

Appendix B-8

LAKE TAHOE RESTORATION PROJECTS ESTIMATED NECESSARY EXPENSES & KEY MILESTONE DATES

Project Name: Restoration of Fire Adapted Meadow Ecosystems Agency: US Forest Service
 Prepared by: Sarah Muskopf Phone: 530-543-2835 EIP #: 4
 SNPLMA Project No.: F086

Identify estimated costs of eligible reimbursement expenses:

1. Planning, Environmental Assessment and Research Costs (NFMA, NEPA, vegetative trend

monitoring in eight meadows) \$ 20,000 7 %

2. FWS Consultation—Endangered Species Act \$ 0 0 %

3. Direct Labor (Payroll) to Perform the Project \$ 30,000 10 %

4. Project Equipment (trimble GPS.) \$ 2,000 1 %

5. Travel (per diem for UC Davis travel to discuss analysis.) \$ 2,000 1 %

6. Official Vehicle Use (pro rata cost for use of Official Vehicles when required to carry out project) \$ 5,000 1.7 %

7. Cost of Contracts, Grants and/or Agreements to Perform the Project \$ 25,000 8.3 %

8. Other Direct and Contracted Labor:

Contract for vegetative treatments (lodgepole thinning) and prescribed fire, Agency payroll for the Contracting Officer to do project procurement, COR, Project Manager, Project Supervisor, and subject Experts to review contracted surveys, designs/drawings, plans, reports, etc)

\$ 180,000 60 %

9. Other Necessary Expenses

(10% overhead, 2% environmental ed.) \$ 36,000 12 %

TOTAL: \$ 300,000 100 %

Estimated Key Milestone Dates:

Milestones/Deliverables:	Date:
Complete restoration plan and design report	3/30/2009
Complete NFMA and NEPA	8/15/2009
Thin lodgepole pine in 100 acres	10/30/2009
Broadcast burn 400 acres in selected 8 meadows	11/15/2009
Phase 3 (thin and burn additional 10 meadows/500 acres)	11/15/2010
Final Completion Date:	03/31/2011

**APPENDIX K
LAKE TAHOE CAPITAL PROJECT PROPOSAL
ROUND 9**

Consistency with Lake Tahoe nomination criteria:

Project nominations must qualify as an Environmental Improvement Program (EIP) project and be the responsibility of the federal government (federal share responsibility); and have a willing and ready federal sponsor.

Project nominations must be consistent with one of the focus areas in the June 2006 Federal Vision (pp. 8-9) (<http://www.fs.fed.us/r5/ltbmu/documents/lbec/revised-FV-Final.pdf>) and fit into at least one category.

Capital Focus Area (2006 Federal Vision): Watershed and Habitat Improvement _____

Circle a minimum of one category:

1. Continued emphasis on fuels reduction in coordination with projects funded under the 2006 SNPLMA amendment (the "White Pine" amendment).
2. Continued implementation of projects approved in Rounds 5 through 8 which implement the EIP. Project proposal should clearly describe the phase/product being produced along with the consequence of not completing the project phase proposed for Round 9.
List project(s): Round 7 Meadow Restoration (F086) \$93,600 EIP #4
3. Project is consistent with and contributes toward TMDL pollutant reductions within the four source categories (atmospheric, urban & groundwater, forested uplands, and stream channel).
List category(ies): _____
4. Control of aquatic invasive species and prevention of new aquatic invasive species.

Project Name:
Restoration of Fire Adapted Meadow Ecosystems

EIP #: 4

Lead Agency:
US Forest Service

Contact:
Sarah Muskopf

Threshold: SC, F, W, SR, WQ, V

Phone Number:
530.543.2835

Threshold Standard:
SC2, F2, W1, W2, SR2, SR3, WQ1-6, V1, V4

Email Address:
smuskopf@fs.fed.us

Funding Requested in this Round:
\$300,000

Total Project Cost:
\$700,000

Is this a multi-year Project? (If "Yes", describe in the Detailed Project Description below number of years or phases and which year the requested funding will cover)

YES

Project Summary (maximum 200 words): (applicable ONLY to this Round 9 project):

