5 Protection of Sensitive Values

GIANT SEQUOIA ISSUES: MANAGEMENT AND PROTECTION

Thirty- nine giant sequoia groves (11,417 acres) exist as enclaves in the mixed conifer forest within the two parks. In the late 1960s the parks developed a prescribed fire program after ~75 years of fire suppression was found to have contributed to a lack of sequoia regeneration and the accumulation of unnatural fuel loads in the sequoia groves. Loss of fire as a keystone ecological influence produced "unnatural fuel conditions" and changes in the structure of sequoia- mixed conifer forest. Fire management objectives centered on fuels rather than vegetation management to promote sequoia reproduction. Prescriptions used during restoration burns generally produce a low intensity fire by compensating for "unnaturally heavy fuels" with conservative firing techniques, timing, and weather. As noted by Christensen and others (1987) the presence of unnaturally heavy fuels need not result in unnatural fire effects on giant sequoias, particularly those involving scar creation and enlargement, charring of bark, scorching of foliage, and collapse of individual trees.

The parks' sequoia groves will not be treated differently from the general white fir/mixed conifer forest with two exceptions (noted in Section B of this chapter). Sequoia trees that are of special social or scientific interest have been designated for special management consideration. These "trees of special interest" can be single individuals or groups of living trees, logs, or snags with special cultural, interpretive, or scientific resource value that warrant special management status (Table 5- 1). These trees will be protected from fire, so as to prevent any change in their cultural or resource value. Other trees or logs can be added to this list. A hollow sequoia log, for example, which has interpretive value, may be protected so that it may continue to be used in this capacity. Nominations for protection should be submitted to the Chief of Natural Resources for consideration.

The best technique, or combination of techniques, will be selected for restoring and maintaining fire at locations where "trees of special interest" exist, depending on the defined value for that tree. Specific procedures that will be followed are defined later in this chapter (Section C). Of particular importance will be the removal of heavy unnatural fuel loads. Some judgment is involved in the determination of the presence or absence of unnaturally heavy fuels. Such fuels are ground fuels three inches in diameter and larger, principally fallen trees and aerial fuels (e.g. understory trees such as white fir). Single logs, individual snags near sequoia trunks, debris from a single giant sequoia fallen top or a broken branch, do not in themselves constitute unnatural fuels. Since this accumulation is difficult to quantify, each giant sequoia will be inspected and heavy fuel accumulations removed using a conservative approach.

Table 5-1. Individual Trees, Groups of Trees, Logs or Stumps Referred to as "Trees of Special Interest"

Grove	Sequoia Feature Name	Condition
Giant Forest	Auto Log	Dead / Down
	Black Chamber	Live
	Buttress Tree	Dead / Down
	Chief Sequoyah	Live
	Clara Barton Tree	Live
	Dead Giant	Dead / Standing
	Ed by Ned	Live
	Founders Group	Live
	Four Guardsmen	Live
	General Lee Tree	Live
	House Group	Live
	Lincoln Tree	Live
	McKinley Tree	Live
	Parker Group	Live
	President Tree	Live
	Room Tree	Live
	Senate Group	Live
	Sentinel Tree	Live
	Sherman Tree	Live
	Susan B. Anthony Tree	Live
	Telescope Tree	Live
	Tharps Log	Dead / Down
	Tunnel Log	Dead / Down
	Washington Tree	Live
Grant Grove	Dead Giant	Dead / Standing
	Centennial Stump	Dead
	California Tree	Live
	Fallen Monarch	Dead
	Grant Tree	Live
	Lee Tree	Live
Big Stump	Burnt Monarch	Dead
	Mark Twain Stump	Dead
	Sawed Tree	Live
Redwood Mountain	Hart Tree	Live
	Barton Cabin	Dead / Down

SPECIAL MANAGEMENT AREAS

Two specific locations within Giant Forest and Grant Grove are designated as Special Management Areas (SMA). These areas are the General Grant Tree and Sherman Tree areas. The objective in giant sequoia SMAs is to balance natural process restoration with the need to preserve the important scenic value of sequoias in heavily- used portions of groves where the presence of a large number of visitors or developments exist. In these areas, prescribed burning is done on a small scale to allow for better smoke management in these highly visited areas, provide public safety, and to prevent sudden, large- scale scenic changes.

