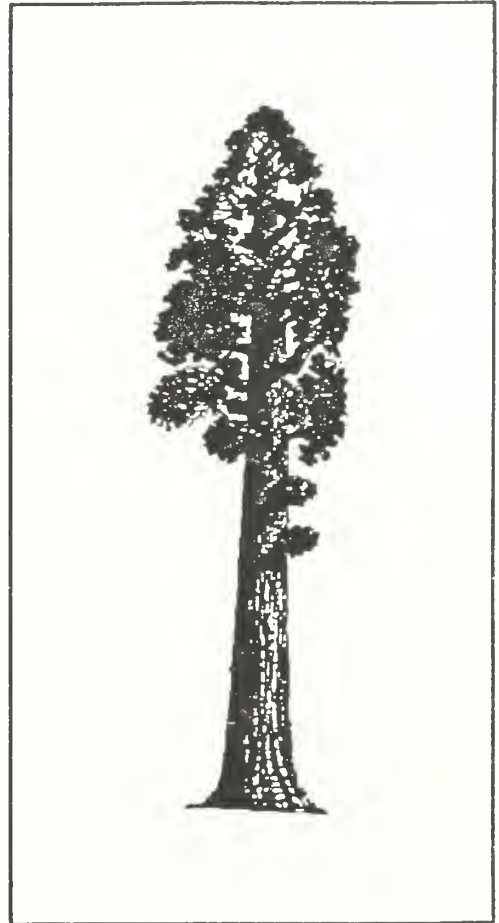


Draft  
Interim Management Plan/  
Environmental Assessment



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Giant Forest  
**SEQUOIA**  
National Park • California



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# Alternatives for Interim Management and Draft Environmental Assessment

July 1995

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## Giant Forest **SEQUOIA**

National Park • California

This document, *Alternatives for Interim Management and Draft Environment Assessment*, proposes alternatives for the redevelopment, restoration, and management of the Giant Forest area of Sequoia National Park, California. The alternatives are intended to guide the management of the area for an interim period of 10–20 years, pending eventual implementation of a 1980 plan that cannot now be implemented because of fiscal restraints. No preferred alternative is presented; however, the National Park Service will select a preferred alternative following the public review period. Interested parties are encouraged to submit comments on these alternatives to: Superintendent, Sequoia National Park, Three Rivers, California 93271.



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## SUMMARY

Giant Forest is the biggest and best known of the giant sequoia groves within Sequoia National Park. In 1980 a *Development Concept Plan* was approved for Giant Forest and the adjoining areas of Lodgepole and Clover Creek (now referred to as Wuksachi Village). Compliance for the plan was provided by a separate *Environmental Impact Statement* completed in 1979. That planning effort established five primary long-term goals for Giant Forest:

- All existing commercial services provided in the grove would be terminated. Nearly all buildings supporting these services would be removed. Of the existing structures in the Giant Forest development zone, which number more than 200, only the market, the ranger residence, and the comfort station, would be preserved. The market would be converted to a visitor center, while the other two buildings would retain their traditional uses. Existing historic buildings and comfort stations in the Giant Forest sequoia grove, outside the development zone, would also be retained.
- Giant Forest would become a day use area only. All required visitor services such as food service, gift shops, and overnight facilities would be accommodated in areas outside the grove. New overnight facilities would be constructed at Wuksachi Village, while day use support would be centered at Lodgepole.
- Although Generals Highway would remain open to through-traffic, access to the grove's best known features would be limited to shuttle service or walking. No private automobiles would be allowed to park in the grove, and visitor parking would be consolidated into a single parking structure at the Wolverton corrals. At the parking structure visitors would board shuttles and be transported to primary visitor emphasis points in Giant Forest, where trails would lead them to a variety of secondary destinations.
- All areas vacated as a result of facility removal would be restored to a natural state. Restoration would include both topographic and biological restoration, with the goal of returning disturbed sites to a state of biological health and natural appearance.
- The desired visitor experience in Giant Forest would emphasize providing visitors with opportunities to interact with the park's best known feature — the giant sequoias. Past experience shows that this interaction becomes vastly more significant to individuals when they leave behind their motor vehicles and enter the forest on foot, even if only for a short stroll. It was, therefore, an objective of the 1980 plan to encourage dispersed, nonvehicular exploration of Giant Forest.

Since 1980 substantial progress has been made toward achieving these goals. Infrastructure development at Wuksachi Village has proceeded far enough that the site is ready for development by a concessioner. At the same time the National Park Service has committed to the California Regional Water Quality Control Board that sewage flow into the existing Giant Forest wastewater treatment plant from commercial facilities in the grove will end by November 1, 1998. A concern is that the 1980 *Development Concept Plan* proposed only a very general vision of how Giant Forest would be used by visitors

after the lodges are closed. Taken together, these facts require that the Park Service begin finishing plans for ecological restoration and converting the grove to day use.

In reviewing this situation, the Park Service has concluded that under current and anticipated budget constraints, portions of the 1980 *Development Concept Plan* cannot be implemented in the foreseeable future. Specifically, the concept that all visitors to the grove should park in a single large parking structure at Wolverton and be transported into the grove by an obligatory but free shuttle system is estimated to cost \$45 million. Because the Park Service does not believe that this sum will be available in time to address the needs generated by the rapidly approaching closure of the old facilities in Giant Forest, it has been determined that interim alternatives for the restoration and conversion of the grove are required.

This plan is entitled "interim" because it recognizes that the approved 1980 *Development Concept Plan* remains the park's long-term goal. The actions considered in this plan are designed to carry Giant Forest through the next 10–20 years, during which time a review of the park's long-term goals for all areas should be undertaken. In the meantime the 1980 *Development Concept Plan* constitutes a desired state against which other action alternatives should be measured.

This planning effort examines three alternatives for the near-term use of Giant Forest. These alternatives explore how Giant Forest might be served by a less expensive shuttle system for day visitors or without a day use shuttle system. All alternatives assume that the 1980 *Development Concept Plan* would be implemented and that commercial facilities in Giant Forest would be physically removed.

The three alternatives are being released to the public without a preferred alternative being selected. It is the intent of the National Park Service to solicit substantive comments on the alternatives presented in this document, analyze the comments received, and then select a preferred alternative based on that analysis. The final alternative selected may contain elements of several of the alternatives described below, and reviewers are encouraged to study the material with this possibility in mind. It is anticipated that the National Park Service will select a preferred alternative during the fall of 1995.

## **ALTERNATIVE A: EXISTING VISITOR ACCESS AND PARKING (NO ACTION)**

Alternative A would maintain existing vehicle access routes, parking areas, trails, and interpretive facilities in the context of day use only in Giant Forest. The existing seasonal Giant Forest area lodging shuttle, which serves overnight guests at Lodgepole, would be retained and would serve Wuksachi Village also, but no shuttle system would be instituted to meet the needs of day users. Most current natural resource and visitor management problems would continue, together with their impacts. Erosion control work would be done as necessary, but active ecological restoration would not be carried out in the grove.



## **ALTERNATIVE B: CONCENTRATED FOCUS / PEDESTRIAN EXPERIENCE**

Alternative B would emphasize the historic core area near Round Meadow and concentrate use there. Heaviest visitor use would occur in the Sunset Rock, Round Meadow, Hazelwood, Giant Forest Center, and Beetle Rock areas. Access to these areas would be facilitated by parking nearby on the grove's natural boundary and by an improved system of trails and interpretive exhibits. Vehicle access to Sherman Tree, Moro Rock, and Crescent Meadow would be eliminated in favor of foot travel. The existing seasonal Giant Forest area lodging shuttle, which serves overnight guests at Lodgepole, would be retained and would serve Wuksachi Village also. However, no shuttle system would be instituted to meet the needs of day users. Active ecological restoration would be carried out as called for in *Guidelines for Ecological Restoration, Giant Forest, Sequoia National Park*.

## **ALTERNATIVE C: DISPERSED USE / CONSOLIDATED PARKING**

Alternative C would emphasize the historic core area near Round Meadow and concentrate use there, as described in alternative B; however, it would also disperse use by providing continued motorized access to other major features, including Sherman Tree, Moro Rock, and Crescent Meadow. This access would be provided by a day use shuttle that would operate from parking lots on the grove's fringe, and during periods of peak demand from existing parking areas outside the grove at Wolverton. This seasonal shuttle service would differ from that proposed in the 1980 *Development Concept Plan* in that it would complement grove-fringe parking rather than require all visitors to park several miles farther away at Wolverton. Also, it would not be free but rather would be funded by user fees paid either as a part of the park entrance fee or at the service site. Shuttle user fees would be determined at a later date, depending on how the day use shuttle would be funded. The existing seasonal Giant Forest area lodging shuttle would be retained and would also serve Wuksachi Village. Under this alternative the lodging shuttle would be a feeder for the day use shuttle. Ecological restoration would be carried out as called for in *Guidelines for Ecological Restoration, Giant Forest, Sequoia National Park*.





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## **PURPOSE AND NEED**



## BACKGROUND

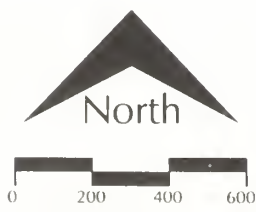
Sequoia National Park, located in the southern Sierra Nevada of California (see Regional Context map), was established by Congress on September 25, 1890, and was the second formally titled "national park" created in the United States. The purposes for establishing Sequoia National Park were to provide for the benefit and enjoyment of the people; to preserve from injury all timber, mineral deposits, and natural curiosities or wonders encompassed by the park boundary; and to retain these resources in their natural condition. Of these, the most important was the preservation of the park's forests, especially the giant sequoia groves.

Throughout the 20th century Giant Forest, Sequoia National Park's biggest and best known sequoia grove, has been the park's most popular attraction (see Giant Forest Context map). The grove covers approximately 3 square miles and contains more than 2,500 sequoias larger than 10 feet in diameter. The grove also is home to four of the world's five largest trees. From the time of its first development at the beginning of the 20th century, the grove attracted both visitor attention and facilities. Many of these facilities, including campgrounds, employee housing areas, and the old park headquarters, have been closed and removed. But many facilities remain in the grove today, including 248 guest accommodations, two restaurants, two gift shops, and many associated support structures, including both concessioner and government employee housing. The grove also contains numerous interpretive exhibits and 42 miles of maintained trails for visitors. To support all these facilities the National Park Service maintains an extensive network of roads and parking lots, as well as water and sewer systems and a wastewater treatment plant.

In 1980 the Giant Forest/Lodgepole *Development Concept Plan* was completed and approved. The document was supported by an *Environmental Impact Statement* dated 1979. That plan established five primary long-term goals for Giant Forest, which are listed below.

- All existing commercial services provided in the grove would be terminated. Nearly all buildings supporting these services would be removed. Of the existing structures in the Giant Forest development zone, which number more than 200, only the market, the ranger residence, and the comfort station, would be preserved. The market would be converted to a visitor center, while the other two buildings would retain their traditional uses. Existing historic buildings and comfort stations in the Giant Forest sequoia grove, outside its development zone, would also be retained.
- Giant Forest would become a day use area only. All required visitor services such as food service, gift shops, and overnight facilities would be accommodated in areas outside the grove. New overnight facilities would be constructed at Wuksachi Village, while day use support would be centered at Lodgepole.
- Although Generals Highway would remain open to through-traffic, access to the grove's best known features would be limited to shuttle service or walking. No private automobiles would be allowed to park in the grove, and visitor parking would be consolidated into a single parking structure at the Wolverton corrals. At the parking





REGIONAL CONTEXT

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# SEQUOIA NATIONAL PARK

United States Department of the Interior • National Park Service

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DATE: 8-16-94





GIANT FOREST CONTEXT  
**SEQUOIA**  
**NATIONAL PARK**

United States Department of the Interior • National Park Service



DATE 8/16/93

structure visitors would board shuttles and be transported to primary visitor emphasis points in Giant Forest, where trails would lead them to a variety of secondary destinations.

- All areas vacated as a result of facility removal would be restored to a natural state. Restoration would include both topographic and biological restoration, with the goal of returning disturbed sites to a state of biological health and natural appearance.
- The desired visitor experience in Giant Forest would emphasize providing visitors with opportunities to interact with the park's best known feature — the giant sequoias. Past experience shows that this interaction becomes vastly more significant to individuals when they leave behind their motor vehicles and enter the forest on foot, even if only for a short stroll. It was, therefore, an objective of the plan to encourage dispersed, nonvehicular exploration of Giant Forest.

## THE PROBLEM

Since 1980 substantial progress has been made toward achieving these goals. Infrastructure development at Wuksachi Village has proceeded far enough that the site is ready for development by a concessioner. At the same time the National Park Service has committed to the California Regional Water Quality Control Board that sewage flow into the existing Giant Forest wastewater treatment plant from commercial facilities in the grove will end by November 1, 1998. Additionally, the 1980 *Development Concept Plan* proposed only a very general vision of how Giant Forest would be interpreted to and enjoyed by visitors. As written, these vague prescriptions are not adequate to resolve the visitor management problems facing the grove today, particularly those relating to visitor congestion, vehicle gridlock, and visitor experience.

Additionally, in reviewing this situation, NPS management has concluded that, under current and anticipated budget constraints, portions of the 1980 plan cannot be implemented in the foreseeable future. Specifically, the concept that all visitors to the grove should park in a single large parking structure at Wolverton and be transported into the grove by an obligatory shuttle system is estimated to cost \$45 million. Because NPS management does not believe that this sum will be available in time to address the needs generated by the rapidly approaching closure of the old facilities in Giant Forest, it has been determined that interim alternatives for the management, restoration, and conversion of the grove to day use are required.

This plan is entitled "interim" because it recognizes that the approved 1980 *Development Concept Plan* remains the park's long-term plan. The actions considered in this plan are designed to carry Giant Forest through the next 10–20 years, during which time a review of the park's long-term goals for all areas should be undertaken. In the meantime the 1980 plan constitutes a desired state against which other action alternatives should be measured.

This planning effort proposes three alternatives for the interim future management and use of Giant Forest. These alternatives recognize that portions of the existing 1980 plan cannot currently be implemented as written, that other portions of that same plan require

additional details for implementation, that current operations in the area are not satisfactory in many regards, and that the closure of existing commercial facilities in the area is imminent.

## **THE PLANNING PROCESS**

The intent of this planning study was to develop and assess a range of interim strategies aimed at implementing as much of the 1980 plan as is currently feasible while at the same time resolving or reducing the grove's current management problems.

As a part of this planning process, park management has identified the following planning objectives:

- Define a range of day use visitor experiences for Giant Forest, including interpretive opportunities, trail systems, and resource opportunity areas.
- Explore alternative methods of access and parking in Giant Forest, realizing that a fully operational shuttle system with a centralized parking structure and staging area at Wolverton would not be funded in the near future.
- Study the issues related to a phasing strategy for the removal of facilities from Giant Forest and the stabilization of affected sites. Any eventual phasing strategy would respond to the phasing requirements and milestones established in the state of California's sewer reduction requirements for Giant Forest and the final agreements established as a result of the concessioner contracting process, currently underway.
- Define issues related to the ecological restoration of those portions of Giant Forest damaged by previous development, and develop guidelines for carrying out such a program.