Meadows in the Lake Tahoe Basin (LTB) are spatially limited resources that play a crucial role in hydrologic processes, erosion control, nutrient cycling, and habitat for many plant and animal species. Past land use, specifically grazing and fire suppression, coupled with droughts (possibly driven by global warming) has impaired natural function and processes of many meadows in the Basin. Meadows were surveyed in 2004 and grouped by similarities in vegetation, elevation, depth to saturation, precipitation and temperature. As part of SNPLMA Round 7 funding, representative meadows from each group will have experimental burns (2m²) along designated transects in 2008 to determine the effectiveness of fire in suppressing small diameter conifers and to determine the effects on native herbaceous vegetation. This Round 9 project proposes to burn and thin vegetation, where needed, in selected meadows, based on ecological trends and information gained from experimental burn plots, in order to reintroduce a natural fire regime to these [previously] fire-adapted ecosystems.

Detailed Project Description (focuses on what Round 9 is funding; list the number of years or phases the Round 9 requested funding will cover; if phased, briefly describe how this project links into previously phased projects including what remains for Rounds 10 and beyond).

Funds requested for Round 9 will be used to complete Phase 2 of this project (formerly known as the "Meadow Restoration Project"). Phase 1 was funded in Round 7 (\$93,600) and allowed us to test the effects of fire in meadow systems, both positive and negative, specifically relating to the potential for cheatgrass invasion, lodgepole mortality and native vegetative response on ten meadows around Lake Tahoe. Phase 1 will be completed in 2008. With this information gained, the funds from Round 9 will be used to:

- complete the needed environmental documentation (NFMA and NEPA)
- survey vegetative trend transects in selected meadows (eight meadows based on results from phase 1 and their ecological status and importance)
- implement lodgepole thinning in selected meadows (100 acres)
- implement prescribed burns that mimic the natural fire regime in selected meadows (400 acres)

Implementation is intended to reestablish the natural processes and natural vegetation in eight meadows around the LTB. The selection of these meadows will be based on the results from Phase 1 and their ecological status and ecological importance.

A Round 10 proposal (Phase 3) will be submitted requesting \$300,000 to implement prescribed fire and lodgepole thinning in an additional ten meadows (500 acres) and to conduct vegetative monitoring in meadows burned with Round 9 funding.

In the Sierra Nevada of California, meadows play important roles in hydrology, erosion control, nutrient cycling, provision of animal food and shelter, and human recreation. Meadows are also important in maintaining hydrological processes downstream, conserving stream flows, channel erosion, and nutrient loads (Carter 1986, Johnston 1991, Johnston 1993).

Meadow drying is one of the most significant forms of change that has occurred in the LTB and many other places in the Sierra Nevada, primarily as a result of past overgrazing (Wagoner 1886, Hughes 1934, Ratliff 1985, Menke et al. 1996). Montane meadows have been identified among the most vulnerable and impacted habitat types of the Sierra Nevada (Kattelman and Embury 1996, USFS 2004), and the Tahoe Regional Planning Agency (TRPA 2002) has identified meadow ecosystems as an important focus area for restoration efforts in the LTB.

Droughts are a familiar stressor on Basin vegetation; whereas, global warming is a newly recognized threat to the condition of Sierran meadows that may be a significant contributor to droughts and is likely to

exacerbate the problem of meadow drying. Because of their high sensitivity to drying, montane meadows have been suggested as early indicators of environmental changes associated with global warming (Debinski et al. 2004).

Meadow drying has been observed to cause the replacement of native perennials with non-native annuals (Burcham 1970, Hagberg 1995). Meadow drying is also believed to be a major reason for the invasion of Sierran meadows by the native lodgepole pine (*Pinus contorta*). Meadow restoration via the removal of lodgepole pine is currently a major focus area in the LTB, and prescribed fire is one potentially powerful tool that is being proposed (TRPA 2002).

Describe the goals and objectives of the project (those applicable ONLY to this Round 9 project):

Goal: Restore montane meadows in the Lake Tahoe basin to a desired fire-adapted condition in which they support plant communities that function within the natural range of variability, meadow processes (physical and biological) are comparable to historic conditions, herbaceous species composition is predominately native, and meadows provide a wide range of habitat.

