



USDA Forest Service
Pacific Southwest Region
Lake Tahoe Basin Management Unit



Pre-Decisional Memo
For Implementation of the
Meadow Restoration Pilot Project
Carson City and Douglas Counties, Nevada
El Dorado County, California

BACKGROUND:

The proposed project encompasses eight meadows located around the Lake Tahoe Basin Management Unit (LTBMU). Proposed meadows include High Meadows, Edgewood Meadow, Big Meadow, Baldwin Meadow, Meeks Meadow, Slaughterhouse Meadow, Grass Lake, and Meiss Meadow (see map). These meadows were selected to represent the moisture gradient (east to west precipitation) and temperature gradient (low to high elevation) around the Lake Tahoe Basin (LTB).

Grass Lake is a designated Research Natural Area (RNA) and considered the largest *Sphagnum* bog in California and the best representative floating bog in the Sierra Nevada. The RNA program is a nationwide system created to protect a network of federally administered public lands for the primary purposes of maintaining biological diversity, providing baseline ecological information, and encouraging research and university natural-history education. Areas selected exemplify minimally disturbed ecosystems representative of the range of widespread and unique natural vegetation types on federal lands. Non-manipulative research, monitoring, and education are promoted on these RNA lands. In California, the RNA program is administered jointly by the USDA Forest Service Pacific Southwest (PSW) Research Station and Pacific Southwest Region. Prior to any implementation activities in Grass Lake, the Station Director from PSW would provide an approved application and letter giving the LTBMU authority to implement the proposed action within the RNA.

This project would examine the relationship between climate change, fire, and species invasion in meadows of the LTB and would consist of niche modeling, historical change detection, and small scale field experimental burn treatments. Focus would be on two ecological aspects of concern in meadows: cheatgrass (*Bromus tectorum*) invasion and lodgepole pine (*Pinus contorta*) encroachment.

The results of the research would be used to create design criteria that could be incorporated at the project level. Projects are currently being planned in the LTB that intend to utilize fire as a restoration tool. The design criteria gathered through this pilot project would improve land and project managers understanding of a meadows resistance

to species invasion, natural community restoration potential, and the ability to sustain biodiversity and ecosystem function in meadows in the face of changing climate and anthropogenic disturbance. In short, this project would inform project managers and decision makers as to (1) the risk of cheatgrass invasion in LTB meadows and the effects of prescribed fire on cheatgrass establishment and spread, (2) the probability that lodgepole pine encroachment in LTB meadows can be controlled by prescribed fire, and (3) the response of native meadow vegetation communities to fire.

The goals are to understand how moisture and temperature gradients and other factors affect plant composition in meadows and affect response to prescribed fire treatment, to predict future impacts, and to suggest management solutions. To achieve these goals, small scale burns (less than 1 acre per meadow) would be implemented along transects in each meadow to test fire affects.

Objective 1: Create a predictive model of cheatgrass invasion risk for the LTB.

While cheatgrass is present in the LTB, it has not yet become abundant in most meadows. In an effort to forecast if climate change or meadow disturbance would trigger further cheatgrass establishment and spread, we will model the environmental factors related to current cheatgrass distribution and abundance in adjacent areas. Such a model will then be used for predicting the spread of cheatgrass in the LTB under climate change scenarios. We will assess three hypotheses:

H₁: Cheatgrass distribution is strongly related to the regional and local moisture gradients, and cheatgrass is more prevalent and abundant at the drier ends of these gradients.

H₂: Conditions suitable for cheatgrass establishment and spread are already widespread in the LTB, but the species has not yet reached most of these suitable locales.

H₃: The future climate that is forecast for the Sierra Nevada will expand the suitable habitat for cheatgrass establishment and spread in the LTB.

Objective 2: Examine the effect of fire on cheatgrass establishment and spread.