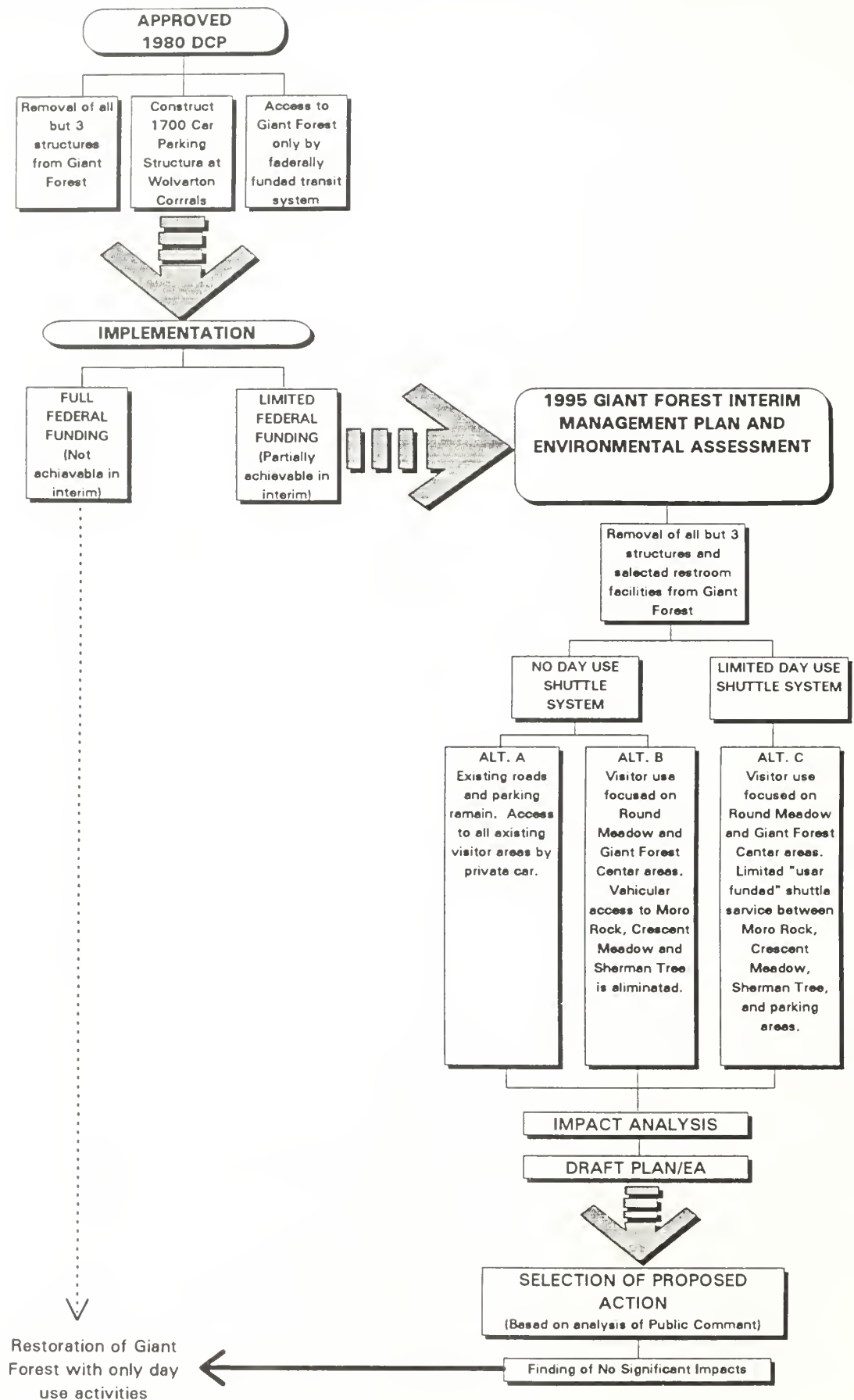
Workshops were held with park staff and resource scientists early in the planning process. These workshops focused initially on the two critical issues of ecosystem restoration and visitor experience.

## **Forest Restoration Techniques and Strategies**

The forest restoration workshops and dialogue were intended to identify forest restoration options and strategies that the park could employ following facility removal and in conjunction with visitor use. During the workshops it was concluded that forest restoration work in Giant Forest could be seen as a two-step process, consisting of (1) facility removal and site stabilization and (2) ecological restoration.

Site stabilization would begin immediately after the removal of structures or other previous development and would include road and trail removal, landform restoration, and erosion control.

# SEQUOIA NATIONAL PARK/GIANT FOREST PLANNING PROCESS





The goal of restoration will be to create a structure and composition at the restoration sites within the range of natural variability if development had not taken place and if fire had not been suppressed. Restoration will be considered successful when the forest composition and structure falls within the range that would occur naturally following fire or biological mortality in an undisturbed forest.

Efforts to fully complete restoration will be long-term and based on a forest comparative model to be developed independently of this study (1994–95). The model is intended to identify equivalent, relatively undisturbed sites in Giant Forest with similar aspect, elevation, and soil conditions to the disturbed areas in Giant Forest. These sites would be characterized according to vegetation, composition, and the effect of fire on the plant communities. Once the model was complete, a comparison would be made between the model zone and the restoration areas to determine if the restoration areas would be within the range of forest composition and structure identified in the model. This would identify differences and similarities that would guide the development of specific site restoration plans.

Building on this base, guidelines for the ecological restoration of Giant Forest were developed. These are contained in the document, *Guidelines for Ecological Restoration, Giant Forest, Sequoia National Park*. A copy of these guidelines is included in this plan as appendix B.

## Planning for the Visitor Experience

Planning for the future visitor experience in Giant Forest also was initiated in workshops with park staff. These workshops confirmed the primary goal of providing day use opportunities for visitors to experience the unique natural and cultural resources of Giant Forest in a setting with minimal apparent human influence. The experience should be primarily pedestrian-oriented, but fully accessible, de-emphasizing the role of automobiles and focusing on the experience of personal interaction with the giant sequoias, meadows, views, and cultural themes of Giant Forest.

## Resource Sensitivity Analysis

Using a geographic information system computerized data base, an overlay analysis was conducted to provide "early warning" information regarding areas of environmental sensitivity. Two summary composite analysis maps were generated by electronically manipulating and combining the following resource data layers:

- Tree inventory
- Special status — threatened and endangered species
- Hydrology
- Solar aspect
- Slope
- Cultural resources
- Biological inventory
- Soils
- Utilities

The two summary composite analysis maps classified areas of environmental sensitivity into high, moderate, and low sensitivity on one map (the highest rating on any layer takes precedence when composited), and in varying, weighted degrees of sensitivity, ranging from 2 (lowest sensitivity) to 18 (highest sensitivity) on the other. The composite analysis maps illustrated areas of early warning to the planning team, providing a basis for further discussion and analysis regarding the area's environmental sensitivity, and ultimately the appropriate levels of visitor use, type of activity, and phasing strategies to relieve serious burdens on environmentally sensitive areas.

## Development of Alternatives

Beginning from these bases of information about natural resources and visitor experiences, alternatives were developed to explore various possibilities for the future management of the grove. Some of these alternatives proved potentially applicable and they are included in this document. Others were considered but rejected. A list of rejected alternatives, along with the reasons for rejection, is also contained in this document.

## Selecting the Preferred Alternative

The National Park Service is releasing this document for public review having selected a preferred alternative. It is the intent of the National Park Service to solicit substantive comments on the alternatives presented in this document, analyze the comments received, and select a preferred alternative based on that analysis. It is anticipated that the National Park Service will select a preferred alternative during the fall of 1995. A document summarizing the alternative selected for implementation will be made available at that time.

## ISSUES

### Visitor Experience Issues

The National Park Service believes that what Giant Forest does best is provide visitors with an opportunity to interact with the park's best known feature — the giant sequoias. Past experience shows that this interaction becomes vastly more significant to individuals when they leave behind their motor vehicles and enter into the forest on foot, even if only for a short stroll. It is, therefore, an objective of park management to encourage dispersed, nonvehicular exploration of Giant Forest. To facilitate this experience, the following issues were identified.

**Access.** Access to park features and facilities plays a key role in determining visitor experience. The following access items have been identified for analysis in this planning effort:

*Focus* — Giant Forest has a wealth of features, and visitors can be focused on them in a number of different ways. Perhaps the most critical choice to be made is the relative importance of places like Sherman Tree, Moro Rock, and Crescent Meadow, which have



been emphasized in recent decades and have become management and resource problems, versus other quality features like those at Round Meadow, Hazelwood, Sunset Rock, and Beetle Rock.

Severe visitor concentration and congestion currently occur during the peak season at Sherman Tree, Giant Forest Village, and all along the Moro Rock/Crescent Meadow road, including at the two major parking areas along the route. Anticipated removal of commercial facilities at Giant Forest Village is expected to reduce congestion at that site. Resolving congestion issues elsewhere would involve reconsidering vehicle access and/or relative feature emphasis. There might be other areas that would better sustain concentrated visitor presence than those now in use.

*Roads* — Currently, visitors have two side roads that can be used for auto touring in the grove: the Moro Rock/Crescent Meadow road and the Round Meadow/Puzzle Corner road. The Moro Rock/Crescent Meadow road is heavily used. Both routes are in extremely sensitive resource areas. Whether these roads will remain, and if they do, how they would be traveled, is an important issue.

*Parking* — Since the desired experience in Giant Forest involves getting visitors out of their vehicles, parking is the key to facilitating the desired visitor experiences. Whether one can walk easily to sequoias from the parking area, or will need to use a shuttle, are critical issues. The 1980 plan calls for removing all peak-season parking from the grove, but it retains some off-season parking at Giant Forest Center, Sherman Tree, and Crescent Meadow. Terrain limits where parking can be located. A number of parking areas, including those at Sherman Tree, Moro Rock, and Crescent Meadow, are congested and gridlocked during peak-season use. Other existing parking areas, including those at Giant Forest Lodge and Round Meadow, are at risk from leaning sequoias. A study carried out by the Park Service in 1994 concluded that continuing existing levels of visitation to Giant Forest would require the perpetuation of approximately 700 parking spaces in or near the grove.

*Shuttles* — If parking was not located in the grove or near its edge, public transportation might be an answer to connecting visitor and park features. Shuttles would provide access but tend to concentrate people at staging areas that would require significant parking space. Funding for shuttles is another critical issue. With the option of full federal funding for operations apparently no longer available, alternative sources of revenue must be explored. Finally, shuttles would require dedicated support space for bus storage, maintenance, operational support, and employee housing.

*Trails* — Giant Forest has an extensive trail system that might or might not meet future needs. Trails need to start from places that visitors can reach either by private vehicle or by shuttle. Heavily used trails need hardened surfaces in Giant Forest's fine soils, but the construction of hardened trails can result in environmental impacts. Very few of the existing trails are accessible for visitors with disabilities.

*Backcountry Access* — The High Sierra Trail begins at the Crescent Meadow parking area. Any alternative that changed current access by private vehicle to this site would affect the trailhead function. Trails from the Wolverton trailhead also lead to the same backcountry destinations, but the route involves more difficult hiking.

*Access for Visitors with Disabilities* — Access in Giant Forest for visitors with disabilities is currently very limited. Only the Trail for All People, which circles Round Meadow, currently approaches universal access standards. With an aging population it can be expected that demand for accessibility will increase. New opportunities may exist for accessible trails. Construction of additional accessible trails in the grove will have associated environmental impacts.

*Winter Access* — Winter conditions in Giant Forest are strikingly different from those during the summer. Winter visitation to the grove is much less than summer, and the area often receives heavy snowfall, which limits access but encourages certain activities like cross-country skiing and snow play. For these reasons winter access presents a different series of management problems. A plan for Giant Forest needs to facilitate visitation during all seasons.

**Interpretation.** The following interpretation items have been identified for analysis in this planning effort:

*Orientation* — Currently there is no visitor orientation system specifically designed to tell visitors how to enjoy Giant Forest. During the peak season a ranger information booth is staffed at Giant Forest Village, but rangers are present only part time. Neither the Lodgepole nor Foothills (Ash Mountain) visitor center has exhibits about how to see Giant Forest. The *Sequoia Bark* park newspaper and the park brochure do not address the subject, and the park brochure provides almost no useful information. This problem would be further intensified if the direction ultimately chosen for the area differed significantly from the current pattern. Such a situation would mean that it would be very difficult to know how to approach and enjoy the grove. Parking plans that would concentrate visitor use might offer opportunities for orientation exhibits.

*Visitor Center* — The old visitor center in Giant Forest was closed in 1966, and since that time Sequoia National Park has had no visitor center that features the giant sequoias and their story. The 1980 *Development Concept Plan* calls for the conversion of the existing Giant Forest Village market building into a visitor center/museum.

*Focus Areas* — The current nonpersonal interpretive services in Giant Forest focus on General Sherman Tree, Congress Trail, Moro Rock, Round Meadow, and Hazelwood. These sites all have either wayside exhibits or self-guiding trails. Personal service interpretation varies seasonally in its emphasis, but it generally follows similar patterns. Of these sites, by far the most attention is given to Sherman Tree and Moro Rock. These are also areas of heavy visitor congestion and accelerating resource damage. Giant Forest has multiple quality features, and some of these stories could be told elsewhere. The issue of where to focus visitors for interpretive messages connects closely with the questions of where to concentrate visitors for management efficiency and environmental protection, and to improve the quality of the existing visitor experience.

*Level of Interpretive Services* — As noted in the preceding items, Giant Forest has three self-guiding trails (Congress Trail, Round Meadow, and Hazelwood) and a number of wayside exhibits. It has no orientation facilities, and many of its best features are unmarked. Many different levels of development and possibilities for interpretive emphasis exist here.

**Picnicking.** Currently the grove has no designated picnicking area. For many years Hazelwood served that purpose, but the picnic area there was closed after a fatal accident in 1969. In recent years park management has concluded that the existing picnic facility at Crescent Meadow is causing too many resource impacts, and it is now being phased out. Since 1969 Wolverton has been considered a picnic area, but the area was never developed for this purpose. The existing "picnic area" consists of several dozen tables scattered about in two parking lot islands. Picnicking is nonetheless a very popular activity in the grove, and visitors picnic currently at many locations.

**Safety.** One of the largest safety risks to visitors comes from the forest itself. Trees fall, as do branches. Sequoia branches are particularly dangerous during heavy winter snowfalls, when they often fail. Entire sequoia trees fall, often without immediate warning. All of the old trees will fall eventually. Whenever areas that include stationary human targets are placed near sequoias, the risk of human injury increases. High-risk areas include parking areas, comfort stations, and picnic grounds. Park management generally does not mitigate giant sequoia tree hazards. Other tree species also present risks to visitors, but park management would remove the identified trees. However, this has a cumulative impact on the forest. An additional visitor safety risk in the area is the fact that all routes open to bicyclists are also open to motor vehicles. Since the roads in Giant Forest are narrow and do not have consistent shoulders, this mixes motor vehicles and bicycles, and increases risks to both.

## **Natural Resource Issues**

Visitation that exceeds the capacity of the grove's existing parking areas, roads, and trail systems has resulted in widespread and increasing resource damage to soils and vegetation. Trampling of sensitive vegetation, erosion as a result of denuded soils, compacted soils from heavy pedestrian traffic, and contaminated runoff from many dispersed parking areas into sensitive wetland areas are all concerns. Giant sequoias, being shallow-rooted trees, are particularly at risk from human-caused soil erosion. Also of general concern is the ability to facilitate a program of prescribed fire in the grove. In addition to these general concerns, the following specific issues relate to the alternatives in this document.

**Ecological Restoration.** A major goal of the 1980 plan was to restore Giant Forest to a more natural state while continuing to facilitate appropriate visitor use. Different options for the conversion of the grove to day use allow different amounts of restoration. Alternatives that maintain more development in the grove obviously would allow less restoration than those that remove development. Some areas might be more critical for restoration than others. There is also a choice to be made regarding whether stabilization and natural reproduction would be sufficient to achieve restoration or whether active vegetation management would be necessary. Active revegetation could be expected to accelerate the process of recovery and lead to recovery patterns more in line with those in undisturbed forests.

**Development Remaining in the Grove.** There are many environmental costs to retaining development in the grove. But there are also environmental costs associated with developing alternative facilities near the grove's boundary or at other locations. Facilities



remaining in the grove require tree hazard protection, and their utility support lines continue to interfere with the forest. Facilities in the grove may also interfere with the prescribed fire program. The 1980 plan identifies the goal of removing as much development as possible from the giant sequoia area.

**Tree Hazard Implications.** Park management has a responsibility to protect visitors from known risks. The biggest risks associated with natural resources in Giant Forest come from tree hazards. Mitigating tree hazards generally requires the identification and removal of potential hazards, including weakened branches or entire trees. This activity has a definite effect on the forest ecosystem. Generally, the level of tree hazard impact is proportional to the amount of development in an area and the type of forest. Mature mixed conifer forests usually have high tree hazards, and sequoias, as noted above, produce special hazards because of the size of the trees, the limited ability of park management to predict the timing of failure, and the park's general policy not to apply direct mitigation to sequoia trees.

**Wetlands.** Past developments in Giant Forest have impacted wetlands. The existing Round Meadow parking area is at least partly on wetland fill, as are portions of the existing Giant Forest Lodge parking areas. The potential exists for restoring these wetlands to a more natural state.

**Threatened and Endangered Species.** By law the potential effects of each alternative on threatened and endangered species must be analyzed.

## Cultural Resource Issues

In the 1980 *Development Concept Plan* and the 1979 *Environmental Impact Statement* historic districts and structures were identified in Giant Forest, and potential impacts on those structures and districts were analyzed. A proceeding in accordance with section 106 of the National Historic Preservation Act, as amended, was undertaken to resolve the issues identified, which resulted in a full Historic American Buildings Survey (HABS) recording of the two historic districts in Giant Forest and permission to implement the 1980 plan and remove the buildings. In 1994, in response to the fact that 15 years had passed since resolution of this issue, a new study of potential historic structures in Giant Forest was undertaken. This study identified a number of additional structures that were subsequently determined to be eligible for listing on the National Register of Historic Places. Therefore, the planned removal of these structures would result in additional adverse impacts on these historic buildings. Since the 1980 plan still calls for the removal of these structures, the Park Service has undertaken to develop a programmatic agreement with the state historic preservation officer and the Advisory Council on Historic Preservation to resolve these new issues.