Areas around the General Grant and the Sherman Tree will be maintained as a feature with a fixed historical scene. Localized, low intensity prescribed burns, removal of understory, and planting of native species will restore it to its turn- of- the- century appearance. These are the only areas in the

parks in which natural processes will subordinate to a fixed scene. SMA activities are guided by input from landscape architects to a greater degree than elsewhere in these parks. Prescribed burn unit size, the location of subsequent prescribed burns, and the protection of various scenic resources are guided by input from specialists in this field. The 30- acre Grant Tree SMA Project Area is described in the *Vegetation Management Plan for the Grant Tree Area* (Warner 1980). A separate planning process will be extended to the area surrounding the Sherman Tree in association with the Giant Forest restoration project underway in 2002.

TREES OF SPECIAL INTEREST AND SMAS

Objectives

The following objectives will be used on all giant sequoia prescribed burns with trees or areas categorized as "trees of special interest" or SMAs:

- Charring of a tree's bark will not exceed 10 feet in height and extend around more than 50 percent of a tree's circumference, on more than 10 percent of the trees with a diameter at breast height of four feet or greater. Exceptions may be due to technique #8 described below.

- No sequoia with a diameter of four feet or greater will have more than 30% of its total crown scorched. Exceptions may be due to technique #8 described below.

- A flaming front will not be allowed to ignite fire scars. Should ignition occur during the smoldering stage of the fire, the scar will be extinguished if practical to do so. In addition, steps will be taken to ensure that there is no change in visual character of trees in these areas.

Techniques

The following techniques will be used to accomplish these objectives:

1. Prior to the prescribed burn, all protected giant sequoias in the prescribed burn unit will be inspected for fuel conditions in a 20- foot diameter buffer zone area around their base. If accumulations of 1,000 hour (three- inch diameter) and greater size classes of fuel are found in this buffer, they will be removed.

2. Fallen giant sequoia trunks within this buffer zone will not be removed. However, photo documentation of the presence of this large fuel size class will be done, as noted in technique #8 below. Taking photographs pre- and post- burn in these areas will document the changes in fuels. These pictures, along with shots during the burn, will provide important interpretive and documentary tools to display the area's biological and scenic recovery.

3. If the tree is on a slope, fuel will be scattered to the sides of the trees. The fuel will not be scattered above or below trees, if possible. If space is limited, fuel removed from around a tree may be piled in clearings or openings.

4. When burning out from the base of a tree the ignition ring around the tree should be no closer than six feet from the tree.

5. If needed a fire line may be placed around a tree. However, this should not be done if roots deeper than 12" will be uncovered. Surface litter may also be raked from around the tree.

6. Foam or water may be applied to the trunk of the tree if assessable by equipment.

7. Burning will be carried out at the moderate to cool end of the prescription. During the summer and early fall, prescribed burns may be accomplished at night to meet protection objectives. However, this technique exposes the crew to special hazards and can produce large quantities of smoke on highways and developed areas below the prescribed burn.

8. Some judgment is involved in the determination of the presence of unnaturally heavy fuels. Generally, such fuels are of larger diameter (>three inch - 1,000- hour fuels) which are principally fallen cedar, fir, and pine trees or unusually heavy litter and duff accumulations. Giant sequoia logs, single snags near sequoia trunks, debris from a fallen sequoia top or branch, do not in themselves constitute unnaturally heavy fuels, although the tonnage can be enormous. Such fuels can be left in place to burn, although such situations may radically alter the appearance of neighboring giant sequoias. In these cases, either the area should be lined off and not burned, if the retention of the current appearance of the neighboring sequoias is a management objective, or photopoints should be established (as described under #2 above).