The addition of fire in meadows has been proposed to manage conifer encroachment in meadows of the LTB. To examine if fire will facilitate cheatgrass establishment and spread, we will conduct pre and post-fire surveys of cheatgrass performance on burns scheduled for fall of 2008 as well as on experimental burn treatments using burn-boxes. We will assess the following two hypotheses:

H₁: Cheatgrass growth and reproduction will increase in burned plots, relative to unburned controls.

H₂: The magnitude of this increase will be greatest at the dry end of the regional and local moisture gradients.

Objective 3: Analyze lodgepole pine invasion using direct tree aging and aerial photographs from 1930 to present.

Many causes of woodland encroachment have been documented, including fire suppression, periods of warm, dry climate, and disturbance (e.g., Wood 1975). To determine appropriate restoration techniques for conifer invasion in the LTB, it is important to understand the history and controls of invasion. Also, an examination of invasion history will identify which meadows are most invaded and help in prioritizing management efforts. We will assess the following two hypotheses:

H₁: Spatially, lodgepole distribution in meadows is strongly related to regional and local moisture gradients, with lodgepole being more prevalent and abundant in meadows at the drier ends of these gradients.

H₂: Temporally, lodgepole invasion is associated with the occurrence of warm, dry years.

Objective 4: Examine the effect of fire on lodgepole pine survival and the native meadow plant community.

Prescribed fire may be an effective way to deter lodgepole pine establishment and growth. However, in addition to removing the lodgepole from meadows, it is important to monitor what returns following disturbance from fire. Understanding the response of lodgepole pine and the surrounding plant community will help to inform further restoration activities in an adaptive management framework. We will assess the following three hypotheses:

H₁: The degree to which fire will kill lodgepole pine seedlings will depend on lodgepole pine density and the biomass and composition of the herbaceous community, both of which will vary along regional and local moisture gradients.

H₂: Fire will cause an increase in the percentage cover of native meadow species.

H_{2a}: Fire will cause an increase in the percentage cover of exotic species.

H₃: The degree to which fire increases natives versus exotics in meadow communities will vary along regional and local moisture gradients; success in using fire to restore native-dominated communities will be greatest at the high ends of these gradients.

PURPOSE AND NEED:

In the last decade biologists, hydrologists and ecologists working on the LTBMU have identified a need to utilize prescribe fire as a tool to maintain and/or reclaim meadow landscapes from encroaching conifers, as well as to increase the vigor and diversity of herbaceous meadow vegetation. Before current and future projects are completed, managers need to know if meadow restoration activities, especially prescribed burning, would effectively control lodgepole pine (*Pinus contorta*) invasion, restore native plant vigor and abundance, and if the disturbance would unintentionally facilitate cheatgrass (*Bromus tectorum*) invasion. This project is designed to address these key management questions that need answers for other, large scale restoration efforts to proceed (Appendix A). The proposed study would allow land managers the tools to develop meadow management plans for the LTB and aid in the continued effort to answer basic biological and ecological questions about meadow and fen habitats.

The effects of prescribed fire on meadow ecosystems in the LTB are relatively unknown as this practice has been discouraged until recently. It is not clear to what extent land managers should be concerned about cheatgrass invasion as it is not known if cheatgrass is niche limited or limited by other environmental constraints (i.e. elevation) throughout the LTB. However, the LTB is on the cusp of the cheatgrass invasion front, as it has become common in disturbed sites on the east shore and at lower elevations elsewhere, and has also begun to appear in Carson Range riparian and meadow areas, primarily in the last five years.

This project would inform LTBMU land managers where prescribed fire may not be a recommendable avenue for meadow restoration. Because of the desire to use prescribed fire as a tool to maintain meadow size, function and distribution, this proposed project is a vital component of moving forward and understanding meadow response to these efforts. The LTBMU has a unique opportunity at this time to determine the likely effects of key management decisions before they cause large, undesirable problems. This project would provide insight into a) the role that prescribed fire may play in either ameliorating or exacerbating the presence and abundance of cheatgrass in meadows, b) the effectiveness of fire to suppress encroaching conifers and c) the recovery of native herbaceous vegetation (species composition and ground cover).