Several archeological surveys of the affected area have been undertaken. Plans for restoration and conversion work in the grove would need to ensure that impacts on these sites are minimized or avoided. Plans would also need to incorporate guarantees to ensure that unknown archeological resources discovered during construction would be managed properly.

In addition to the general items listed above, adaptively using historic buildings will be explored in the individual alternatives. Different options exist for how the few historic buildings proposed for retention are to be used.

## **Park Facility and Operational Issues**

Future day use of Giant Forest by millions of visitors requires that the area have a visitor infrastructure. The size, scale, and location of this infrastructure are all issues of considerable importance. These issues overlap with visitor experience issues, but they are intended to focus on the operational aspects involved.

**Road Reconstruction.** Potential changes in the role of Generals Highway as a through-route connecting Sequoia and Kings Canyon National Parks are not within the scope of this planning effort. The roads within Giant Forest, however, present a number of issues. Proposals to retain the Moro Rock/Crescent Meadow and/or Round Meadow/Puzzle Corner roads have significant implications. These roads are both narrow and in relatively poor condition. Depending on the proposed new use, either rehabilitation for continued use or reconstruction to facilitate a different use might be necessary. Such actions would have definite environmental impacts and also would have long-term impacts on park operational responsibilities.

**Parking areas.** The issues here are closely related to those listed above under "Road Reconstruction." Several of the existing parking areas, particularly those at Sherman Tree, Giant Forest Village, Moro Rock, and Crescent Meadow, currently experience congestion and gridlock under peak-season demands. All are in poor physical condition. Proposed future uses must take these concerns into account.

**New Trails.** Giant Forest has an extensive system of existing trails. However, these trails might not connect successfully with sites proposed for possible parking areas or shuttle stops. Also, as noted above, current levels of accessibility are quite low. New trails might solve some of these problems; however, new trails might have impacts on natural resources in the grove and the areas where they begin, where people would be expected to concentrate.

**Trail Reconstruction.** Many of the existing trails in Giant Forest are in poor condition. This is particularly true of hardened trails. Plans for future heavy use of existing routes might need to consider rehabilitating or reconstructing existing trails either to sustain existing use or to support more intense and/or different uses.

**Potable Water.** The anticipated continuation of significant visitor use in the grove would require the presence of potable water for both human consumption and sanitation. How this water would be provided must be considered.

**Wastewater Treatment.** A major issue addressing all alternatives is the imminent closure of the existing wastewater treatment plant in Giant Forest. This plant is old and produces a substandard grade of effluent, which is disposed of through a sprayfield on steep terrain that is not considered suitable for this purpose under current standards.

On May 20, 1994, after a negotiation with the National Park Service, the California Regional Water Quality Control Board, Central Valley Region, issued an order placing severe limitations on the future of this plant and all the existing facilities in Giant Forest that depend on it. Under this order summer sewage flows to the wastewater treatment plant are to be reduced approximately by 17% each year, using 1993 as a base. This will result in a reduction of flows from a seasonal daily average of 60,000 gallons in 1993 to essentially zero after the end of the 1998 season.

Beginning in the winter of 1995–96, winter flows are to be reduced to no more than 1,400 gallons per day.

The effect of these limitations is that summer sewer flows must be reduced aggressively over the next several years. This will almost inevitably result in reductions in visitor services, probably beginning in the summer of 1996. No commercial facilities will be allowed to produce sewage that will flow into the existing wastewater treatment plant after October 31, 1998. No commercial facilities are now available in Giant Forest during the winter. Support facilities, including both concessioner and NPS employee housing, would also be closed seasonally beginning with the winter of 1995–96. Final details of the visitor facilities and services phaseout in Giant Forest are to be negotiated between the National Park Service and a concessioner as part of the concessions contracting process now underway.

Because the existing wastewater treatment plant is to be closed, this plan must consider how much sewage will be generated in the grove under the several alternatives and how sewage will be handled.

**Staffing Requirements.** Management of future visitor use of the Giant Forest area requires not only facilities and infrastructure, but also personnel. Affecting this situation is the fact that the National Park Service is being asked nationally to reduce overall staffing levels and personnel costs. Different alternatives might result in differing requirements for staffing, both to serve visitors directly and to maintain and support the operation of the area. The development of alternatives should include a discussion of staffing implications.

## RELATIONSHIP TO OTHER PLANS AND PROJECTS

It is important that this plan identify and conform with other planning efforts that guide the development, management, and/or operation of Sequoia and Kings Canyon National Parks.

The primary relationship this document has is with the 1980 plan, which established long-term development goals for Giant Forest. The 1980 plan is summarized in the following chapter.

A second critical document is the draft *Guidelines for Ecological Restoration, Giant Forest, Sequoia*, prepared by the Denver Service Center in 1995. This document contains policy and direction for proposed ecological restoration work in the grove. A copy of the document is included in this plan as appendix B.

Also important is the *Interpretive Prospectus for Giant Forest / Wuksachi, Sequoia National Park*, which is currently being prepared by the Harpers Ferry Center of the National Park Service. This plan will identify how interpretive goals for Giant Forest will be implemented.

In addition to those three critical documents, this planning effort consulted the substantial body of resource planning for Sequoia and Kings Canyon National Parks. Besides the umbrella document — the *Sequoia and Kings Canyon National Parks' Natural and Cultural Resources Management Plan* — resource plans affecting Giant Forest include the 1989 *Fire Management Plan*, the 1987 *Vegetation Management Plan for the Development Zone*, the 1992 *Bear Management Plan*, the 1987 *Special Management Area Visual Resources Management Study for the Sequoia National Park Prescribed Fire Management Program*, the *Wildlife Management Plan*, and the *Aquatic / Water Resources Management Plan*.



## 1980 DEVELOPMENT CONCEPT PLAN

In 1971 the National Park Service completed and authorized a new *Master Plan* for Sequoia and Kings Canyon National Parks. Recognizing that the existing situation in Giant Forest was unsatisfactory in nearly all aspects, the *Master Plan* called for the redesign and relocation of many of those facilities in Giant Forest.

To carry out this decision, the National Park Service initiated a planning effort to define a new "development concept" for Giant Forest. By 1973 it became apparent to the planning team that the *Master Plan's* recommendations for Giant Forest could not be carried out without unacceptable impacts on the grove. As a result, the Park Service began to explore ways of removing development from the grove and converting the area to day use only. After the general endorsement of this proposal during public meetings, this concept grew into a formal plan known as the *Giant Forest / Lodgepole Development Concept Plan*. This document was approved by the agency in 1980. The plan called for removing commercial facilities from Giant Forest, restoring and converting the grove for day use, and developing a new area (originally Clover Creek, now Wuksachi Village) to support commercial facilities.

In fiscal year 1984 Sequoia National Park began receiving annual funding to execute the proposals. That funding allowed implementation of the Wuksachi aspects of the plan. Now, as is described in the previous chapter, attention is shifting to the Giant Forest portion of the plan. After 15 years the basic concepts of the 1980 plan remain valid — especially the conversion of Giant Forest to a day use area. Several aspects of the plan, however, are not implementable under current fiscal conditions. The most difficult proposal to implement would be that all visitors to Giant Forest should be served by an obligatory shuttle system staged from a single large parking structure at the Wolverton corrals. This concern has resulted in the development of this document with its alternatives for interim management (10–20 years) of the grove.

Despite these concerns and the current inability of the park to fully implement the plan, the 1980 *Development Concept Plan* remains the long-term plan for Giant Forest. This document does not question that assumption.

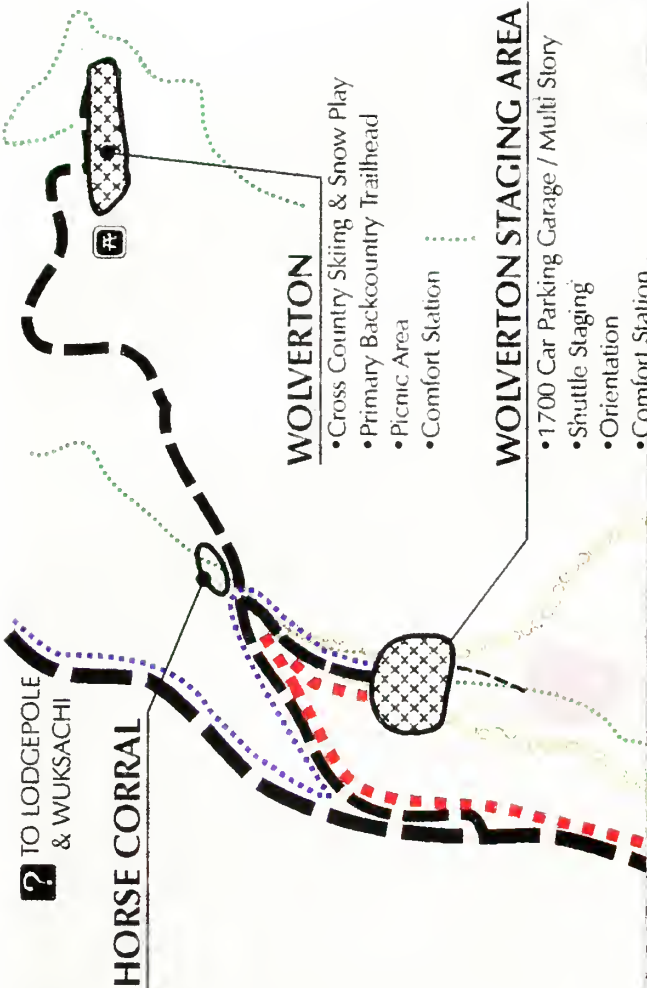
The provisions of the 1980 plan that relate to Giant Forest are presented below. Because the plan cannot currently be implemented as written, the 1980 plan does not constitute a formal alternative within the confines of this document. Instead, the 1980 plan should be considered as a desired ultimate state against which the alternatives presented in this document should be evaluated.

### OVERVIEW OF THE 1980 PLAN

The 1980 plan emphasizes existing features in the grove but very significantly shifts visitor transportation patterns (see 1980 Development Concept Plan map). The plan envisions that all visitors to the grove would park in a single consolidated 1,700-vehicle parking structure to be located outside the grove at the current site of the Wolverton corrals. Generals Highway would remain open through the grove, but no public parking

## Legend

- Unrestricted Road
- Day Use Shuttle
- Lodging Shuttle
- Primary Pedestrian Trail
- Secondary Pedestrian Trail
- Handicapped Accessible Trail
- Horse Trail
- Parking Area
- Existing Developed Zone
- Previously Developed Zone
- Existing Wolverton Developed Zone
- Shuttle Stop
- Orientation Center



## EXISTING APPROVED PLAN

- 1,700 TOTAL PARKING SPACES IN ONE LOT
- FULL SHUTTLE SYSTEM: from LODGE and PARKING LOTS to GIANT FOREST CENTER; from GIANT FOREST CENTER to CRESCENT MEADOW
- NO FOOD SERVICE

## MORO ROCK

- Comfort Station
- Shuttle Stop

This map represents the approved 1980 DCP. Parking capacity is nearly doubled from existing conditions and peak season use of Giant Forest requires a fully operational transit system. A 1700 car parking garage at Wolverton Corral serves as a primary visitor staging area. Nearly all facilities and 16 parking lots have been removed from the Giant Forest. Giant Forest is reclaimed and restored to a more natural character while de-emphasizing the automobile.

# SEQUOIA NATIONAL PARK

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MILES

1/2

1

METERS

500

1000



North

DATE: 6-30-95





Unrestricted Road

Day Use Shuttle

Lodging Shuttle

Primary Pedestrian Trail

Secondary Pedestrian Trail

Handicapped Accessible Trail

Horse Trail

Parking Area

Existing Developed Zone

Previously Developed Zone

Existing Wolverton Developed Zone

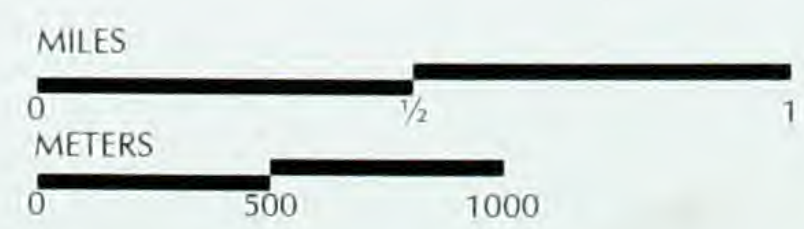
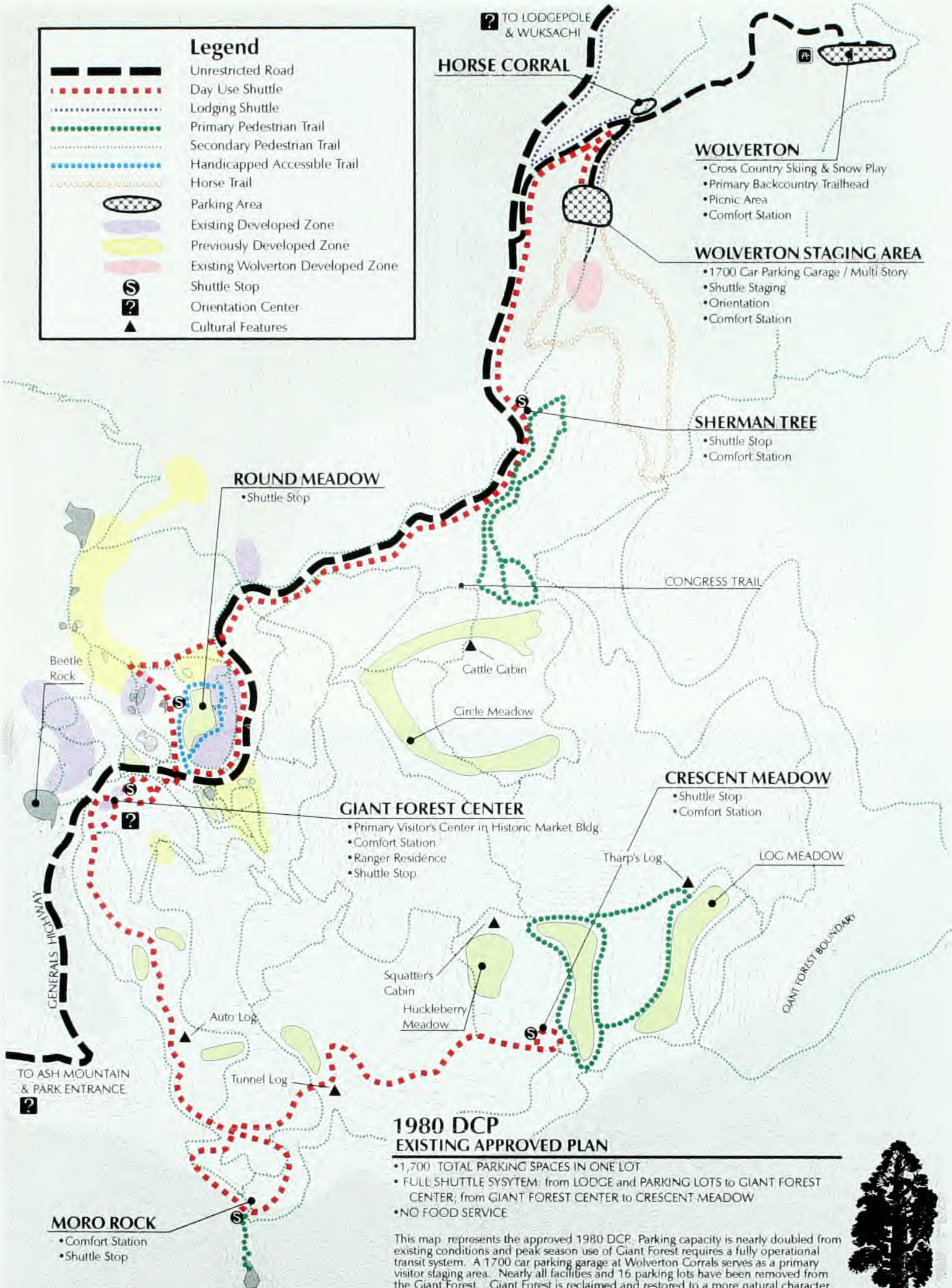
S

Shuttle Stop

?