Objective 1: Reestablish fire in [previously] fire-adapted ecosystems as a management tool to reclaim meadow ecosystems.

Objective 2: Increase water availability and meadow wetness by significantly reducing the presence of lodgepole pine and other conifer species within meadows and increasing the presence of native riparian plant communities.

Describe the anticipated project accomplishments (i.e. products or identifiable environmental benefits being produced or implemented under this project):

The ecological status of meadow vegetation will become late seral, with a high similarity to the “potential natural vegetation” (PNV) community. A diversity of age classes of herbaceous and hardwood shrubs will be present and regeneration will be occurring.

Hydrologic function in meadows will be enhanced. Herbaceous and riparian shrub rooting will occur throughout the available soil profile. Meadows with perennial and intermittent streams will 1) dissipate stream energy from high flows, thereby reducing erosion and improving water quality, 2) meadows will filter sediment and capture bedload, with subsequent floodplain development, 3) meadow conditions will enhance floodwater retention and groundwater recharge, and 4) root masses will stabilize streambanks against cutting action.

Meadows will provide habitat for species dependant on both aquatic and terrestrial habitat types, specifically threatened, endangered or sensitive species.

Describe the “readiness” of this project to move forward (urgency, capacity, capability, environmental documentation etc.):

- Vegetative trend transects were established in 49 meadows within Lake Tahoe Basin.
- The analysis of the trend transects was completed in 2004 and current ecological conditions were evaluated.
- An agreement with UC Davis was established in 2006 to further analyze results from the 2004 trend transects. Through this analysis, the 49 meadows were divided into five groups based on ecological status, elevation, precipitation, temperature, and depth to saturation. Two meadows from each group

were selected to implement a burn box experiment to examine the effects of fire on cheatgrass establishment and spreads (to be done only in Basin meadows where cheatgrass already exists), lodgepole pine survival and plant community. Additionally, a predictive model of cheatgrass invasion risk will be developed.

- Phase 1 including environmental review, implementation and analysis will be completed in the fall/winter of 2008.

Describe partnerships for this project. (if applicable, project should identify partner funding [committed/secured] and how it is integrated into the project)

- University of California Davis: CESU Joint Venture Agreement Modification CESU-06-JV-11052007-004 between USDA FOREST SERVICE, Pacific Southwest Region and the University of California, Davis. LTBMU has contributed \$17,000 (SNG086 Round 7 SNPLMA) for this agreement.
- Tahoe Regional Planning Agency (TRPA)
- Lahontan Regional Water Quality Control Board (LRWQCB)

No appropriated funds are available for this project.

Describe the project monitoring that will be implemented as part of this project including:

1) The questions the monitoring program is designed to answer

- How effective is prescribed fire as a management tool in the restoration of native plant communities in meadows?
- How often is fire needed during the initial restoration effort to eliminate lodgepole pine and lodgepole pine seedlings from meadows (i.e. are two consecutive years of burning required to successfully remove lodgepole pines?)
- Will removal of lodgepole pine in meadows increase groundwater levels and meadow wetness?

2) The monitoring approach (describe the methods and strategies [i.e. monitoring, research, or both] that will be used to verify whether the project goals and objectives have been met. A detailed monitoring/research plan is not required, but enough detail must be provided to allow someone that is unfamiliar with the project to understand and evaluate the proposed methods and strategies.)

Round 9 funds will be used to conduct two years of post-treatment monitoring to test the effectiveness of fire and thinning for reducing lodgepole pine, increasing native species composition, and increasing groundwater levels and meadow wetness.

Monitoring approaches will include vegetations plots (R5 Vegetative Trend Monitoring Protocol), vegetative transects, piezometers for groundwater monitoring, and photo points. These approaches will allow us to answer key monitoring questions. Vegetation transects and additional piezometers will be installed prior to implementation, to facilitate monitoring of fire effects across the meadow.

