Guo, M. Kelly, 2013. "Delineating individual trees from lidar data: A comparison of vector- and raster-based segmentation approaches," in Remote Sensing, 5(9):4163-4186. Marek K. Jakubowski, Q. Guo, M. Kelly, 2013. "Tradeoffs between lidar pulse density and forest measurement accuracy," in Remote Sensing of Environment, 130(15):245–253. Marek K. Jakubowski, Q. Guo, B. Collins, S. Stephens, M. Kelly, 2013. "Predicting surface fuel models and fuel metrics using lidar and CIR imagery in a dense, mountainous forest," in Photogrammetric Engineering & Remote Sensing, 79(1):37–49. Li., W., Q. Guo, Marek K. Jakubowski, M. Kelly, 2012. "A New Method for Segmenting Individual Trees from the Lidar Point Cloud," in Photogrammetric Engineering & Remote Sensing, 78(1):75-84. Blanchard, S.D., Marek K. Jakubowski, M. Kelly, 2011. "Object-Based Image Analysis of Downed Logs in Disturbed Forested Landscapes Using Lidar," in Remote Sensing, 3(11):2420-2439.
c. Concisely describe the scientific basis (e.g. how much research has been conducted) **of the proposed project in 300 words or less.**	The USFS has used LiDAR extensively to characterize forest canopies. Marek Jacubowski, PhD has published peer-reviewed papers specifically on this topic, and he will be a key team member on this project.

d. Does the project implement green technology (e.g. alternate forms of energy, recycled materials, LID techniques, etc.).	☐ No ☒ N/A If yes, please describe.
e. Are you an Urban Water Supplier[1]?	☐ No ☒ N/A
f. Are you are an Agricultural Water Supplier[2]?	☐ No ☒ N/A
g. Is the project related to groundwater?	☐ Yes ☐ ☐ If yes, please indicate which groundwater basin. TBD. Potentially, some or all of the UFR groundwater basins identified in DWR Bulletin 118 and as depicted on UFR IRWM maps.

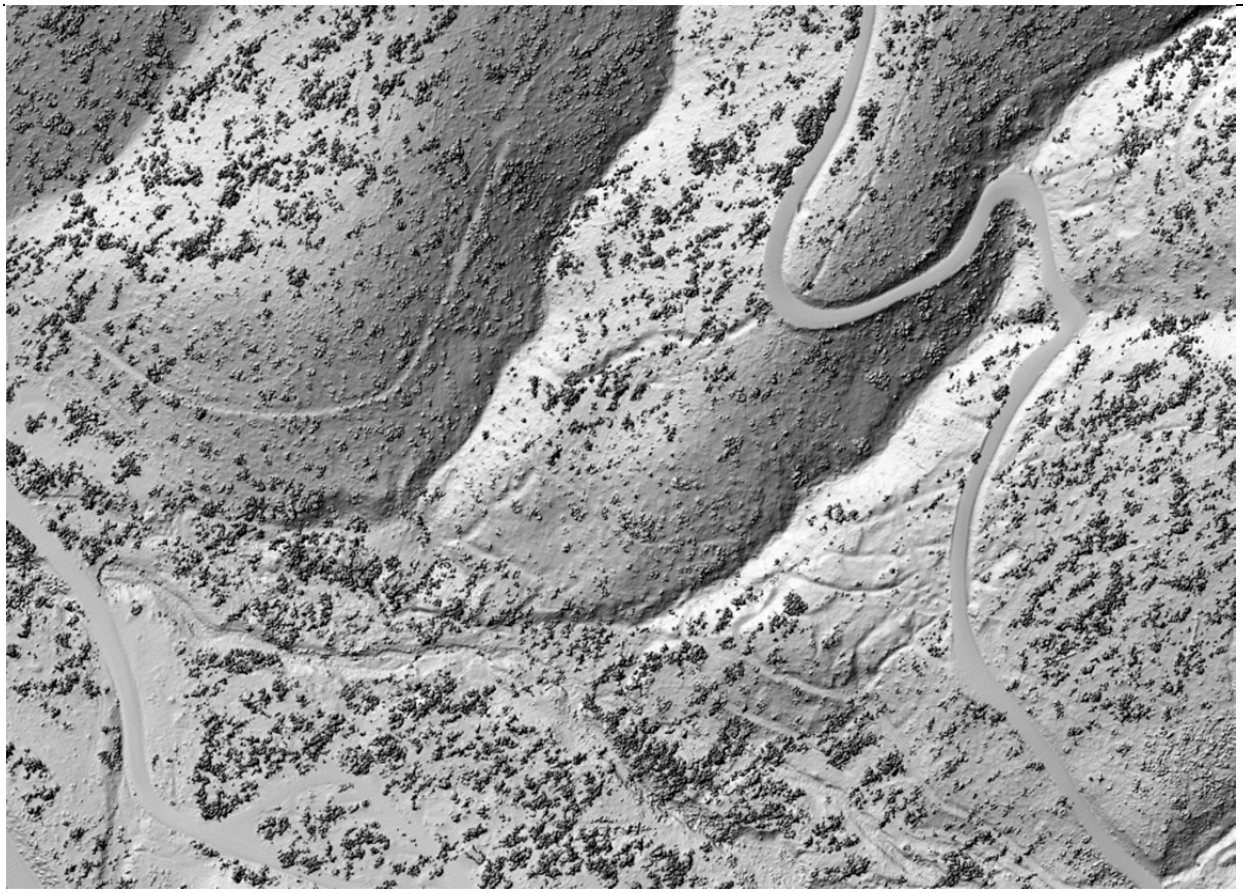
Urban Water Supplier is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

[2] Agricultural Water Supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Attachments:

LiDAR mapping example for Eastern Plumas County

LiDAR Imagery for the Clio Area – shows road fills, gullies, floodplain, channels, potential flood risk.



Example use of LiDAR elevation data to evaluate stream channel areas and map forest road-related erosion.

LiDAR Imagery showing forest density and age classes in same area as bare-earth image, above.