Orientation Center

Cultural Features



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would be available along the route anywhere in the grove. From the parking structure ("staging area") all visitors to the grove would be transported by a shuttle system that would run from that site to Sherman Tree, Giant Forest Center, Moro Rock, and Crescent Meadow. Visitor emphasis would continue to focus on those features. A visitor center/museum would be developed in the Giant Forest Village market building.

## PURPOSE

The 1980 plan seeks to preserve the current pattern of feature emphasis and reduce current visitor impacts within Giant Forest by making profound changes in visitor transportation. The plan explores what could be achieved by ending all private vehicle use in or near the grove and concentrating all parking in a single location well removed from the grove boundary.

## VISITOR EXPERIENCE

### Access

**Focus.** The current emphasis on Sherman Tree, Moro Rock, and Crescent Meadow as the grove's major features would continue. A visitor center/museum at the village center would be developed. The Round Meadow/Hazelwood area would remain secondary. Existing congestion in the Giant Forest Village center would be replaced by a smaller visitor concentration point in the form of the visitor center/museum. Vehicular congestion would be totally removed from the grove, but would likely be present at the staging area.

**Roads.** Generals Highway through the grove would remain open, but no parking or stopping would be allowed. The Moro Rock/Crescent Meadow road could be accessed by shuttle, as could the Round Meadow/Puzzle Corner road.

**Parking.** All peak-season parking would be concentrated at the parking structure at the Wolverton corrals site (staging area). No visitor parking would be allowed anywhere in or near the grove during the summer heavy use period. Small amounts of parking would be retained at Sherman Tree, Giant Forest Village, and Crescent Meadow to support operations during quiet periods when the day use shuttle would not be operating.

**Shuttles.** A free, high-volume shuttle system would transport visitors from the staging area at Wolverton to Sherman Tree, Giant Forest Center, Moro Rock, and Crescent Meadow.

**Trails.** The existing trail system in the grove would remain the same.

**Backcountry Access.** Backcountry access would not change; however, the Crescent Meadow trailhead could be accessed only by shuttle. Visitors wishing to drive to the trailhead would use the Wolverton trailhead.

**Access for Disabled Visitors.** An accessible day use shuttle system would be provided.

**Winter Access.** The day use shuttle system would not operate during the winter months. Limited parking would be retained at Sherman Tree, Giant Forest Center, and Crescent Meadow to provide access to these areas when the shuttle was not running.

## **Interpretation**

**Orientation.** Orientation for Giant Forest visitors would be concentrated at the Wolverton staging area. All visitors would share this opportunity to discover what the grove has to offer.

**Visitor Center.** The existing Giant Forest Village market building would be converted to a visitor center/museum and would tell the story of Giant Forest and its trees.

**Focus Areas.** Interpretive focus would remain at Sherman Tree/Congress Trail, Moro Rock, and Crescent Meadow. The new visitor center/museum would add a possible new focus area for interpretation.

**Level of Interpretive Services.** Except for the significant addition of the visitor center/museum, the level of interpretive services would remain unchanged.

## **Picnicking**

Picnicking would remain concentrated at the upper parking area at Wolverton.

## **Safety**

All parking and almost all development would be removed from in or near the grove, which would reduce tree hazard risks to visitors at developed sites. The plan does not address safety concerns associated with bicycles.

## **NATURAL RESOURCES**

### **Ecological Restoration**

The 1980 plan establishes the goal of extensive and thorough restoration in the grove. Although all roads will remain in the grove, the upper parking lot at Sherman Tree and the parking area at Crescent Meadow will be restored. With the exception retaining the market for use as a visitor center/museum, all areas currently occupied by commercial development will be available for restoration, as will all previously abandoned areas, including the old campgrounds near Puzzle Corner and Sunset Rock. The road corridor through the Round Meadow area will remain in use. No standards for restoration procedures were identified in the 1980 plan.

## **Development Remaining in the Grove**

Under the 1980 plan three historic buildings at the Giant Forest Village center (the market, comfort station, and ranger residence), as well as comfort stations at Sherman Tree, Moro Rock, and Crescent Meadow, will remain. All other structures will be removed from the grove. No public parking will be retained. All existing road corridors will continue to accommodate vehicle use.

## **Tree Hazard Implications**

The impacts of the tree hazard program on the forest will be largely eliminated.

## **Wetlands**

The wetland fill parking areas at Giant Forest Lodge will be removed, as will the similar parking area at Round Meadow. The Round Meadow road will be retained.

## **CULTURAL RESOURCES**

Under the 1980 plan the Giant Forest market building will be adaptively used as a visitor center/museum. The comfort station and ranger residence at the same site will retain their traditional uses. The historic structures elsewhere in the grove (Cattle Cabin, Tharp's Log, and Moro Rock Steps) will be retained.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

Although the 1980 plan does not specifically call for any road reconstruction, the heavy volume shuttle it envisions will probably require eventual rehabilitation or reconstruction of both the Round Meadow/Puzzle Corner and Moro Rock/Crescent Meadow roads.

### **Parking Areas**

No public parking will remain in the grove or on its immediate fringe. A large (1,700-vehicle) parking structure will be constructed at the Wolverton corrals site.

### **New Trails**

The plan calls for no new trails.

## **Trail Reconstruction**

The plan does not specifically call for any trail reconstruction.

## **Potable Water**

Water for the Wolverton staging area, Sherman Tree comfort station, and the visitor center/museum complex at Giant Forest Center will come from the Wolverton water treatment plant by way of the existing water main running from that plant to Giant Forest. The Moro Rock and Crescent Meadow comfort stations will continue to be served by the Log Meadow water system.

## **Wastewater Treatment**

The comfort stations at Sherman Tree, Moro Rock, and Crescent Meadow will continue to rely on their existing septic systems. A new treatment facility will need to be constructed to support the Wolverton staging area, where a substantial sewage volume could be expected. A new low-volume treatment system would also be required to support the visitor center/museum, comfort station, and ranger residence at the village center.

## **Staffing Requirements**

NPS staffing requirements will be increased significantly from the current level under this plan. Law enforcement requirements will be simplified by the concentration of visitors at the Wolverton staging area and closure of the grove's side roads to private vehicles. Interpretative services will be increased by the opening of a visitor center/museum, which will require significant additional staffing, and by the possible need for staffed orientation services at the Wolverton staging area.

Maintenance crews will face a shifted and potentially heavy workload. The new staging area, with its 1,700-vehicle parking structure, will require a very different level of maintenance attention than the old facilities. The tree hazard program will be reduced from the current level but will still have the responsibility of protecting the remaining limited development in the grove.

A large staff will be required to operate the new shuttle system. In addition, a new shuttle maintenance and storage facility will have to be constructed in the park, but outside Giant Forest. This facility will potentially require several acres of land.



# **ALTERNATIVES FOR INTERIM MANAGEMENT**



## **ELEMENTS COMMON TO ALL ALTERNATIVES**

Three alternatives for the interim management of Giant Forest and vicinity have been developed during this planning effort. Each is intended to explore different solutions to the problems the area faces. The following elements are common to all the alternatives.

### **VISITOR EXPERIENCE**

#### **No Reduction in Visitation Capacity**

All alternatives provide for overall day use capacity equal to or exceeding that now present. Alternatives differ, however, in which areas they would make readily accessible. This results in differing visitation emphases between the alternatives.

#### **Visitor Experience Goal**

Park management has concluded that the primary means of experiencing Giant Forest should be through a comprehensive system of trails, providing varying levels of challenge and accessibility for the full range of park visitors. The primary visitor experience should be pedestrian rather than vehicular. All alternatives incorporate this goal.

#### **Interpretive Focus**

All alternatives focus interpretive opportunities primarily on Giant Forest's giant sequoias, meadows, mountain views, and human history.

#### **Visitor Orientation**

All alternatives assume that the existing NPS visitor centers at Ash Mountain (Foothills) and Lodgepole would continue in their current role of providing orientation to park visitors. Alternatives vary in how and to what degree orientation services would be provided in the grove.

#### **Lodging Shuttle**

A low-volume shuttle system connecting features in Giant Forest with overnight accommodation areas, including the Lodgepole campground, is operated currently by the primary concessioner for Sequoia National Park. All alternatives call for the continuation of this service, although some alternatives call for changes in routing and locations served.

## **Generals Highway**

All alternatives assume that Generals Highway through Giant Forest would continue to be open to through-traffic. The existing advisory that vehicles longer than 22 feet should not use the highway south of Giant Forest Village would be maintained. None of the plans propose any significant change in the character or capacity of the highway.

## **Winter Access and Ski Trails**

All year access is currently provided to Giant Forest via Generals Highway, and all alternatives assume that this access would continue. Winter parking would be provided in the grove in each alternative, but different alternatives call for different locations. A system of cross-country ski trails would be maintained.

## **Horseback Riding**

Concessioner-operated horse tours in the northeastern part of Giant Forest would continue under all alternatives. This activity would be based at the Wolverton corrals, located outside the grove.

## **Food Service**

All food service facilities would be located in remote areas in Lodgepole or Wuksachi.

## **NATURAL RESOURCES**

### **Ecological Restoration**

All alternatives assume that, unless otherwise noted, sites opened by the removal of past development would be stabilized to prevent erosion and then made available for revegetation.

### **Fire Management**

Under all alternatives current obstacles to prescribed fire management in the grove would be reduced by removing development.

### **Tree Hazard Management**

All alternatives assume that the existing park program of tree hazard management would continue in areas of concentrated human use. This program would call for the physical management of tree hazards from selected heavy use sites, including buildings and major parking areas.

## **Hazardous Materials**

A complete evaluation of hazardous materials found in the developed area would be performed, and appropriate methods of remediation would be applied during facility removal. Additional documentation in accordance with the National Environmental Policy Act (NEPA) would be prepared if necessary.

## **CULTURAL RESOURCES**

### **Historic Structures**

All existing historic structures in the Giant Forest development zone would be removed except for the market, comfort station, and ranger residence at Giant Forest Village. This would include both structures currently in historic districts and those determined eligible for listing on the National Register of Historic Places. All alternatives also assume that the existing historic structures in the grove outside the development zone (known individually as Cattle Cabin, Squatter's Cabin, Tharp's Log, and Moro Rock Steps) would be retained in an unaffected state. These four properties are each listed on the national register.

### **Section 106 Implementation**

All actions proposed under the alternatives would comply with section 106 of the 1966 National Historic Preservation Act, as amended, and its implementing federal regulations.

### **Archeological Mitigation**

All alternatives would maintain known archaeological sites in the grove and surrounding areas in an unaffected state. Additionally, before any earth-disturbing activities, archeological testing would be conducted to determine the nature and extent of the archeological resources to be affected. Testing would be carried out in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation, as appropriate, to avoid, minimize, or mitigate effects.

## **PARK FACILITIES AND OPERATIONS**

### **Removal of Existing Facilities**

All existing commercial facilities in Giant Forest would be removed, as would all associated buildings, including associated maintenance, housing, and aboveground utility structures. The sole exception would be the physical retention of the market, comfort station, and ranger residence at Giant Forest Village. The retention of these three buildings is called for in the 1980 *Development Concept Plan*. All three alternatives would also preserve comfort stations and supporting utility systems in Giant Forest outside the development zone. However, the alternatives vary in which facilities would be retained.

## **Hiking Trails**

Giant Forest has an extensive system of foot trails for visitor use. All alternatives call for the retention of this system. All access trails to structures that would be razed would be removed.

## **Potable Water**

All alternatives assume that the existing Wolverton water treatment plant and the waterline connecting that site with Giant Forest would remain in service. The main watertank in Giant Forest is an underground concrete tank near Pinewood. This tank would be used in all alternatives.

## **Wastewater Treatment**

The existing Giant Forest wastewater treatment plant would be removed. This facility would be replaced by appropriate low-volume treatment system(s) near the point of sewage origin. The alternatives vary in how much sewage would be produced at particular sites.

## **ALTERNATIVE A: EXISTING VISITOR ACCESS AND PARKING (NO ACTION)**

Alternative A would maintain existing vehicle access routes, parking areas, trails, and interpretive facilities in the context of day use only in Giant Forest (see Alternative A: No Action map). The existing seasonal Giant Forest area lodging shuttle that serves overnight guests at Lodgepole would be retained and would serve Wuksachi Village also, but no shuttle system would be instituted to meet the needs of day users. Most current natural resource and visitor management problems would continue together with their impacts. Erosion control work would be done as necessary, but active ecological restoration would not be carried out in the grove.

### **PURPOSE**

This alternative proposes that subsequent to the removal of the existing commercial development in Giant Forest, nothing else would be changed except for a very few required health and safety actions. The purpose of the alternative is to explore the implications of minimal additional federal investment in Giant Forest and to determine how well existing roads, parking, trails, and visitor use patterns would serve future day use visitation and resource management needs in Giant Forest.

### **VISITOR EXPERIENCE**

#### **Access**

**Focus.** The visitor experience would continue to focus on Sherman Tree, Moro Rock, and Crescent Meadow. Round Meadow, Hazelwood, Beetle Rock, and Sunset Rock would continue in their current roles as secondary features.

**Roads.** The existing system of roads would be retained for public use. The Moro Rock/Crescent Meadow road and the Round Meadow/Puzzle Corner road would remain open to the public. Existing vehicle size advisories or limitations would be continued.

**Parking.** The existing system of roadside parking areas would generally be retained. The sole exception would be that parking areas in Giant Forest that are threatened by leaning sequoias would be closed. This list could include Giant Forest Lodge parking lots 1, 3, and 4, and the Round Meadow parking area. The existing parking facilities at Sherman Tree, Moro Rock, and Crescent Meadow would remain.

**Shuttles.** The existing seasonal lodging shuttle that connects Lodgepole campground with visitor features in Giant Forest would be retained. This shuttle would be extended to serve Wuksachi Village when that area opens. The lodging shuttle would continue to provide service to Moro Rock and Crescent Meadow. No other shuttle services would be present.

**Trails.** Visitors would continue to use the existing trail system in Giant Forest. No changes would be made in the type or number of trails available; however, all access trails to structures that would be razed would be removed.



**Backcountry Access.** The existing backcountry trailhead function at Crescent Meadow would continue, as would the trailhead function at Wolverton. Overnight parking would be available at both locations.

**Access for Visitors with Disabilities.** The current situation would be preserved. The existing Trail for all People circling Round Meadow would be retained, as would the short accessible route connecting the upper Sherman Tree parking area with the tree itself. There would be no other accessible trails under this alternative. Visitors with disabilities would also continue to have vehicle access to the Moro Rock/Crescent Meadow and Round Meadow/Puzzle Corner roads.

**Winter Access.** Existing parking areas in the grove would be cleared of snow at Giant Forest Village and General Sherman Tree (lower lot only). Existing ski trails leading from those sites would remain available. The Moro Rock/Crescent Meadow and Round Meadow/Puzzle Corner roads would not be cleared of snow. Visitors would be encouraged to engage in snow play at Wolverton rather than in Giant Forest.

## Interpretation

**Orientation.** No new orientation services or facilities would be developed in Giant Forest.

**Visitor Center.** No visitor center would be developed in Giant Forest. However, the Giant Forest Village market building would be "mothballed" for future conversion to a visitor center, as called for in the 1980 *Development Concept Plan*. The existing ranger information booth at Giant Forest Village would be removed.

**Focus Areas.** Interpretive focus in the Giant Forest would continue to emphasize Sherman Tree and vicinity, Moro Rock, Round Meadow, and Crescent Meadow.

**Level of Interpretive Services.** The level of interpretive services available in Giant Forest would remain the same, with the exception of the closure of the Giant Forest ranger information both. The existing self-guiding trails at Hazelwood, Round Meadow, and Congress Trail would be retained, as would the existing system of wayside exhibits. The existing classroom facilities at Beetle Rock would be removed, along with the remainder of the upper Kaweah development complex.

## Picnicking














The existing picnic area at Wolverton would be retained, but no formal picnic areas would be available in the grove.

## Safety

Because the current pattern of use in Giant Forest would remain the same, many of the area's visitor risks would also remain. Parking lots in the grove would still be subject to both branch and trunk failures. This risk would be reduced, but not eliminated, by the closing the most obvious high-risk sites. Bicyclists would still be subject to the current risks that result from mixing bicycles and motor vehicles on all routes open to bicycles.