A monitoring plan will be developed before completion of the NEPA decision document using results from phase1, pre-restoration monitoring data, site potential, and desired conditions documents.

Future, longer-term effectiveness monitoring will need to be funded through research proposals funded through the TSC process, or the USFS monitoring program funded through base appropriations and/or the SNPLMA funded NEPA Resource Surveys Project, as available.

3) Whether this project monitoring fits into a larger monitoring or research program (including how information from the monitoring and research will be used to improve the continued performance of the proposed project or improve future similar projects)

The monitoring identified for this project is part of the overall Forest Plan monitoring effort for the Lake Tahoe Basin Management Unit. Results and accomplishments of all Forest Monitoring are summarized every year in the Annual Forest Monitoring Report. When appropriate, interpretation of results is integrated at the programmatic, forest, and sometimes Regional level. For this project integration at a larger scale is expected as results will be incorporated into the Region 5 Rangeland Monitoring Project.

Round 7 is funding research on the effects of fire on cheatgrass establishment, lodgepole pine survival, and plant community response. A predictive model will be created of cheatgrass invasion risk for LTB. Research results will aid in the prioritization of meadows scheduled for prescribed fire for this project, provide information for meadow restoration monitoring plan, as well as provide invaluable information for land managers planning prescribed fire in other areas (i.e. Big Meadow, High Meadows, Meeks Meadow), specifically on the cheatgrass component. Additionally, all 49 vegetative trend transects surveyed in 2002 will be resurveyed in 2008 field season. These data will be used to determine the ecological trend, as well as be incorporated regionally into the Rangeland Monitoring Project. Piezometers were installed in twelve meadows selected for the burn box experiment to determine groundwater changes.

Trend transects and vegetation transects established in burned meadows will be monitored for two years following implementation and are recommended to be repeated subsequently every five years. Round 9 funding will be used for 2010 and 2011 post-treatment monitoring; whereas, additional funding from other sources will be needed for subsequent monitoring. Piezometers will be measured twice a month (more frequent measurements will be weather dependant) during spring and summer in 2010 and 2011. This information will also be incorporated into the Region 5 Rangeland Monitoring Project.

Describe these two items which will be considered along with the above project monitoring information by the Tahoe Science Consortium related to research and monitoring resource areas and the effectiveness of environmental restoration activities:

1) Describe the specific goals and objectives of the project and describe how fulfilling those objectives will contribute to the achievement of one or more environmental thresholds.

The goals of this project are to restore montane meadows in the LTB to a desired fire-adapted condition which supports native plant communities that are established within the natural range of variability, and enhances physical hydrologic processes that are comparable to historic conditions, and provides diverse habitats for aquatic and terrestrial species.

The objectives for this project include: (1) reestablish fire in fire adapted ecosystems as a management tool to reclaim meadow ecosystems and (2) increase water availability by significantly reducing the presence of lodgepole pine and other conifer species within meadows and increasing the presence of native riparian plant communities.

By fulfilling the above mentioned objectives, we will contribute to the attainment of soil conservations thresholds, specifically standard SC2 stating: “preserve existing naturally functioning SEZ lands in their natural hydrologic condition, restore all disturbed SEZ lands in undeveloped, unsubdivided lands, and restore 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided to attain a five (5) percent increase in the area of naturally functioning SEZ lands”. By contributing to the success of

SC2, the objectives will also aid in the success of threshold standard W2. Standard W2 states “a nondegradation standard shall apply to significant wildlife habitat consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of such riparian associations.”

Additionally, by successfully fulfilling objectives and restoring natural meadow processes, we will contribute to the achievement of standards set in the Water Quality threshold by reducing sediment load, reducing stormwater and surface water runoff, and decreasing sediment entering stream channels.

2) Describe the risk to the environment from failure of the proposed project (i.e. if the project fails what is the environmental consequence).