PROPOSED ACTION:

This project proposes two research strategies: analyze the environmental controls of meadow invasion by lodgepole pine and cheatgrass and analyze the response of native meadow communities to prescribed (small-scale) fire. This project would answer key questions whose resolutions are prerequisites to widespread application of prescribed fire to LTB meadows. Information gathered in the proposed action is intended to support large scale meadow restoration efforts in the future.

Of the eight meadows identified for experimental work, five meadows were selected to determine the niche and environmental constraints to cheatgrass invasion. These meadows are: High Meadow, Edgewood Meadow, Big Meadow, Baldwin Meadow, and Meeks Meadow. These meadows either already contain cheatgrass or cheatgrass is present in disturbed sites adjacent to the meadows. In either case, these meadows are currently subject to cheatgrass seed rain. Each of the chosen meadows would have four strategically located transects. Three transects would be placed around the meadow edge in areas of recent lodgepole invasion, and one transect (with a slightly different spatial configuration) would be placed within the area sampled by the original meadow condition and trend plot in 1999 or 2004. Each transect would contain one to four 10m² burn plots adjacent to one to four 10m² burn enclosure plots. Wet lines would be used to insure prescribed fire remains in the designated burn plots only. No chemicals would be used during the course of this project. The total area affected in each meadow would be 0.5 to 1 acre (approximately 8 acres for total project). Implementation, weather permitting, would occur in October through November. Each meadow would be monitored pre-implementation. Each meadow would be surveyed by UC Davis researchers for two years following implementation to insure no cheatgrass has established within the burn enclosures. In addition to testing niche and environmental constraints to cheatgrass establishment, the burn box experiment in these five meadows

would also test the effects of prescribed fire on lodgepole pine mortality, and native meadow vegetation response.

The additional three meadows, Slaughterhouse, Grass Lake, and Meiss, would have four transects located throughout the meadow. Three transects would be along the meadows edge adjacent to lodgepole pine invasions and one transect would be located in a previously established vegetative trend transect. Each transect would include one to four 10m² burn plots adjacent to 10m² burn enclosure plots. Each meadow would have three site visits following implementation to determine fire effects on invasion of cheatgrass and other species, lodgepole pine survival, and native vegetation response. In addition, piezometers were installed in all eight meadows and would be monitored to determine fire effects on the ground water table.

Burning of the plots would be accomplished by LTBMU fire crews who would utilize hand tools and water to control the burn to the plot locations. A specific burn plan would be completed prior to implementation. It is expected that the burn plots would be easily controlled and not escape the study perimeter.

PROJECT DESIGN FEATURES:

Project design features are elements of the proposed action and project design that are applied in treatment areas. These features were developed to reduce or avoid negative environmental effects of the proposed action on forest resources.

Air Quality

- A burn plan would be prepared and reviewed by the Lake Tahoe Basin Management Unit Forest Fire Management Officer and the Forest Supervisor prior to implementation. This burn plan includes a Smoke Management Plan which is the basis for obtaining a burn permit from the Nevada Division of Environmental Protection (NDEP) and the California Air Resources Board (CARB). In order to minimize the effects of prescribed burning on air quality; monitoring, mitigation and contingency measures would be identified in the Smoke Management Plan. Desirable meteorological conditions such as favorable mixing layer and transport wind speeds are required in the Smoke Management Plan to facilitate venting and dispersion of smoke from populated areas.
- Smoke management mitigation measures would begin immediately if smoke is adversely affecting a neighborhood or other smoke sensitive areas. Mitigation measures would include: cease all ignition, monitor and mop up.

Fire/Fuels

- Prescribed Burning would take place when meteorological conditions identified in the burn plan are met and when surface fuel conditions would allow for consumption of surface fuels.