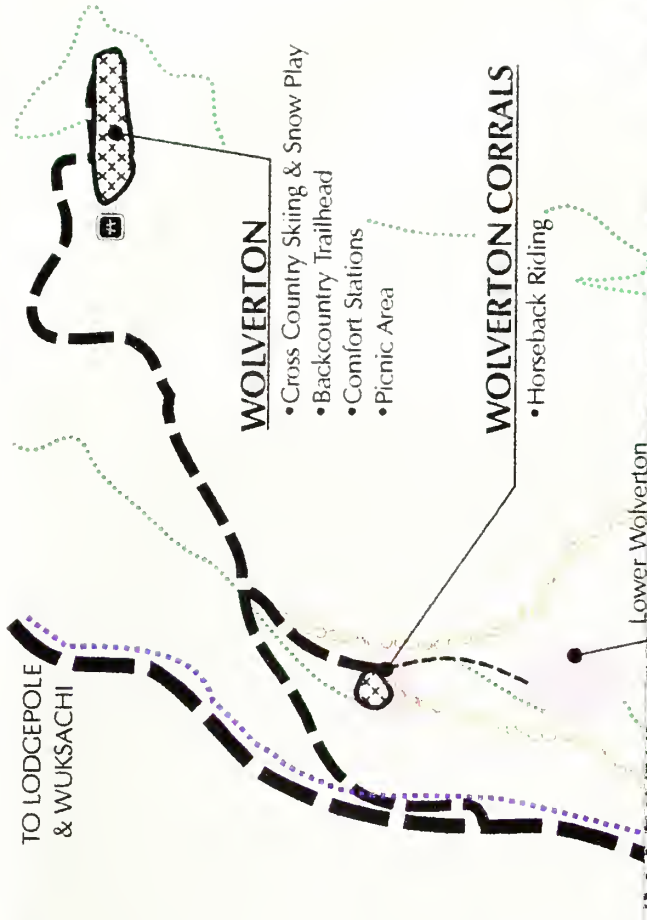


## Legend

-  Unrestricted Road
-  Lodging Shuttle
-  Primary Pedestrian Trail
-  Secondary Pedestrian Trail
-  Handicapped Accessible Trail
-  Horse Trail
-  Parking Area
-  Existing Developed Zone
-  Previously Developed Zone
-  Existing Wolverton Developed Zone
-  Shuttle Stop
-  Cultural Features
-  Primary Visitor Destination

## MORO ROCK

- 31 Parking Spaces
- Comfort Station
- Primary Interpretive Area



## ALTERNATIVE A - NO ACTION MAINTAIN EXISTING VISITOR PATTERNS AND PARKING

- 782 TOTAL SUMMER PARKING SPACES in 19 LOTS - 535 winter
- NO FOOD SERVICE

This alternative maintains all of the traditional visitor destinations and access methods in Giant Forest. Parking lots are unchanged. Most buildings and facilities are removed from Giant Forest. Existing pedestrian activity levels are maintained. The automobile is still the primary mode of transportation.

MILES



METERS



DATE: 6-30-95

# SEQUOIA NATIONAL PARK

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Unrestricted Road

Lodging Shuttle

Primary Pedestrian Trail

Secondary Pedestrian Trail

Handicapped Accessible Trail

Horse Trail

Parking Area

Existing Developed Zone

Previously Developed Zone

Existing Wolverton Developed Zone

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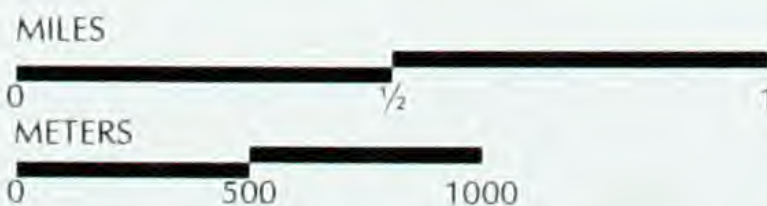
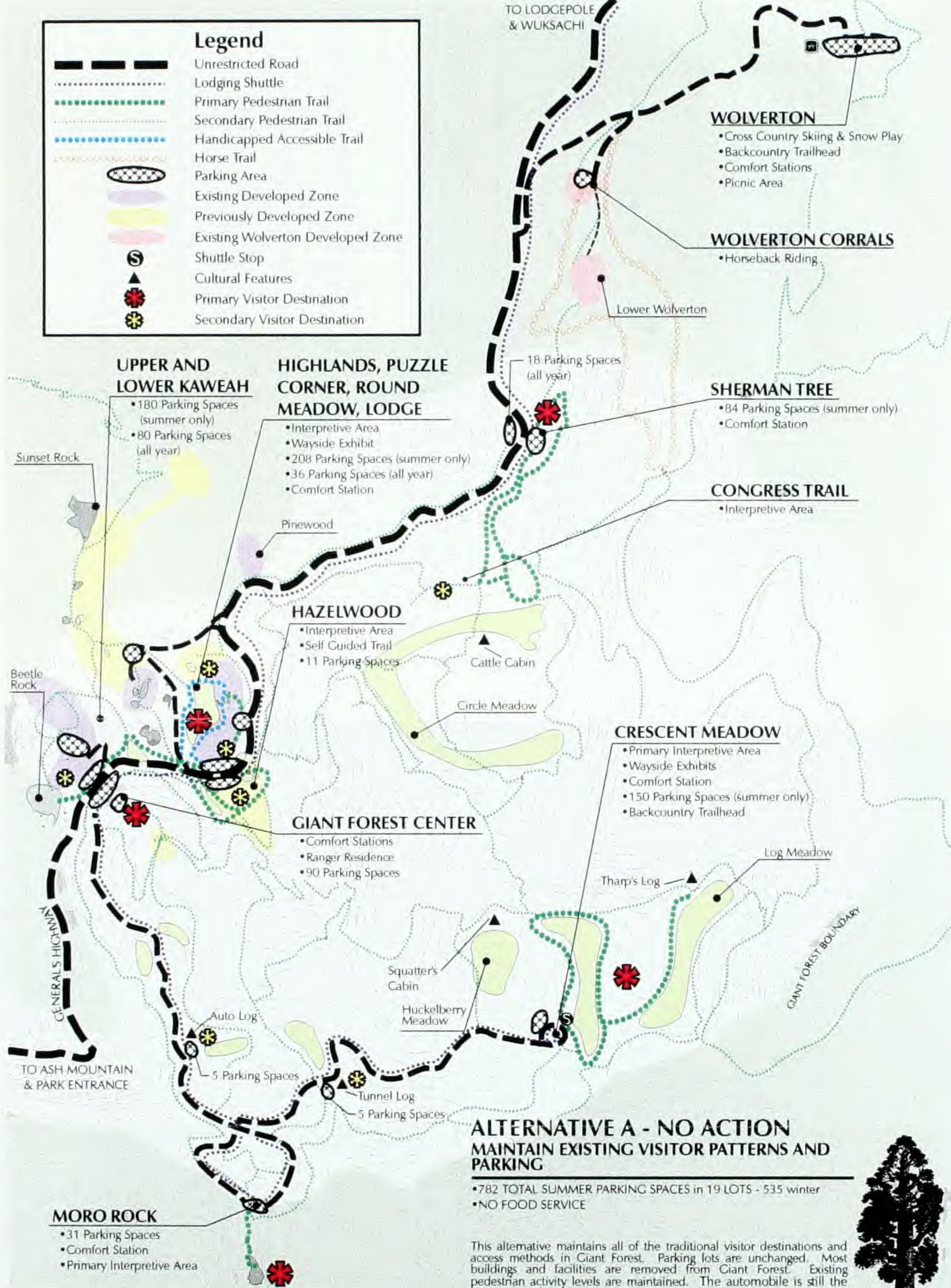
Shuttle Stop

Cultural Features

Primary Visitor Destination

Secondary Visitor Destination

### Legend



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## **NATURAL RESOURCES**

### **Ecological Restoration**

This alternative does not include any active ecological restoration work. Areas from which buildings have been removed would be stabilized to prevent soil erosion. Reliance would be then be placed on natural reproduction to revegetate these sites. Areas in the grove being retained for road and/or parking area use, including portions of upper Kaweah and lower Kaweah, Giant Forest Village, Crescent Meadow, Sherman Tree, and the Round Meadow/Puzzle Corner road, would not be restored to natural conditions.

### **Development Remaining in the grove**

This alternative would retain a substantial amount of development in the grove. As mentioned above, the side roads to Moro Rock/Crescent Meadow and Round Meadow/Puzzle Corner would be retained, as would all associated parking. The Giant Forest Village parking complex would remain, as would those at upper and lower Kaweah and General Sherman Tree. All of these developments are in giant sequoia habitat. Existing comfort stations would be retained at Sherman Tree, Giant Forest Village, Moro Rock, and Crescent Meadow. The ranger residence at Giant Forest Village would remain in use.

### **Tree Hazard Implications**

Retaining extensive parking areas in the grove would require that all those areas continue to be the focus of tree hazard management. Older or otherwise weakened trees would continue to need to be removed from these areas for the lifetime of this interim plan.

### **Wetlands**

The wetland fill parking areas at Giant Forest Lodge would be closed and stabilized to prevent erosion. The Round Meadow road and parking area would be retained.

## **CULTURAL RESOURCES**

No historic buildings would be adaptively used in Giant Forest. However, the Giant Forest market building would be mothballed and kept for possible future use as a visitor center.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

No roads would be reconstructed under this alternative.

## **Parking Areas**

Most existing parking areas would be retained. No new parking areas would be built.

## **New Trails**

No new trails would be constructed under this alternative.

## **Trail Reconstruction**

No trail reconstruction would be undertaken under this alternative.

## **Potable Water**

The two existing water systems in Giant Forest would be retained. The main line from the Wolverton water treatment plant would remain in service and would serve the comfort stations at Sherman Tree, the village center, and the ranger residence. The Log Meadow water system would continue to provide water to the comfort stations at Crescent Meadow and Moro Rock.

## **Wastewater Treatment**

Three septic tank systems would be maintained to serve the comfort stations at Sherman Tree, Moro Rock, and Crescent Meadow. Because the existing wastewater treatment plant serving Giant Forest Village is to close by the end of 1998, it would be necessary to develop a new low-volume treatment system to serve the comfort station and ranger residence at that site.

## **Staffing Requirements**

Because use patterns would not change, NPS staffing requirements would be little changed from the current level under this alternative.

## ALTERNATIVE B: CONCENTRATED FOCUS AND PEDESTRIAN EXPERIENCE

Alternative B would emphasize the historic core area near Round Meadow and concentrate use there (see Alternative B map). Heaviest visitor use would occur in the Sunset Rock, Round Meadow, Hazelwood, the village center, and Beetle Rock areas. Access to these areas would be facilitated by parking nearby on the grove's natural boundary and by an improved system of trails and orientation exhibits. Vehicle access to Sherman Tree, Moro Rock, and Crescent Meadow would be eliminated in favor of foot travel. The existing seasonal Giant Forest area lodging shuttle would be retained and would serve Wuksachi Village in addition to Lodgepole. However, no shuttle system would be instituted to meet the needs of day users. Active ecological restoration would be carried out as called for in the draft *Guidelines for Ecological Restoration*.

### PURPOSE

This alternative explores how reduced vehicular access to parts of the grove and a geographical shift in visitor focus would interface with a use pattern that emphasizes walking to many area features. The alternative would reduce potential expense by not calling for additional shuttle services in the grove. It proposes reducing visitor concentration at major features such as Sherman Tree, Moro Rock, and Crescent Meadow by providing readily accessible similar alternatives and making the more famous features less easy to visit. In general the proposal attempts to protect the grove by reducing easy access to the grove's most troubled features by shifting visitation toward a new zone of concentrated use. This new zone would be created within the restoration zone, where commercial development is being removed.

### VISITOR EXPERIENCE

#### Access

**Focus.** This alternative proposes significant shifts away from the existing pattern of visitor use. Visitor focus would shift away from Sherman Tree, Moro Rock, and Crescent Meadow, and toward the Round Meadow, Hazelwood, Sunset Rock, and Beetle Rock areas. The new zone of emphasis would all be in the historic Giant Forest development zone. The areas featured under this alternative would be those that were the focus of the original visitation patterns in the grove early in the 20th century. These areas, which contain include many large sequoias, beautiful meadows, and excellent mountain views, were overdeveloped and congested by the mid-1920s. The current pattern of visitor emphasis on other features was developed in response to this congestion.

**Roads.** Under this alternative significant portions of the existing Giant Forest road system would be closed to private vehicles. Some roadways would be removed altogether and their routes restored to natural conditions. The Moro Rock/Crescent Meadow road would be closed to private vehicles. The portion of the road from Giant Forest Village to Moro Rock would be designated as a bicycle route. The portion of the Round



Meadow/Puzzle Corner road that runs south from Puzzle Corner to Round Meadow and Generals Highway would also be closed. Private vehicle access would remain to Puzzle Corner from the east and would be extended to the vicinity of Sunset Rock.

**Parking.** This alternative would make very significant changes to the existing parking patterns in Giant Forest. All existing parking in the grove would be closed except for 100 spaces in the upper Kaweah/Giant Forest Village center area and 12 spaces for disabled visitors at the lower lot for Sherman Tree. To replace all the other parking in the grove, the alternative proposes constructing three new parking lots in previously disturbed locations at Sunset Rock, Pinewood, and lower Wolverton (Wolverton log dump).

**Shuttles.** The existing seasonal lodging shuttle that connects Lodgepole campground with visitor features in Giant Forest would be retained. This shuttle would be extended to serve Wuksachi Village when that area opens. However, the lodging shuttle would terminate at the village center and would not provide access to Moro Rock or Crescent Meadow. No other shuttle services would be offered.

**Trails.** This alternative proposes a number of additions to the existing trail system in Giant Forest. These trails would make the Round Meadow area easily accessible from the Sunset Rock parking area and would connect the Sherman Tree and Congress Trail areas with the Pinewood and lower Wolverton parking areas.

**Backcountry Access.** This alternative would shift primary backcountry trailhead access to the High Sierra Trail from Giant Forest to Wolverton. The existing Crescent Meadow trailhead would no longer exist since the road to the site would be gone. Overnight parking for wilderness users would be at Wolverton.

**Access for Visitors with Disabilities.** Access to the Sherman Tree would be provided by a dozen specially reserved sites on Generals Highway where it most closely approaches the tree. A 200-yard accessible trail would be provided from the parking area to the tree. The Round Meadow/Hazelwood area, and surrounding sequoia forest, would be made fully accessible by an extensive system of trails.

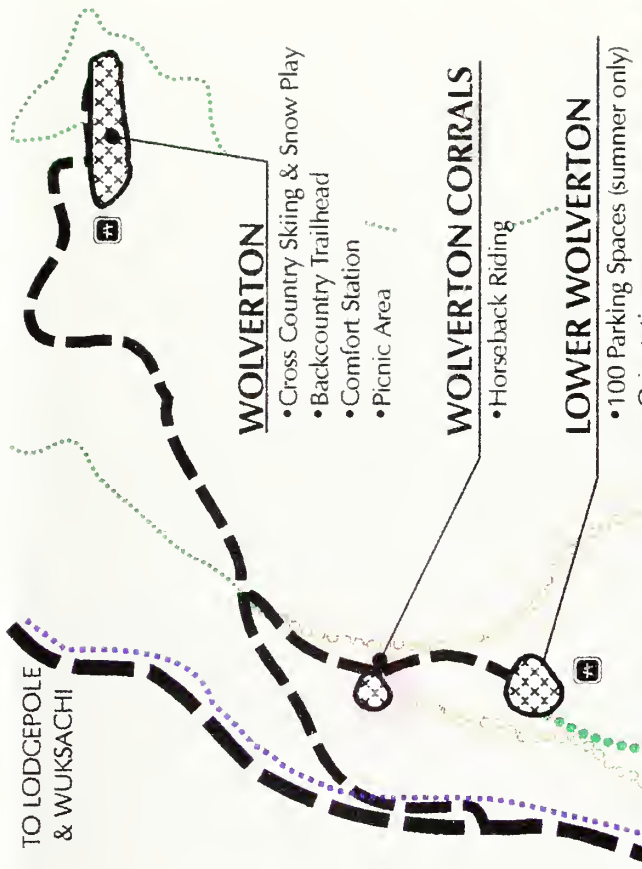
**Winter Access.** Winter access to the grove would be provided from the village center parking area. The Sunset Rock and Pinewood parking areas could also be cleared of snow and used as winter access points if demand required. At the Sherman Tree the summer parking area for visitors with disabilities would be made available for unrestricted winter parking. This site, which currently provides winter parking for the site, has spaces for 18 vehicles.

## Interpretation

**Orientation.** Visitor orientation for the grove would be provided by wayside exhibits at the parking areas at the village center, Sunset Rock, Pinewood, and lower Wolverton. These would consist of outdoor panels orienting visitors to the Giant Forest area and its features.