Montane meadows play a unique and crucial role in the ecology of many aquatic and terrestrial wildlife species. Past management has critically altered the ability of montane meadows to support these habitat dependant species as well as to perform other physical processes needed to reduce nutrients and sediments from entering adjacent stream channels. Without appropriate management actions, similar to cultural practices prior to European settlement, many meadows will be lost to conifer encroachment and nonnative plant communities. “The protection and restoration of stream environment zones are essential for improving and maintaining the environmental amenities of the Lake Tahoe Basin and for achieving environmental thresholds for water quality, vegetation preservation, and soil conservation” (TRPA 1986)

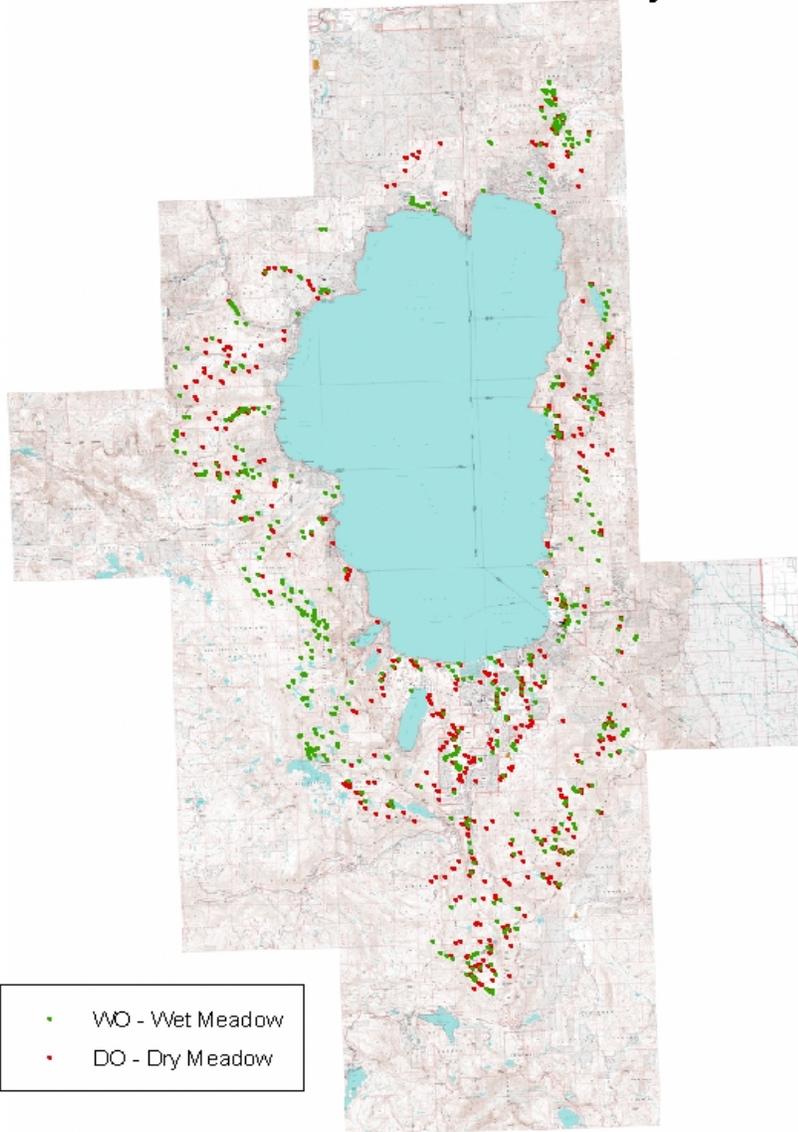
Risks to the environment could include but are not limited to reductions and/or extirpation of some riparian dependant species, increased nutrient and sediment loading into streams adjacent to nonfunctioning meadows, and potentially increased fire hazards due to excessive conifer encroachment in meadows.

Describe how the project results will be communicated and made available to the public.

The information created from this project will be disseminated to three audiences: 1) the general public, 2) other resource agencies, and 3) the broader scientific community. The audiences will be informed respectively through the USFS website, public/interagency meetings, and peer-reviewed publications.

Additionally, the results and accomplishments will be summarized in the Annual Forest Monitoring Program Report, as well as project specific monitoring reports. Project specific monitoring reports will be produced one to five years post project implementation, depending on variables being monitored and questions to be answered.

Meadow Restoration Project



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