Heritage Resources

- Flag and avoid identified cultural resource areas within the Area of Potential Effect.

Botany

- Clean all vehicles coming from known weed infested areas before moving to other NFS lands. Equipment would be considered clean when visual inspection does not reveal soil, seeds, plant material, or other such debris. Edgewood is a known infestation site; all equipment used at Edgewood would be cleaned and inspected by botanist/ecologist prior to moving to another implementation site.
- A botanist/ecologist would be on-site at Edgewood and Slaughterhouse to ensure staging areas for equipment, materials, or crews are not sited in weed infested areas.
- After the project is completed, the LTBMU Noxious Weed Coordinator must be notified so that project areas can be monitored subsequent to project implementation to ensure additional weed species do not become established in the areas affected by the project and to ensure that known weeds do not spread.
- A botanist/ecologist would be on-site at High Meadows to ensure that treatment activities avoid known sensitive plant locations within meadow boundary, but outside of project area.

Fisheries

- Locate burn plots away from stream channel in Meiss Meadow.
- Utilize wet lines to prevent fire spread at all implementation sites.
- No foam applications will be used.
- If drafting water from the Upper Truckee River (Meiss Meadow), utilize a screen to prevent any impact to juvenile Lahontan cutthroat trout.
- A fisheries biologist will be on-site at Meiss Meadows to ensure fire crews follow design features.

Soil and Hydrology

Soil and hydrology design features were developed to minimize or avoid direct and indirect negative effects of proposed treatments on forest resources and to meet the Riparian Conservation Objectives of the LTBMU Forest Plan (1988), as amended by the Sierra Nevada Forest Plan Amendment (SNFPA, 2004).

- Retardant foam would not be applied within SEZs.

- Flame height would not exceed 2 feet within 50 ft of stream courses or in wetlands (unless higher intensities are required to achieve specific objectives) to ensure that water temperatures necessary for local aquatic and riparian dependent species assemblages are not adversely affected by management activities and that disturbance of ground cover and riparian vegetation in Riparian Conservation Areas (RCAs) is minimized (SNFPA, 2004).
- If drafting water from nearby water courses, use screening devices for water drafting pumps. Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat (SNFPA, 2004).

Recreation and Special Uses

- Provide advanced notice to public to ensure that the public is aware of proposed burning. Post signs in project areas near public access points to highlight the proposed action, ecological and stewardship benefits, and impacts to public access.

MONITORING:

1. This project would utilize implementation monitoring to ensure that all pertinent and prescribed design features and BMPs are met. A list of applicable BMPs is located in Appendix B.
2. Plots would be monitored for cheat grass invasion following disturbance for two years. If cheat grass is detected appropriate action would be taken as directed by the Forest Botanist. Actions would most likely include removing cheatgrass prior to seed development and increased monitoring of the plot.

PERMITTING:

- California Air Resources Board and Nevada Division of Environmental Protection regulate prescribed burning in their respective states in accordance with the State Implementation Plan (SIP). Prescribed burning in this project would coordinate with the respective State and follow the SIP to protect air resources; including obtaining and following air quality permits.
- Lahontan Regional Water Quality Control Board (LRWQB) is aware of and anticipating collaboration on this project. The USFS will submit a Timber Waiver Category 5 *Timber harvest activity on federal lands managed by the U.S. Forest Service* for implementation activities occurring in California. We will comply with the guidance as described in the Memorandum of Understanding (MOU) with this agency.

- Forest Service staff coordinated with the Tahoe Regional Planning Agency (TRPA) staff and TRPA concurs with the project as proposed. This project is considered exempt and does not require any permit for implementation.