Other Special Considerations for Giant Sequoia Management

Giant Forest Restoration
Guidelines for the Giant Forest restoration include the use of fire within either the "biological" or "landscape" restoration zones (NPS 1995). Goals and objectives of restoration include the recreation of the structure and composition of vegetation within the natural range of variability if development had not taken place and if fire had not been suppressed. Two fire management options have been defined in the plan:

> **Fuel Manipulation**
> The removal of buildings and facilities has left large openings in the forest that are lacking in fuels. Fuels may be hauled onto these restoration areas and burned onsite to create the bare, mineral seedbed which fosters sequoia seedlings. The source of fuel will be adjacent forest areas with excessive amounts of limbs, litter, and duff.
>
> **Prescribed Fire**
> Prescribed fire may be utilized to achieve project goals. Fire modifies the composition and structure of the forest by killing some tree species while giant sequoias are fire resistant and tend to survive. Giant sequoias are also a shade intolerant species in which most successful regeneration occurs in open areas with bare mineral soil that are usually created by fire.

Dillonwood Grove
The addition of a large portion (~1,500 ac) of the Dillonwood giant sequoia grove to the parks occurred in 2001. The grove is located adjacent to Sequoia National Park's south boundary in the

North Fork of the Tule River drainage. It has been under private ownership since the late nineteenth century and has experienced extensive logging of giant sequoias through the 1940s and non- sequoia species into the 1980s. Incorporation of this new area into park management will require assessment of the area's natural, scientific, cultural, and historical features and how it should be integrated into fire and fuels management planning. Should the grove's separate planning effort resolve that the area will be managed in accord with the rest of the parks' mixed conifer forest (including the use of fire as a research tool), this *Fire and Fuels Management Plan* will apply. If the grove planning effort resolves a management direction for Dillonwood that is outside of the treatments covered in this plan and the companion Environmental Assessment (EA), a separate fire planning and compliance effort will take place.

CULTURAL RESOURCES

Cultural resources (both prehistoric and historic) may be impacted to varying degrees by fire and fire management actions. Since these resources are located in a highly flammable environment, unwanted fire effects may not be completely preventable under all circumstances. However, impacts may be managed with appropriate pre- planning, avoidance, and mitigation. Mitigation efforts are designed to prevent the impairment of the parks' known cultural resources, and minimize the chance of adverse impact to unknown sites.

General Fire Effects

Prehistoric Resources

The effects of fire on prehistoric sites are variable, with particular concerns associated with rock art sites and those sites with dense, surface- visible scatters of obsidian. In general such sites, even those with shallowly buried deposits or features, tend not to be impacted adveresely by low intensity fires, while high intensity fire events associated with heavy fuel loads may cause serious impacts such as spalling of rock surfaces, the crazing of cherts or obsidian artifacts, the fracturing of ceramics or potsherds, and the disruption of hydration bands on obsidian surfaces.

Of significant concern is the ground disturbance associated with the placement of staging areas and the construction of firelines necessary to fight or manage fires. These actions have the potential to impact prehistoric resources directly through ground disturbance.

Ethnographic Resources

The effects of fire on ethnographic resources are variable and difficult to identify. Sites with fragile archeological features such as pictographs or petroglyphs would be affected similar to prehistoric resources. Sites where traditional access to particular natural resources of cultural significance (such as plants used for craft production or ceremonial purposes) could be affected as a result of fire (e.g., re- growth and health vs. loss or diminution of the plants) and may result in either positive or negative effects.

The loss or reconfiguration of culturally important landscapes or vistas may occur as a result of fire, especially high intensity wildfire.

Historic Resources
The effects of fire on historic era sites are variable. Located in and around developed areas of the parks, there is particular concern associated with wooden buildings and structures, logging debris (e.g., stumps and shake piles), and mining features (e.g., flumes and trestles). Many other sites are effectively sub- surface in their current appearance and thus relatively protected from adverse impact from fires, especially low intensity burns. Of greatest concern is the placement of staging areas and firelines needed to fight or manage fires. Associated ground disturbance has the potential for direct and adverse impacts on historic sites.