## Legend

- Unrestricted Road
- Lodging Shuttle
- Primary Pedestrian Trail
- Secondary Pedestrian Trail
- Handicapped Accessible Trail
- Horse Trail
- Bike Trail
- Parking Area
- Existing Developed Zone
- Previously Developed Zone
- Existing Wolverton Developed Zone
- Orientation Center
- Cultural Features



**WOLVERTON**

- Cross Country Skiing & Snow Play
- Backcountry Trailhead
- Comfort Station
- Picnic Area

**WOLVERTON CORRALS**

- Horseback Riding

**LOWER WOLVERTON**

- 100 Parking Spaces (summer only)

- 742 TOTAL PARKING SPACES in 6 LOTS - up to 648 winter
- 112 PARKING SPACES in GROVE - 118 winter
- LODGING SHUTTLE ONLY
- NO FOOD SERVICE

This alternative redefines primary visitor destinations and de-emphasizes the Sherman Tree, Moro Rock, and Crescent Meadow areas in Giant Forest. Primary interpretive opportunities and most visitor use are focused in the Giant Forest Center and Round Meadow area. Accessible trails are increased in the focus area, encouraging pedestrian activity. Visitor access to Moro Rock is limited to pedestrians and bicycles only. Sherman Tree parking is limited to the handicapped and winter use only. 14 parking lots have been removed from within the Sequoia grove.

## MORO ROCK

- Secondary Interpretive Area

MILES

1/2

METERS

500

1000



# SEQUOIA NATIONAL PARK

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- Unrestricted Road
- Lodging Shuttle
- Primary Pedestrian Trail
- Secondary Pedestrian Trail
- Handicapped Accessible Trail
- Horse Trail
- Bike Trail
- Parking Area
- Existing Developed Zone
- Previously Developed Zone
- Existing Wolverton Developed Zone
- Orientation Center
- Cultural Features
- Primary Visitor Destination
- Secondary Visitor Destination

- 380 Parking Spaces
- Orientation
- Comfort Station
- Picnic Area
- Interpretive Area

- 150 Parking Spaces
- Orientation
- Comfort Station
- Picnic Area

- Cross Country Skiing & Snow Play
- Backcountry Trailhead
- Comfort Station
- Picnic Area

- Horseback Riding

- 100 Parking Spaces (summer only)
- Orientation
- Comfort Station
- Picnic Area

- Drop off
- 12 Handicapped Parking Spaces (summer only)
- Comfort Station
- 18 Parking Spaces (winter only)

- Primary Interpretive Area

- Primary Interpretive Area

- Visitors Center
- Comfort Stations
- 100 Year-Round Parking Spaces  
(U.K. & Market Area)
- Picnic Areas
- Ranger Residence
- Orientation (parking area)

- Secondary Interpretive Area

## CONCENTRATED FOCUS / PEDESTRIAN EXPERIENCE

- 742 TOTAL PARKING SPACES in 6 LOTS - up to 648 winter
- 112 PARKING SPACES in GROVE - 118 winter
- LODGING SHUTTLE ONLY
- NO FOOD SERVICE

This alternative redefines primary visitor destinations and de-emphasizes the Sherman Tree, Moro Rock, and Crescent Meadow areas in Giant Forest. Primary interpretive opportunities and most visitor use are focused the Giant Forest Center and Round Meadow area. Accessible trails are increased in the focus area, encouraging pedestrian activity. Visitor access to Moro Rock is limited to pedestrians and bicycles only. Sherman Tree parking is limited to the handicapped and winter use only. 14 parking lots have been removed from within the Sequoia grove.



MILES

0  
METERS

Age Group	Number of People
18-24	~100
25-34	~150
35-44	~250
45-54	~350
55-64	~450
65-74	~550
75-84	~650
85+	~950

# SEQUOIA NATIONAL PARK

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**Visitor Center.** At the village center, the old market building would be converted into a visitor center/museum. This facility would feature the natural and human history of the grove, with primary focus on the giant sequoias.

**Focus Areas.** The alternative proposes major geographical shifts in interpretive focus. Sherman Tree, Moro Rock, and Crescent Meadow would be de-emphasized, and the Round Meadow/Hazelwood area together with Sunset and Beetle Rocks would be featured. The giant sequoia story would be focused primarily in the Round Meadow/Hazelwood area and around the visitor center/museum.

**Level of Interpretive Services.** Because of the addition of a visitor center/museum to the grove, the construction of a new series of interpretive trails at Round Meadow, and the installation of orientation exhibits, this alternative would see a significant increase in the level of interpretive services in and near the grove.

### **Picnicking**

Picnicking facilities would be placed near the major parking areas serving the grove at the village center, Sunset Rock, and Pinewood. These sites would each have a comfort station. The existing picnic facility at Wolverton would be retained.

### **Safety**

The removal of most parking from the grove and its concentration at three new sites on the grove's boundary would greatly reduce the risk to visitors from giant sequoia failure near parking areas. Only the village center and lower Sherman Tree parking areas would remain exposed to the sequoias. The designation of the existing road from the village center to Moro Rock as a dedicated bicycle path would provide a safe and relatively short route (1.5 miles) for recreational bicycling in the grove.

## **NATURAL RESOURCES**

### **Ecological Restoration**

This alternative proposes active ecological restoration for many disturbed sites in the grove. All developed sites in the Giant Forest development zone would be restored except for portions of upper Kaweah and the village center. At Sherman Tree the existing upper parking area and access road would be removed, and the area would be restored. Conversion of the road from Round Meadow to Puzzle Corner to an accessible trail would allow considerable restoration along that route. The entire lower Kaweah area would be restored unless part of it was needed for wastewater treatment facilities to serve the village center. The existing road right-of-way from near Moro Rock to Crescent Meadow, including the Crescent Meadow parking area, would be removed and restored.

Restoration in these areas under this alternative would involve implementation of the restoration standards developed in the draft *Guidelines for Ecological Restoration*.

## **Development Remaining in the Grove**

The primary development remaining in the grove under this alternative would be the village center complex, which consists of a visitor center/museum, comfort stations, ranger residence, and 100 parking places. At the Sherman Tree the existing lower parking area and a comfort station would remain. Three large parking areas (Sunset Rock — 380 sites, Pinewood — 150 sites, and lower Wolverton — 100 sites) would be constructed in previously disturbed sites near the grove boundary but not inside the grove.

## **Tree Hazard Implications**

By moving most development outside the grove, this alternative would also move most tree hazard work out of the giant sequoia area. The Giant Forest Center complex and Sherman Tree parking area and comfort station would still require protection, however. The three large parking areas outside the grove would also require protective management.

## **Wetlands**

The wetland fill parking areas at Giant Forest Lodge would be physically removed and made available for ecological restoration as would the Round Meadow road and parking area.

## **CULTURAL RESOURCES**

Under this alternative the Giant Forest Village market building would be converted to a visitor center/museum.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

This alternative would require the reconstruction of the existing old roadways connecting the old Sunset Rock campground site with Puzzle Corner and Generals Highway near Pinewood. Because this route would become the highway to the new parking area at Sunset Rock, it would be reconstructed to the same standards being employed elsewhere in Sequoia National Park for the Generals Highway rehabilitation project. This standard calls for a 22-foot-wide paved travel surface and 2-foot-wide graded shoulders. The design speed would not exceed 25 miles per hour. The new road would follow the existing right-of-way except that preliminary studies suggest that grading outside those limits would be required to construct an intersection between the new route and Generals Highway.



## **Parking Areas**

At the village center (including both Giant Forest Village and upper Kaweah) existing parking would be realigned and reconstructed to provide up to 100 spaces. As mentioned above, three large new parking lots would be provided near the grove boundary.

## **New Trails**

The alternative calls for the construction of a network of fully accessible trails connecting Sunset Rock, Round Meadow, Hazelwood, and the village center. A new foot trail, approximately 0.5 mile long, would be constructed from Pinewood to the vicinity of Circle Meadow, where it would connect with existing trails. A new foot trail, approximately 0.3 mile long, would be constructed from the new lower Wolverton parking area to the Sherman Tree. The trail would follow the right-of-way of an abandoned road that connects these two points. A new accessible route would be required to connect the parking area for disabled visitors at Sherman Tree with the tree itself. This would be approximately 0.2 mile long.

## **Trail Reconstruction**

The existing trail from Sunset Rock to the village center via Little Deer Creek would be reconstructed to be accessible for visitors with disabilities.

## **Potable Water**

The main waterline from the Wolverton water treatment plant to Giant Forest would remain in service and would serve the comfort station at Sherman Tree and the village center complex, including the visitor center/museum and ranger residence. A new waterline would be constructed from the existing Pinewood watertank to the Sunset Rock area to serve the proposed comfort station at that site. The Log Meadow water system would be closed and removed.

## **Wastewater Treatment**

The existing septic tank at Sherman Tree would be maintained to serve the comfort stations there. At the village center, since the existing wastewater treatment plant serving the area is to close at the end of 1998, it would be necessary to develop a new low-volume treatment system to serve the visitor center/museum, comfort stations, and ranger residence at that site. New septic systems would be installed to serve the new comfort stations at Sunset Rock and Pinewood.

## **Staffing Requirements**

Increased staff would be required to operate additional interpretive facilities and support an increased trail system.

## ALTERNATIVE C: DISPERSED USE / CONSOLIDATED PARKING

Alternative C would emphasize the historic core area near Round Meadow and concentrate use there, as is described in alternative B; however, it would also disperse use by providing continued motorized access to other major features, including Sherman Tree, Moro Rock, and Crescent Meadow (see Alternative C map). This access would be provided by a day use shuttle that would operate from parking lots on the grove's fringe, and during periods of peak demand from existing parking areas outside the grove at Wolverton. This seasonal shuttle service would differ from that proposed in the 1980 *Development Concept Plan* in that it would complement grove-fringe parking rather than require all visitors to park several miles farther away at Wolverton. Also, it would not be free, rather it would be funded by user fees paid either as a part of the park entrance fee or at the service site. Shuttle user fees would be determined at a later date, depending on how the day use shuttle would be funded. The existing seasonal Giant Forest area lodging shuttle would be retained and would also serve Wuksachi Village. Under this alternative the lodging shuttle would be a feeder for the day use shuttle. Ecological restoration would be carried out as called for in the draft *Guidelines for Ecological Restoration*.

### PURPOSE

Alternative C explores how a combination of public transportation services and geographical redistribution of visitor use could be used to protect the grove, facilitate visitation, and solve existing visitor management problems in the area. The alternative considers reducing potential expense by calling for a shuttle system that is considerably less complex than that identified in the 1980 *Development Concept Plan*. The alternative is, however, the most expensive of the three alternatives considered in this planning effort. The alternative proposes reducing visitor congestion problems at major features such as Sherman Tree, Moro Rock, and Crescent Meadow by providing readily accessible similar alternatives and by offering access to these famous features during the peak season only by means of a seasonal shuttle service. In general this alternative attempts to protect the grove by eliminating private vehicles in the grove's most troubled area and by shifting visitation toward a new emphasis zone, which would be created in the area where commercial development is being removed.

### VISITOR EXPERIENCE

#### Access

**Focus.** Like alternative B this alternative proposes to develop a new interpretive emphasis area for visitor use. It also maintains vehicle access, but only by shuttle, to Sherman Tree, Moro Rock, and Crescent Meadow.

**Roads.** Under this alternative significant portions of the existing Giant Forest road system would be closed to private vehicles. Some roadways would be removed altogether, and their routes would be restored to a natural condition. The Moro Rock/Crescent Meadow road would be closed to private vehicles but retained physically for use by the day

use shuttle and bicyclists. During shoulder seasons when the shuttle system would not operate, the portion of the road from the Giant Forest Village center to Moro Rock would be open to private vehicles. The portion of the Round Meadow/Puzzle Corner road that runs south from Puzzle Corner to Round Meadow and Generals Highway would also be closed. Private vehicle access would remain to Puzzle Corner from the east, and this vehicle route would be extended to the vicinity of Sunset Rock. A dedicated bicycle route would be constructed from the Sunset Rock parking area, via Round Meadow, to the village center, where it would connect with the Moro Rock/Crescent Meadow road.

**Parking.** This alternative proposes major changes in the existing parking patterns in Giant Forest. All existing parking in the grove would be closed except for 70 spaces in the upper Kaweah/Giant Forest Village area for shoulder season and winter use, and 12 spaces for visitors with disabilities at the lower lot for Sherman Tree. These same spaces would provide unrestricted parking for up to 18 vehicles during the winter. To replace all the other parking in the grove, the alternative proposes constructing two new parking lots at Sunset Rock and Pinewood. The Sunset Rock parking area would provide immediate access for trails in the area containing Round Meadow, Hazelwood, and Sunset Rock. This would be the primary parking area for Giant Forest. The Pinewood parking area would provide access to trails into the Circle Meadow and Congress Grove areas. Together these two parking lots would also provide the primary parking pool for supporting the seasonal day use shuttle in the grove. During periods of peak use the shuttle would be extended to the existing 300 parking spaces at Wolverton, and these spaces would also be used to facilitate visitation to Giant Forest. The retained parking at the village center would serve as three-season parking for the visitor center/museum at that site and would provide access to the trails leading to Moro Rock and Crescent Meadow. It would not be open during the peak season. During spring and fall when the day use shuttle was not running, visitors would be allowed to drive to Moro Rock and use the existing parking area at that site.

**Shuttles.** The Giant Forest seasonal day use shuttle would collect day visitors from parking areas at Sunset Rock and Pinewood and deliver them to Sherman Tree, Giant Forest Center, Moro Rock, and Crescent Meadow. During periods and seasons of peak use the shuttle also would transport visitors into the grove from the large existing parking lots in the Wolverton area. The purpose of the shuttle would be to provide access to those areas of the grove not accessible by private vehicles and to facilitate the dispersal of visitors on area trails. The existing seasonal lodging shuttle that connects Lodgepole campground with visitor features in Giant Forest would be retained and extended to Wuksachi Village when that area opens. The lodging shuttle would terminate at the village center, however, and would not provide access to Moro Rock or Crescent Meadow. Lodging shuttle patrons wishing to continue to Moro Rock or Crescent Meadow would transfer to the day use shuttle.

The day use shuttle would be funded by user fees, which could be collected either as a part of park entrance fees or directly from users onsite. Fee levels would be determined at a later date depending on how the day use shuttle would be operated.

**Trails.** This alternative proposes a number of additions to the existing trail system in Giant Forest. These trails would make the Round Meadow area easily accessible from the



Sunset Rock parking area and would connect the Sherman Tree and Congress Trail areas with the Pinewood parking area.

**Backcountry Access.** This alternative would shift primary backcountry trailhead access to the High Sierra Trail from Giant Forest to Wolverton.

**Access for Visitors with Disabilities.** Access to the Sherman Tree would be provided by a dozen specifically reserved sites on Generals Highway, where it most closely approaches the tree. The day use shuttle would also accommodate visitors with disabilities. A 200-yard, fully accessible trail would be provided from the parking area to the tree. The Round Meadow/Hazelwood area and surrounding sequoia forest would be made fully accessible by an extensive system of new or rebuilt trails. Vehicle access for visitors with disabilities along the Moro Rock/Crescent Meadow road would be retained during the summer, but would require riding the day use shuttle. During shoulder seasons when the shuttle was not operating, visitors with disabilities would have access to the Moro Rock area by private vehicle. The Crescent Meadow portion of the route would not be available.

**Winter Access.** Winter access to the grove would be provided from the village center parking area. The Sunset Rock and/or Pinewood parking areas could also be cleared of snow and used as winter access points if demand required. At the Sherman Tree the summer parking area reserved for visitors with disabilities would be made available for unrestricted winter parking. This site would accommodate 18 vehicles.

## Interpretation

**Orientation.** Visitor orientation for the grove would be provided by wayside exhibits at the parking areas at Sunset Rock, Pinewood, and Wolverton. These would consist of outdoor panels orienting visitors to the Giant Forest area and its features.

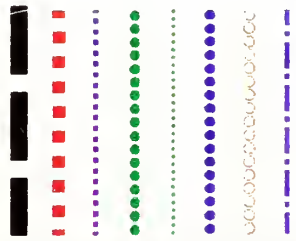
**Visitor Center.** At the village center the market building would be converted into a visitor center/museum. This facility would feature the natural and human history of the grove, with primary focus on the giant sequoias. The Beetle Rock classroom building, located approximately 100 yards from the market, would be retained experimentally in this alternative as a classroom for environmental education. After three years of use the continued retention of the building would be reviewed.