REASONS FOR CATEGORICALLY EXCLUDING THE PROPOSED ACTION:

CEQ regulations allow Federal agencies to exclude from documentation in an environmental assessment (EA) or environmental impact statement (EIS) categories of actions that do not individually or cumulatively have a significant effect on the human environment, based on the agency's experience and knowledge. I have determined that this proposed action fits under Forest Service Handbook (FSH 1909.15) Chapter 31.1 - Categories for Which a Project or Case File and Decision Memo Are Not Required; 31.11 – Categories Established by the Secretary. The category used is at 7 CFR 1b.3, #3 Inventories, research activities, and studies, such as resource inventories and routine data collection when such actions are clearly limited in context and intensity. The project is consistent with this category as it is limited to wet lines and hand equipment only. No ground disturbing activities are proposed.

EXTRAORDINARY CIRCUMSTANCES:

This project is Categorically Excluded because no extraordinary circumstances exist potentially having effects which may individually or cumulatively have a significant affect on the human environment. This is based on the following:

1. Federally listed threatened or endangered species or designated critical habitat, species proposed for Federal listing or proposed critical habitat, or Forest Service sensitive species – The potential effects of this decision on listed wildlife, fish, and plant species have been analyzed and documented in a Biological Assessment (BA) and Biological Evaluation (BE). The only threatened or endangered species known to occur on the LTBMU is Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*; LCT). There would be no effect to LCT as the species does not occur in or adjacent to the project area. Critical habitat has not been designated by the FWS for LCT.

Project design features, described in this memo, are intended to minimize potential effects to sensitive species. The proposed action, including these design features, may allow for minimal impact to some individuals, but is not likely to result in a trend toward federal listing or loss of viability for any sensitive species. Effects to wildlife, aquatic and sensitive plant resources are discussed in the Wildlife and Aquatic Species BE/BA and in the Sensitive Plant BE, which are found in the project record.

2. Flood plains, wetlands, or municipal watersheds – This project is intended to determine the effects of fire in fire adapted ecosystems, where fire has been excluded for the past 100 years. This includes floodplains, meadows, and wetlands. Because of the small scale and timing of this project, no significant effect on the quality of the human environment is expected.

Floodplains: Executive Order 11988 is to avoid adverse impacts associated with the occupancy and modification of floodplains. Floodplains are defined by this order as,

“ . . . the lowland and relatively flat areas adjoining inland and coastal waters include flood prone areas of offshore islands, including at a minimum, that area subject to a one percent [100-year recurrence] or greater chance of flooding in any one year.”

The project area contains floodplains. This has been validated by map and site-review. To ensure that floodplain-related impacts are minimized, Best Management Practices (BMPs) would be incorporated. These two BMPs are identified in Appendix B (PSW BMP 6-2 and 6-3). The potential effects from the proposed action have been evaluated and would not result in extraordinary circumstances.

Wetlands: Executive Order 11990 is to avoid adverse impacts associated with destruction or modification of wetlands. Wetlands are defined by this order as, “areas inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.”

There are no swamps, bogs, sloughs, potholes, mud flats or natural ponds in the project areas. However, project activities occur in both fen and marsh habitats. This has been validated by map and site-review. This is a research driven project intended to provide land managers needed information of the impacts of fire in meadows, which includes fen and marsh habitat. Project design features would reduce the intensity of the prescribed fire when near stream courses or in wetlands. Finally, riparian areas are adapted to frequent disturbance, and are expected to recover rapidly.

Municipal Watersheds: There are no municipal watersheds located within the project area.

3. Congressionally designated areas, such as wilderness, wilderness study areas, or national recreation areas – The project area is not located in a congressionally designated area.

4. Inventoried roadless areas – The project is located within inventoried roadless areas; however, no vehicles will be utilized in these areas. All guidelines associated with roadless areas will be implemented.

5. Research Natural Areas –Research Natural Area (RNA) are federally administered public lands protected for the primary purposes of maintaining biological diversity, providing baseline ecological information, and encouraging research and university natural-history education. Non-manipulative research, monitoring, and education are promoted on these RNA lands. The RNA Station Director has the authority to authorize research activities within an RNA. Grass Lake RNA, is included in this project. Implementation will occur when written authority is provided to the LTBMU from the Station Director, PSW Research Station. Lodgepole pines have begun encroaching into

this meadow. This project would help determine lodgepole mortality following fire as well as native vegetative response.