Potential Impact Sources

There are three major fire- related factors that can affect the level of impact to cultural resources: disturbance of the ground, the ability to pre- plan and avoid impacts, and the risk posed by high intensity fire events.

Surface disturbance occurs as a result of the need to construct fireline, fire camps, staging areas, and related facilities. Fire management actions that minimize the need for surface disturbance will have less potential to affect cultural resources.

Pre- planning minimizes potential impacts from fire management actions by allowing consultation and oversight by cultural resource specialists. Tools that rely more heavily on pre-planned fire management actions (such as prescribed fire) allow advance identification and avoidance of significant cultural resources. Conversely alternatives that entail more unplanned or emergency fire events, with little opportunity for advanced planning and clearance for cultural resources, have more potential to impact cultural resources.

High intensity fires have the potential to drive heat pulses deep into the ground and to spall off rock surfaces that may contain rock art. These mechanisms can also negatively affect subsurface and lithic cultural resources. There are opportunities for high intensity fire events in many areas of the parks, though the size and timing of such events vary by alternative. Actions that proactively reduce heavy fuel accumulations through low intensity prescribed fire or through mechanical removal of fuel reduce the risk of damage to cultural resources from high intensity fire.

General Mitigation Process

1. The park archeologist will review all prescribed burn and mechanical fuel project plans for the presence of known surface resources and shallow subsurface resources in the project area. Combining information on the location and sensitivity of known sites with information on the expected fire operations impacts, fuel loads, and anticipated fire intensity, the archeologist will specify requirements necessary for the protection of significant resources within the project area. These requirements will be documented in each individual burn or mechanical fuel treatment plan.
2. Fireline construction or any other ground disturbing activity planned for prescribed and mechanical fuel projects will be flagged in advance of any work on the ground, and must receive clearance and approval from the park archeologist prior to the work.
3. For fire use projects, the park archeologist will be consulted during the development of the WFIP. Known significant resources requiring protection will be identified in the planning

process, and mitigations specified and documented in the plan and implemented as part of the project.

4. For unwanted fires, the archeologist will be consulted as soon as practical to identify sensitive resources that have the potential to be affected by the fire or by fire management actions. To the extent possible – and considering short timeframes, unpredictable fire behavior, and firefighter and public safety - mitigation measures specified by the archeologist will be implemented as part of the suppression response.

Required mitigation in all cases may include but is not limited to: relocation of firelines away from sensitive sites, line construction to exclude sites, removal of fuels from sensitive sites to reduce fire intensity, installation of hoselays, sprinklers or other water handling devices for direct protection of features, and/or wrapping sites or features with fire protective shelter material. As new cultural resource requirements and standards for protection are developed, they will be adopted and included as an appendix in this document.

Assessing the condition of known resources before project implementation and after the project is complete will provide better information on effects on cultural resources, and feedback on the effectiveness of mitigation practices. These pre/post project inspections are considered part of the project and may be funded from project dollars. More detailed cultural resource monitoring information is included in Appendix C.

WILDERNESS

Approximately 85% of the parks are designated wilderness. As of 2002, another 12% of parklands have been proposed for wilderness designation. By NPS policy, areas proposed for wilderness are managed exactly the same as designated wilderness.

NPS Management Policy 6.3.9 directs that "fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. The parks' fire management and wilderness plans together will identify the natural and historic roles of fire in the wilderness and will provide a prescription for response to natural and human caused wildfires.

Wildland fire in wilderness will be suppressed when necessary to protect life safety, significant cultural and natural resource values, or to conform to air quality regulatory requirements. Such wildland fire suppression is deemed the minimum requirement.