**Focus Areas.** This alternative would result in changes in the geographical focus of interpretive activities. Primary emphasis would go to the Round Meadow/Hazelwood area, since it contains the most accessible of the grove's features. Sherman Tree, Moro Rock, and Crescent Meadow would be primarily accessed by shuttle but would remain integral to the overall interpretive program.

**Level of Interpretive Services.** The overall level of interpretive services under this alternative would rise. Formal orientation to the grove would be available at major parking areas. The fully accessible trail network in the Round Meadow/Hazelwood area would provide excellent opportunities for the development of self-guided interpretive trails. Interpretive areas at Sherman Tree, Moro Rock, and Crescent Meadow would continue to



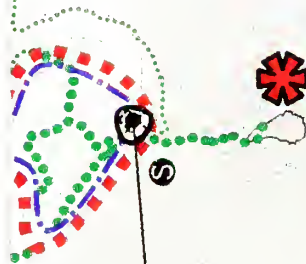
## Legend



Unrestricted Road  
Day Use Shuttle  
Lodging Shuttle  
Primary Pedestrian Trail  
Secondary Pedestrian Trail  
Handicapped Accessible Trail  
Horse Trail  
Bike Trail  
Parking Area  
Existing Developed Zone  
Previously Developed Zone  
Existing Wolvorton Developed Zone  
Shuttle Stop  
Orientation Center

## MORO ROCK

- 24 Parking Spaces (shoulder season only)
- Comfort Station
- Primary Interpretation Area



MILES

METERS

DATE: 6-30-95

North

0 500 1000

1/2

1

TO LODGEPOLE  
& WUKSACHI

## WOLVERTON

- 300 Parking Spaces (year round)
- Cross Country Skiing & Snow Play
- Primary Backcountry Trailhead
- Picnic Area
- Comfort Stations
- Orientation

## WOLVERTON CORRALS

- Horseback Riding

## DISPERSED USE / CONSOLIDATED PARKING

- 936 PARKING SPACES in 7 LOTS - 842 summer, up to 618 winter, 642 shoulder seasons
- 106 PARKING SPACES in SEQUOIA GROVE - 82 winter
- LIMITED SHUTTLE SYSTEM
- NO FOOD SERVICE

Traditional Giant Forest visitor destinations are maintained while visitation is dispersed to other areas in Giant Forest. Parking capacity has been decreased slightly from existing levels. Nearly all facilities and 14 parking lots have been removed from within the Sequoia grove. Giant Forest is reclaimed and restored to a more natural character while de-emphasizing the automobile. A supplementary shuttle system is proposed to move visitors within Giant Forest.

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be accessible and could be enhanced. A visitor center/museum would provide in-depth information about the giant sequoias and Giant Forest as a whole.

## **Picnicking**

Picnicking facilities would be placed adjacent to the major parking areas serving the grove at Sunset Rock and Pinewood. These sites would each have a comfort station. The existing picnic facility at Wolverton would be retained.

## **Safety**

Only the village center and the lower Sherman Tree parking areas would remain exposed to the sequoias. A bicycles-only route from the Sunset Rock parking area to Giant Forest Center would be constructed, and the existing road from the village center to Moro Rock would be designated as a shuttle/bicycle path.

## **NATURAL RESOURCES**

### **Ecological Restoration**

This alternative proposes active ecological restoration for many disturbed sites in the grove. All developed sites in the Giant Forest development zone would be restored except for portions of upper Kaweah and the village center. At Sherman Tree the existing upper parking area and access road would be removed and the area would be restored. Conversion of the road from Round Meadow to Puzzle Corner to a bicycle path would allow considerable restoration along that route. The entire lower Kaweah area would be restored unless part of it was needed for wastewater treatment facilities to serve the village center. The existing parking area at Crescent Meadow would also be removed and restored.

Restoration in these areas under this alternative would involve implementation of the restoration standards developed in the draft *Guidelines for Ecological Restoration*.

### **Development Remaining in the Grove**

The primary development remaining in the grove under this alternative would be the village center complex, consisting of a visitor center/museum, comfort stations, ranger residence, 100 parking places, and the Beetle Rock classroom building. At the Sherman Tree the existing lower parking area and a comfort station would still be in the grove. Two large parking areas (Sunset Rock — 380 sites and Pinewood — 150 sites) would be located near the grove boundary but not inside the grove.

## **Tree Hazard Implications**

Tree hazard mitigation over substantial acreage would still be required at the village center and in the Sherman Tree area. The two large parking areas outside the grove would also require protective management.

## **Wetlands**

The wetland fill parking areas at Giant Forest Lodge would be physically removed and made available for ecological restoration, as would the Round Meadow road and parking area.

## **CULTURAL RESOURCES**

Under this alternative the Giant Forest Village market building would be converted to a visitor center/museum.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

This alternative would require the reconstruction of the existing old roadways connecting the old Sunset Rock campground site with Puzzle Corner and Generals Highway near Pinewood. Because this route would become the highway to the new parking area at Sunset Rock, it would be reconstructed to the same standard as employed elsewhere in Sequoia National Park for the Generals Highway rehabilitation project. This standard calls for a 22-foot-wide paved travel surface and 2-foot-wide graded shoulders. The design speed would not exceed 25 miles per hour. The new road would follow the existing right-of-way except that preliminary studies suggest that grading outside those limits would be required to construct an intersection between the new route and Generals Highway.

Depending on vehicle size and service frequency, day use shuttle service on the Moro Rock/Crescent Meadow road might require reconstruction of that roadway to sustain continued use.

### **Parking Areas**

At the village center existing parking would be realigned and reconstructed to provide up to 70 spaces. These spaces would be in the existing upper Kaweah motel area. As mentioned above, two large new parking lots would be constructed in previously disturbed sites near the grove boundary.



## **New Trails**

This alternative calls for the construction of a network of fully accessible trails connecting Sunset Rock, Round Meadow, Hazelwood, and the village center. A new foot trail, approximately 0.5 mile long, would be constructed from Pinewood to the vicinity of Circle Meadow, where it would connect with existing trails. A new route for visitors with disabilities would be required to connect the designated accessible parking at Sherman Tree with the tree itself. This new route would be approximately 0.2 mile long.

## **Trail Reconstruction**

The existing trail from Sunset Rock to the village center via Little Deer Creek would be reconstructed as a fully accessible route, as would about 2 miles of existing trail in the Crescent Meadow and Log Meadow areas. A mile of existing secondary trail in the Round Meadow and Hazelwood areas would also be reconstructed to be fully accessible.

## **Potable Water**

The main waterline from the Wolverton water treatment plant to Giant Forest would remain in service and would serve the comfort station at Sherman Tree and the village center complex, including the visitor center/museum and ranger residence. A new waterline would be constructed from the existing Pinewood watertank to the Sunset Rock area to serve the proposed comfort station at that site. The existing Log Meadow water system would also be retained to provide water to the Crescent Meadow and Moro Rock comfort stations.

## **Wastewater Treatment**

The existing septic tank at Sherman Tree would be maintained to serve the comfort station there. At the village center, since the existing wastewater treatment plant serving the area is to closed at the end of 1998, it would be necessary to develop a new low-volume treatment system to serve the visitor center/museum, comfort stations, and ranger residence. New septic systems would be installed to serve the new comfort stations at Sunset Rock and Pinewood. The existing septic tank, which serves the Beetle Rock classroom building, would also be retained as long as the building remained in service.

## **Staffing Requirements**

Owing to increased services offered, NPS staffing requirements would be increased from the current level under this alternative.

## ALTERNATIVES CONSIDERED BUT REJECTED

During the planning process a number of other alternatives were considered and ultimately rejected, as described below.

### Establish a Parking Reservation System

**Proposal:** In order to allow visitors to Giant Forest to continue to drive their private vehicles to current visitor emphasis areas and utilize existing parking lots and road systems, a parking reservation system would be implemented for the Moro Rock/Crescent Meadow road and Sherman Tree parking area.

**Reason for Rejection:** A study was conducted of the logistics of operating such a system. That study concluded that a reservation system would require 20 staff and 45 visitor parking places to handle existing visitor demand. Office space, employee housing, and additional parking space would not be available to support these requirements.

### Implement Shuttle System Identified in the 1980 Plan

**Proposal:** The majority of Giant Forest visitor parking would be located in three remote areas outside the grove at lower Wolverton, Wolverton corrals, and upper Wolverton. Small parking areas at Pinewood and the village center would provide limited, close-in parking in or near the grove.

**Reason for Rejection:** This proposal would create a system that would be overly dependent on successful implementation of a large scale shuttle system for access to Giant Forest, even in off-peak periods and winter seasons. The need for a full-time, large fleet shuttle system would be similar to that proposed in the 1980 *Development Concept Plan* and is not considered to be achievable in the interim time frame of this plan.

### Create a Scenic Corridor

**Proposal:** The majority of visitors to Giant Forest would have a vehicle-oriented, scenic byway type of experience, primarily focused along the Generals Highway corridor. Access to remote attractions such as Moro Rock and Crescent Meadow would only be provided by hiking trails. Small, frequent parking lots would be located along the Generals Highway corridor to facilitate easy, short-term visitor access for a drive-through experience.

**Reason for Rejection:** By severely limiting parking in or near the grove and by not providing any alternative, this proposal would prevent most visitors from spending time walking in the grove, which is one of the park's goals. Also, the overall capacity of the grove to support visitors would be significantly reduced, an option park management has rejected.

### Continue Existing Conditions in Giant Forest

**Reason for Rejection:** The National Park Service remains committed to moving Giant Forest as close as possible to the desired conditions defined by the approved 1980 *Development Concept Plan*. Continuing existing conditions in the grove would fail to move the grove in that direction and would thereby fail to resolve any of the grove's current natural resource or visitor management problems.

TABLE 1: COMPARISON OF THE ALTERNATIVES

PARK AREA	1980 DCP	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Giant Forest Village Center</b>	Market converted to visitor center; ranger residence and comfort station retained; undefined parking; lodging shuttle (Lodgepole); Giant Forest shuttle (day use); primary destination	Market closed but not converted to visitor center; ranger residence and comfort station retained; 90 parking spaces remain; lodging shuttle retained (Lodgepole); no Giant Forest shuttle (day use)	Market converted to visitor center; ranger residence and comfort station retained; 50 parking spaces remain; lodging shuttle expanded (Wuksachi and Lodgepole); no Giant Forest shuttle (day use); primary destination	Market converted to visitor center; ranger residence and comfort station retained; 20 parking spaces remain; lodging shuttle expanded (Wuksachi and Lodgepole); Giant Forest shuttle (day use); primary destination
<b>Upper Kaweah</b>	2.5 acres restored	1.1 acres stabilized; 80 parking spaces remain	2.5 acres restored; 100 parking spaces remain	2.5 acres restored; 50 parking spaces remain
<b>Lower Kaweah</b>	4.7 acres restored; septic and leachfield area; no parking	3.7 acres stabilized; septic and leachfield area; 100 parking spaces remain	4.7 acres restored; septic and leachfield area; no parking	4.7 acres restored; septic and leachfield area; no parking
<b>Lodge</b>	6.0 acres restored	5.0 acres stabilized	6.0 acres restored	6.0 acres restored
<b>Beetle Rock</b>	0.2 acre restored	0.2 acre stabilized	0.2 acre restored; interpretation area	No restoration; interpretation area; assembly hall retained as education center
<b>Round Meadow</b>	Restoration undefined; road retained; shuttle access only	2.5 acres stabilized; road retained; parking removed (tree hazard)	10.3 acres restored (including Firwood); interpretation area; accessible trails; primary destination	10.3 acres restored (including Firwood); interpretation area; accessible trails; primary destination; comfort station
<b>Sunset Rock</b>	4.0 acres restored	No restoration	Redeveloped parking; 380 parking spaces; self-guided information; road improvement; comfort station	Redeveloped parking; 380 parking spaces; self-guided information; road improvement; comfort station
<b>Pinewood</b>	0.8 acre restored	0.8 acre stabilized	Redeveloped (parking); new waterline (3,000'); 150 parking spaces; self-guided information; comfort station	Redeveloped (parking); new waterline (3,000') 150 parking spaces; self-guided information; comfort station



PARK AREA	1980 DCP	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Sherman Tree</b>	No restoration; primary destination; shuttle stop; undefined parking reduced (off-season only)	No restoration; 85 parking spaces; primary destination; lodge shuttle stop	1.1 acres restored; secondary destination; upper lot removed; parking for visitors with disabilities retained (12 spaces); walking access from lower Wolverton	1.1 acres restored; primary destination; shuttle stop; primary interpretation area; parking for visitors with disabilities retained
<b>Moro Rock</b>	Primary destination; shuttle stop; private vehicle access; 30 parking spaces	Primary destination; 30 parking spaces retained	0.5 acre restored; secondary destination; pedestrian and bicycle access only; parking eliminated	0.1 acre restored; primary destination; shuttle stop; primary interpretation area; off-season parking (24 spaces)
<b>Crescent Meadow</b>	Primary destination; Giant Forest shuttle stop (peak season); no vehicle access	Primary destination; vehicle access; 150 parking spaces retained	18.5 acres restored (includes road); hiking access only	1.9 acres restored; primary destination; shuttle access only; primary interpretation area; accessible trails
<b>Wolverton Corrals</b>	1,700-car parking structure (phased); orientation and information; shuttle hub (Lodgepole and Giant Forest)	Livery corrals	Livery corrals	Livery corrals
<b>Lower Wolverton</b>	Woodlot and maintenance storage	Woodlot and maintenance storage	Sherman Tree access; 100 parking spaces; road reconstruction	Woodlot and maintenance storage

TABLE 2: COMPARISON OF IMPACTS

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>VISITOR EXPERIENCE</b>			
<b>Visitor Capacity</b>	Current level of visitor capacity of Giant Forest would be maintained.	Same as alternative A.	Same as alternative A.
<b>Access</b>			
<i>Focus</i>	<p>Sherman Tree, Moro Rock, and Crescent Meadow would remain primary features; Round Meadow, Hazelwood, and Sunset Rock would remain secondary features.</p> <p>Congestion associated with lodging would be removed from Giant Forest Village; concentration/congestion patterns would continue in current form.</p> <p>Private vehicle access would encourage visitors to disperse and use park trails; hikers would likely encounter parking problems at trailheads during heavy use periods.</p> <p>Grove capacity would continue to be controlled by parking capacity.</p> <p>Visitor access would be rationed by first-come/first-served parking availability.</p>	<p>Round Meadow, Hazelwood, Sunset Rock, and Beetle Rock would become primary features; Sherman Tree, Moro Rock, and Crescent Meadow would become secondary features.</p> <p>People would be concentrated at Round Meadow, Beetle Rock, and Giant Forest.</p> <p>Sherman Tree, Moro Rock, and Crescent Meadow would have fewer visitors.</p> <p>Reliance on private vehicles would continue, maintaining the ease and convenience of short-term stays and movement in Giant Forest.</p> <p>Automobile access to some resources would be reduced.</p> <p>Hiking opportunities would increase.</p>	<p>Private vehicle congestion at Sherman Tree, Moro Rock, and Crescent Meadow would be eliminated; access would be maintained by shuttle.</p> <p>Visitation would shift toward Round Meadow.</p> <p>The greatest variety of easily accessible visitor experiences would be provided under this alternative.</p> <p>Sherman Tree, Crescent Meadow, and Moro Rock would likely become secondary features.</p>