6. American Indians and Alaska Native religious or cultural sites – Washoe elders and tribal members have been consulted in implementing this project. Surveys were conducted for archaeological sites and historic properties in September 2008. No American Indian religious or cultural sites within the project area were detected. Alaskan sites do not apply to the California region.

7. Archaeological sites, or historic properties or areas – Surveys were conducted for archaeological sites and historic properties in September 2008. No archaeological sites within the project area were detected.

FINDINGS REQUIRED BY OTHER LAWS:

National Forest Management Act (NFMA) – This Act requires the development of long-range land and resource management plans (Plans). The Lake Tahoe Basin Management Unit Land and Resource Management Plan was approved in 1988 as required by this Act. It has been amended several times, including the Sierra Nevada Forest Plan Amendment, (2004). The amended plan provides for guidance for all natural resource management activities. The Act requires all projects and activities are consistent with the Plan. Therefore, a forest plan consistency analysis of standards and guidelines and management areas was completed for the project. The project is consistent with management direction in the Forest Plan.

Sensitive Species (Forest Service Manual 2670) – The Manual direction requires analysis of potential impacts to sensitive species, those species for which the Regional Forester has identified population viability is a concern; the project biological review contains the sensitive species list. Potential effects have been analyzed and documented in a Letter to File.

Clean Water Act – This Act is to restore and maintain the integrity of waters. The Forest Service complies with this Act through the use of BMPs (see appendix A). This decision incorporates BMPs to ensure protection of soil and water resources. In addition, hydrological and soil field assessments were completed to determine site specific BMPs and project design features. Forest Service staff collaborated with LRWQCB staff to satisfy water quality regulations within the Lake Tahoe Basin that are specific to this project. The project design meets the Timber Waiver for Waste Discharge requirements and would continue to involve LRWQCB staff review during project implementation.

Clean Air Act – Under this Act areas of the country were designated as Class I, II, or III air sheds for Prevention of Significant Deterioration purposes. Impacts to air quality have been considered for this decision. Class I areas generally include national parks and wilderness areas. Class I provides the most protection to pristine lands by severely limiting the amount of additional human-caused air pollution that can be added to these areas. The remainder of the Forest is classified as Class II airsheds. Any prescribed burning in this decision would coordinate with CARB to protect air resources; including

obtaining and following air quality permits. However, because of the small scale of this project, no impacts to air quality are expected.

National Historic Preservation Act - Surveys were conducted for Native American religious or cultural sites, archaeological sites, and historic properties or areas that may be affected by this decision September 2008. No sites were identified in the project areas.

PUBLIC INVOLVEMENT:

This project was listed on the LTBMU's Schedule of Proposed Action (SOPA) on July 1, 2008. Because of the small scope of this project, this 30 day notice will serve as both scoping and a 30 day comment period. Only Lahontan Regional Water Quality Control Board has requested to be included on the scoping list.

The LTBMU will continue to coordinate with Lahontan Regional Quality Control Board, Tahoe Regional Planning Agency, the Washoe tribe of Nevada and California, the Tahoe Science Consortium, and Pacific Research Station.

Lahontan Regional Water Quality Control Board (LRWQCB) has been consulted on this project. USFS staff has been working with LRWQCB to insure appropriate permits are submitted prior to implementation.

Tahoe Regional Planning Agency (TRPA) staff has been contacted regarding this project and are supportive of this proposed action. This project is exempt from TRPA permit requirements.

The Washoe Tribe of Nevada and California has been contacted and is supportive of the proposed action.

The Tahoe Science Consortium members were contacted regarding the project on September 11, 2008, and are supportive of this proposed action.

Other interested public that will be contacted will include League to Save Lake Tahoe, the Sierra Club, and interested parties near proposed implementation locations.