Actions taken to suppress wildland fire will use the minimum requirement concept and will be conducted in such a way as to protect natural and cultural features and to minimize the lasting impacts of the suppression actions and the fires themselves."

NPS Director's Order 41, Wilderness Preservation and Management (DO- 41, Section 5) further states that "under ideal conditions, natural fire should be considered as a fundamental component of the wilderness environment."

In conformity with direction in NPS Management Policy 6.3.9 and NPS Director's Order 41, the natural and historic role of fire in the parks' wilderness has been assessed and documented. In

summary, lightning ignited fires have been found to be a natural process and primary driver of natural plant communities throughout the parks' wilderness. Native American use has also been documented, with the influence of such use in shaping vegetation communities largely unknown (see Chapter 9).

All fire management activity in wilderness will be conducted according to minimum impact suppression guidelines found in the parks' Fire and Aviation Management Operations Guide (Addendum). Delegations of authority to incoming fire management teams will require that minimum impact suppression techniques be followed.

The use of chainsaws, portable pumps, and the landing of helicopters, for all fire operations will be considered appropriate as the minimum tool, as will electronic devices including but not limited to global positioning units for mapping and locating fires, and cell phones and portable radios for communications.

When using helicopters, the parks will consider operational periods, amount of flight time, and sensitivity of travel routes. When using stock, the parks will adhere to existing park regulations including party size restrictions and forage area regulations, and will consider the implications of competing for limited forage in relation to private and commercial stock users. Use of both stock and aircraft will be kept to the minimum necessary commensurate with meeting project objectives and providing for firefighter safety.

Burned area emergency rehabilitation plans may be implemented under the direction of a resource advisor following significant fire management actions. Emergency rehabilitation in wilderness will seek to restore areas impacted by fire operations in ways that will restore and preserve wilderness character and conditions. Actions implemented under emergency conditions as part of immediate suppression and stabilization generally do not require pre-approval. Proposals for long term recovery actions will be submitted to the parks Environmental Management Committee, which will recommend and enforce the appropriate level of environmental compliance prior to implementation.

Fire related research and monitoring may occur to document and understand the effects of fire management actions in wilderness. Research and monitoring staff and equipment would create additional transient (short- term, infrequent) impact. Any proposal that required the installation of long term or permanent research or monitoring equipment in the wilderness will require a separate analysis and approval by the parks Environmental Management Committee.

WILD AND SCENIC RIVERS

The park contains two rivers, including the Kern and the South and Middle Forks of the Kings, that were designated as wild and scenic in 1987. Both rivers are contained within park wilderness, with the exception of the lower seven miles of the South Fork Kings which flows through the Cedar Grove developed area. Other rivers have been proposed for Wild and Scenic status through the *General Management Plan*.

The purpose of wild and scenic rivers as stated in legislation (Public Law 100- 150) is that designated rivers "shall be preserved in free- flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

All segments of the rivers in wilderness are in fire management zones that emphasize perpetuating fire as a natural process. As a result, the fire and fuels management program will not affect the rivers' free- flowing condition or involve new developments within their corridors.

Fire management tools #2 - #5 (described in Chapter 3) will be used in Wild and Scenic River corridors only to protect and enhance outstandingly remarkable values or to protect life safety, significant cultural and natural resource values, or to conform to air quality regulatory requirements.

All riparian areas, including wild and scenic rivers, will be protected from contamination by fire fighting foams and aerial retardant following guidelines in the *Fire and Aviation Management Operations Guide* (FAMOG). Minimum Impact Suppression Techniques (MIST) detailed in the FAMOG are used throughout the parks and are especially critical to apply in Wild and Scenic River corridors.

Following fire, appropriate burned area rehabilitation measures may be taken to protect or restore outstanding resource values of designated Wild and Scenic Rivers. Rehabilitation following fire in a Wild and Scenic River corridor may be conducted under an approved *Burned Area Emergency Rehabilitation Plan*. Developing such plans during and after fire events are the joint responsibility of the park and incident management team.