A request to implement work in Grass Lake RNA was submitted September 2008 to the Pacific Research Station.

Copies of the Decision Memo will be distributed to the Lahontan Regional Water Quality Control Board, Tahoe regional Planning Agency, the Washoe Tribe of Nevada and California and other interested agencies and individuals who request one or comment on the document.

IMPLEMENTATION DATE:

Implementation of this project would commence in October - November, or upon issuance of all pertinent permits.

ADMINISTRATIVE REVIEW OR APPEAL OPPORTUNITIES:

A 30 day comment period is being provided with this pre-decisional memo to provide those interested in or affected by this proposal an opportunity to make their concerns known prior to a decision being made by the Responsible Official. Those who provide comments or otherwise express interest in the proposal by the close of the comment period would be eligible to appeal the decision pursuant to 36 CFR part 215 regulations. If only supportive comments are received during the comment period a decision to implement the project would be made shortly after, without appeal opportunity.

CONTACT PERSON:

For additional information on this project contact Sarah Muskopf – Project Leader at (530) 530-2835 or smuskopf@fs.fed.us.



Figure 1: Meadow Restoration Implementation Locations

Appendix A:
Meadow Restoration Project

Project schedule and activity for implementation actions occurring near the Meadow Restoration Pilot Project.

Project Name	NEPA Status	Expected Implementation	Activity	Relationship with Meadow Restoration Pilot project
Big Meadow Restoration	In progress	2009- 2012 implement conifer thinning, 2011 implement pile burning and broadcast burn in meadows.	Vegetation treatment including conifer thinning and pile burning. Broadcast burning in the meadows.	Data needed to determine the effects of fire on lodgepole pine mortality, potential cheatgrass invasion, and native species response.
High Meadows Restoration	In progress	2009 implement phase 1 (thinning and stream restoration). 2010 implement phase 2 (stream restoration).	Stream restoration and vegetation treatments.	Data needed to determine the effects of fire on lodgepole pine mortality, potential cheatgrass invasion, and native species response.
Meeks Creek Washoe Pilot Burn Project	Complete	2008 and 2009	Vegetation treatments including conifer thinning, broadcast burning and cultural digging/soil disturbance.	This project is in a different portion of the meadow and is not correlated to the Meadow Restoration Pilot Project. However, both projects are intended to provide valuable information to large scale restoration projects.
Slaughterhouse Fuels Reduction Project	Complete	2008	Pile burn	This is a fuels reduction project and although in a similar location as the Meadow Restoration Pilot Project, project goals and objectives are different. The Slaughterhouse Fuels Reduction Project is located in the uplands around the meadow and intends to reduce fuel loads in the Wildland Urban Interface.
Roundhill Fuels Reduction Project	Complete	2008	Thin and pile burn	This is a fuels reduction project in the uplands. No management action are planned for the meadow.

Appendix B:
Meadow Restoration Project

Best Management Practices (BMP)
USFS Pacific Southwest Region (2000) (LTBMU revised BMP descriptions in bold)

Best Management Practice	Description
PSW Region BMP 6-2: Consideration of Water Quality in Formulating Fire Prescriptions	To ensure water quality protection while achieving management objectives through the use of prescribed fires, prescription elements would include, but not be limited to, factors such as fire weather, slope, aspect, soil moisture, and fuel moisture. The prescription would include at the watershed and subwatershed level the optimum and maximum burn block size, aggregated burned area, acceptable disturbance for contiguous and aggregate length for the riparian/SMZ, and maximum expected area covered by water repellent soils.
PSW Region BMP 6-3: Protection of Water Quality from Prescribed Burning Effects	Implementation of techniques to prevent water quality degradation, maintain soil productivity, and minimize erosion from prescribed burning. These techniques include: constructing water bars in fire lines, reducing fuel loading in drainage channels, and retain or re-establish ground cover as needed to keep erosion to a minimum.