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<i><b>Roads</b></i>	No change in access.	<p>Closure of road to Moro Rock and Crescent Meadow would decrease access to hiking and biking routes and enhance the opportunity for quality natural experiences.</p> <p>Access to Round Meadow and restored areas of village would be provided by road to Sunset Rock parking lot.</p>	<p>Conversion of Moro Rock and Crescent Meadow roads to shuttle system would eliminate private touring, but would enhance opportunities for quality environmental experiences. There would be private vehicle access to Moro Rock during the shoulder season.</p>
<i><b>Parking</b></i>	<p>Reduction of parking in the village area with the closure of Round Meadow and lodge parking areas 1, 3, and 4. Giant Forest Village center, upper Kaweah, lower Kaweah, and Puzzle Corner provide spaces. Sherman Tree, Moro Rock, and Crescent Meadow parking would be maintained.</p>	<p>Access to Round Meadow area would be provided by parking at Sunset Rock and Pinewood. Sherman tree parking would be moved to lower Wolverton and increased by 15 spaces. Accessible parking would be retained beside Generals Highway.</p> <p>Visitors might have to try several lots to find space during peak-use periods.</p>	<p>Access to Round Meadow area would be provided by parking at Sunset Rock and Pinewood. Sherman tree parking would be reduced to accessible parking beside Generals Highway.</p> <p>Visitors might have to try several lots to find space during peak-use periods.</p>
<i><b>Shuttles</b></i>	<p>Optional lodging shuttle would be expanded to serve overnight visitors at Lodgepole and Wuksachi; day users would have limited use of, and limited benefits from, this shuttle system.</p>	<p>Continuation of the lodging shuttle would have the same effects as alternative A.</p>	<p>The lodging shuttle would continue and have the same effects as alternative A. A day use shuttle would provide vehicular access to features no longer supporting private vehicle access. Visitors would have to transfer from their own vehicles and pay a user fee. The day use shuttle would support the experience goals (walking) in the grove. User fees, depending on the cost, could discourage shuttle use.</p>
<i><b>Trails</b></i>	<p>The existing trail system would be retained, providing the same experiences that are now available.</p>	<p>Additional trails would facilitate access to Round Meadow, Sherman Tree, Congress Grove, and other areas. The access system would facilitate continued use of all Giant Forest trails.</p>	<p>Trail additions would facilitate access to Round Meadow by a wide range of visitors. The access system would also facilitate continued use of all Giant Forest trails.</p>



IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>Backcountry Access</b>	Easy access to the High Sierra Trail would be preserved at Crescent Meadow. Parking and congestion problems at the trailhead would continue.	High Sierra trailhead would be moved to the Wolverton ski area. The High Sierra Trail would not be longer, but the first day hike would be more strenuous. Hikers wishing to begin in Giant Forest would have to park at Sunset Rock and walk to the secondary trailhead at Crescent Meadow, adding 3 miles to the hike.	Same as alternative B.
<b>Access for Visitors with Disabilities</b>	There would be no change in accessibility for visitors with disabilities. Access would continue to be limited to one trail (Round Meadow), continuing vehicular exploration of the grove as the primary means of experiencing Giant Forest.	The Round Meadow and Hazelwood areas and surrounding sequoia forest would be made fully accessible by an extensive system of trails, facilitating out-of-vehicle experiences. Vehicle access for visitors with disabilities along the Moro Rock/Crescent Meadow road would be lost.	The Round Meadow and Hazelwood areas would be made fully accessible by an extensive system of trails, facilitating out-of-vehicle experiences. Vehicular access to Moro Rock and Crescent Meadow would continue (private vehicle during shoulder season and shuttle during summer). Sherman Tree would be accessible by shuttle or private vehicle, depending on the season.
<b>Winter Access</b>	There would be no change in winter access. Winter access would be limited to features immediately along the Generals Highway corridor. Winter weekend parking would be limited to 18 spaces at Sherman Tree. There would be no plowing at lots outside the village center, Sherman Tree, or the Wolverton ski area.	Existing winter parking shortages could be alleviated by plowing the Sunset Rock and Pinewood parking areas. Access parking for visitors with disabilities (18 spaces total) at Sherman Tree would convert to open parking for winter.  Access to the Wolverton ski area would continue to be provided.	Same as alternative B.
<b>Interpretation</b>			
<b>Orientation</b>	Lack of orientation would continue to be a problem for visitors, with the main visitor centers outside the grove.	Giant Forest orientation would be improved; summer visitors would have access to orientation exhibits in four major parking areas.	Giant Forest orientation would be improved; summer visitors would have access to orientation exhibits in three major parking areas.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<i>Visitor Center</i>	The existing lack of any interpretive facility emphasizing the sequoias in the park would continue. The opportunity to have onsite, all-year interpretation of Giant Forest would be lost.	A new visitor center/museum at the village center would eliminate the existing gap in interpretation, allow easy connection to the sequoias, and facilitate interpretation of the groves' human history.	Impacts of the new visitor center/museum would be the same as described in alternative B. The Beetle Rock facility would continue as a staging center for educational activities in the grove.
<i>Focus Areas</i>	Interpretation of features at the Sherman Tree and vicinity, Moro Rock, and Crescent Meadow would continue. There would be no change in interpretation at the Round Meadow/Hazelwood area.	Round Meadow would be restored as the central point for interpretation in the grove. Moro Rock and Crescent Meadow would also have a special focus. Sherman Tree would be reduced in interpretive emphasis, but would remain a primary destination for many visitors.	Round Meadow would be restored as the central point for interpretation in the grove. Sherman Tree, Moro Rock, and Crescent Meadow would also have a special focus.
<i>Level of Interpretive Services</i>	The opportunity to respond to the need for more interpretation would be largely lost.	There would be a significant increase in the level of interpretive services in and near the grove.	Same as alternative B.
<i>Picnicking</i>	Because the number of picnic sites would not meet demand, picnicking in undesignated sites would continue, causing resource damage. The heavily used and poorly designed Wolverton and Crescent Meadow picnic areas would not be improved.	Visitors would be able to enjoy picnicking at newly developed sites at Sunset Rock, Pinewood, lower Wolverton, and the village center, improving support for this activity and reducing impacts of roadside picnicking.	Same as alternative B.
<i>Safety</i>	Parking areas retained within the grove would still run a high risk of being affected by tree hazards. No improvements would be made in bicycling safety.	The tree hazard risk would be reduced by removing lodging and most parking. New tree hazards would occur at new parking and lodging sites — none would be sequoia related. The risk of bicycle and motor vehicle collisions would be reduced by converting the road to Moro Rock to a bike trail.	Only the village center and lower Sherman Tree parking areas would remain exposed to sequoias, creating a tree hazard risk. New tree hazards would occur at replacement lodging and parking areas — none would be sequoia related. Constructing a bicycle-only path to Round Meadow and converting Moro Rock road to a bicycle/shuttle path would greatly reduce the risk of bicycle and motor vehicle collisions.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>NATURAL RESOURCES</b>			
<b>Threatened and Endangered Species</b>	There would be no adverse effect on threatened or endangered plants or animals.	Same as alternative A.	Same as alternative A.
<b>Vegetation</b>	Vegetation would not be affected	15 acres of previously disturbed mixed conifer forest would be affected by parking lot construction.	13.5 acres of previously disturbed mixed conifer forest would be affected by parking lot construction. One acre of land would be necessary for shuttle maintenance and storage (a site has not been determined).
<b>Wetlands</b>	There would be no new construction in wetlands. There would be no wetland restoration.	Similar to alternative A. Wetland restoration would occur at Round Meadow and lodge parking lots (0.25 acre).	Similar to alternative B.
<b>Soil</b>	Existing erosion problems would be stabilized as would building and infrastructure sites. There would be no increase in soil erosion.	Same as alternative A.	Same as alternative A.
<b>Tree Diseases</b>	The degree to which annosus root rot would be spread is not quantifiable. Stabilization and restoration activities would not disturb deeper root zones.	Same as alternative A. Construction of the Sunset Rock road could increase root damage and infection by annosus root rot.	Same as alternative B.
<b>Ecological Restoration</b>	Revegetation would occur through natural processes on 6 acres; reproductive failure and/or invasion by weedy alien species could occur. No wetland restoration would occur.	Ecological restoration would be implemented on 50 acres. Management of vegetative restoration would result in accelerated recovery and control of weed species. Wetland restoration would be performed as noted above.	Same as alternative B, except that ecological restoration would be implemented on 33 acres. 7



IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>Development Remaining Within The Grove</b>	Parking lots and roads would continue to affect giant sequoia roots and produce contaminated runoff into surface streams. Retention of facilities would also reduce opportunities for prescribed fires.	Removal of most buildings would reduce the effects of development within the grove. Development would be shifted outside the grove and transfer effects there (lower Wolverton, Pinewood, and Sunset Rock campground). A new waterline would be needed to serve Sunset Rock parking (placed in road).	Removal of most development would reduce the effects of development within the grove. Development would be shifted outside the grove, and transfer effects there (Pinewood and Sunset Rock campground). A new waterline would be needed for Sunset Rock parking.
<b>Tree Hazard Implications</b>	Tree hazard removal would continue on a reduced scale in the grove, resulting in continued alteration of the forest structure around remaining parking lots.	Tree hazards would be reduced by removing lodging and parking facilities. Tree hazards at the new parking areas would occur.	Same as alternative B.
<b>CULTURAL RESOURCES</b>			
<b>Historic Structures</b>	There would be no adverse effect on the historic structures identified in the 1980 plan for preservation in the Giant Forest area, including the market, comfort station, and ranger residence at Giant Forest Village and Squatter's Cabin, Cattle Cabin, Tharp's Log, and the Moro Rock Steps.	Same as alternative A.	Same as alternative A.
<b>Generals Highway</b>	There would be no effect on Generals Highway as a cultural resource.	Same as alternative A.	Same as alternative A.
<b>Adaptive Use of Historic Buildings</b>	"Mothballing" the Giant Forest market building for possible future use would make its long-term preservation more difficult and not optimize expenses required for general building upkeep.	Adaptive use of the old Giant Forest Village market building as a visitor center/museum would have no adverse effects on its integrity.	Same as alternative B.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>PARK FACILITIES AND OPERATIONS</b>			
<b>Road Reconstruction</b>	There would be no road reconstruction. Maintenance would continue.	<p>Sunset Rock parking area would require reconstruction of 3,000' of roadway (1,800' within giant sequoia forest and 1,200' within mixed conifer forest). This would disturb an additional 1.5 acres and would probably affect the roots of 12 sequoias and require the removal of a small number of seedlings and saplings. The reconstruction of the intersection at Generals Highway would require fill and rerouting from the existing right-of-way. Road reconstruction would produce short-term inconveniences to park visitors.</p> <p>Reconstruction of the road to lower Wolverton would result in the loss of 1.2 acres of additional mixed conifer forest through widening and realignment.</p>	The impacts would be similar, but less than alternative B. No road reconstruction would be required to lower Wolverton.
<b>Parking Areas</b>	No new lots would be constructed. Round Meadow and lodge lots 1, 3, and 4 would be closed because of tree hazards. 80 parking spaces would be lost. Village center, upper and lower Kaweah, and Puzzle Corner lots would remain (295 spaces).	Redevelopment of parking sites in the village center would take place in the footprint of existing parking areas, creating no new impact. About 15 acres of mixed conifer forest would be affected by construction of the three new parking areas. Displacement of the woodlot and gravel storage function from lower Wolverton would require designation of another site for these activities. Construction could result in temporary visitor inconvenience.	Redevelopment of parking sites in the village center would take place in the footprint of existing parking areas, creating no new impact. About 13.5 acres of mixed conifer forest would be affected by construction of the two new parking areas. Construction could result in temporary visitor inconvenience.
<b>New Trails</b>	No new trails would be built.	New trails would be designed to minimize impacts on vegetation and watercourses.	Same as alternative B.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B	ALTERNATIVE C
<b>Trail Reconstruction</b>	There would be no trail reconstruction, but problems from the poor condition of existing trails, and associated liability, would continue and could intensify.	Reconstruction of the existing trail from Sunset Rock to the village center via Little Deer Creek would require limited rerouting and resurfacing to make it accessible.	Reconstruction of the existing trail from Sunset Rock to the village center via Little Deer Creek would require limited rerouting and would require resurfacing. Similar treatments would apply to the existing trails at Round Meadow and Crescent Meadow.
<b>Potable Water</b>	There would be no new impacts resulting from providing potable water to Giant Forest. The surface diversions at Wolverton and within the grove at Log Meadow would continue. Log Meadow serves the Crescent Meadow and Moro Rock comfort stations.	No new impacts would occur from providing potable water to Giant Forest. The surface diversions at Wolverton would continue. Closing the Log Meadow water diversion would result in an improvement in the condition of the Sharp's Creek watershed. A new waterline would be necessary for Sunset Rock parking (3,000')	Same as alternative A.
<b>Wastewater Treatment</b>	Retention of three existing septic systems within the grove would have no impact. Impacts of a new treatment facility to serve the village center are not yet defined but would probably be confined to 0.25 acre.	Retention of the existing septic system at Sherman Tree would have no impact. Impacts of a new treatment facility to serve the village center are not yet defined, but would probably be confined to 0.25 acre. New septic systems at Pinewood, Sunset Rock, and lower Wolverton would also require ground disturbance (about 0.1 acre each).	Retention of three existing septic systems within the grove would have no impact. Impacts of a new treatment facility to serve the village center are not yet defined but would probably be confined to 0.25 acre. New septic systems at Pinewood and Sunset Rock would also require ground disturbance (about 0.1 acre each).
<b>Staffing Requirements</b>	NPS staffing requirements would be changed slightly from the current level.	Law enforcement staffing requirements would change little from the current level; interpretive staff would increase; and maintenance crews would face a shifted but still heavy workload.	Law enforcement staffing requirements would change slightly from the current level; interpretive staff would increase; and maintenance crews would face a shifted but still heavy workload. About 22 additional employees would be required to operate the shuttle system.



## **AFFECTED ENVIRONMENT**



## INTRODUCTION

This planning document proposes three alternatives for the interim management of the Giant Forest area of Sequoia National Park. Giant Forest is a sequoia grove that covers approximately 1,800 acres. Its extent is defined by the presence of giant sequoia trees (*Sequoiadendron giganteum*), which are not present in the surrounding forest. The environment affected by these proposals encompasses the grove as a whole together with a number of sites along the grove's periphery, which are being considered for possible development as a part of this planning effort. All proposals in the three alternatives apply entirely to Giant Forest and/or the following peripheral sites.

- The abandoned sites of Paradise, Sunset Rock, and Sugar Pine campground, all located on the northwestern boundary of the grove
- Pinewood, a developed site located along Generals Highway about 1 mile northeast of Giant Forest Village (Village Center)
- Lower Wolverton (Wolverton woodlot), a site 0.25 mile east of Sherman Tree, which is currently a log and gravel storage site; part of the site has also been used in the past as a borrow pit
- Wolverton corrals, a site 0.5 mile east of Sherman Tree, currently occupied by a corral complex that supports day rides for visitors
- Upper Wolverton (meadows), a complex of parking lots and buildings 0.75 mile east of the Sherman Tree, including a summer backcountry trailhead and a winter cross-country skiing area

The northwestern portion of the grove contain an extensive area of development, referred to in this document as the Giant Forest "development zone." Presently more than 200 buildings stand in this area. The removal of nearly all of these buildings is a key element in the implementation of the 1980 *Development Concept Plan*. During the next several years, using compliance developed earlier for the 1980 plan, the National Park Service intends to remove nearly all of these buildings, except as specifically noted in the alternatives. The removal of these structures is not a subject of this document.



## VISITOR EXPERIENCE

The current visitor experience in Giant Forest will change significantly before the questions contained in this study are applied. This change will result from the removal of all commercial services from the grove. The relatively small percentage of visitors who have stayed in the accommodations will thereby have a different experience in the future.

Even today the majority of visitors come to Giant Forest as day users. These visitors generally experience the grove in one or both of two ways. The typical experience is motor vehicle based and emphasizes a drive through the forest with a few quick stops at well-known roadside features like the Sherman Tree and Moro Rock. A visitor traveling through Giant Forest in this manner can spend two to three hours seeing the grove. A second experience, which is often added to the first, is to take a walk on one of the grove's many trails that take visitors away from their vehicles and into the forest. Some of the most popular walks, like the Congress Trail or the Tharp's Log loop from Crescent Meadow, take one to two hours to complete. No figures are available that disclose how many visitors use the grove or how they use it. About 1 million visitors annually enter Sequoia National Park, and it is estimated that at least 80% visit Giant Forest during their stay in the park.

During peak season lack of parking is a substantial constraint on visitor experiences in Giant Forest. Parking space is often difficult or impossible to obtain during busy periods at Sherman Tree, Moro Rock, and Crescent Meadow.

Orientation to the grove currently is very limited. No orientation exhibits are present. The *Sequoia Bark* park newspaper and the park brochure do not provide information on how to see Giant Forest. The existing visitor centers at Lodgepole and Foothills (Ash Mountain) do not provide information on this subject unless the staff is specifically asked.

Interpretive opportunities in the Giant Forest center around three self-guided trails. Many other trails exist in Giant Forest, providing visitors with opportunities to explore the grove of sequoias at their leisure with the aid of books, pamphlets, and periodic wayside exhibits.

Existing visitor access to Giant Forest is achieved primarily through the use of private automobiles with dispersed, small parking areas at or near primary visitor destination points. Occasional buses travel from the north entrance to points in Giant Forest; most return the same way due to vehicle size advisories on Generals Highway south to Ash Mountain. All improved roads are accessible to private automobiles. All secondary roads are closed in the winter. A limited capacity shuttle operation (small bus) operates in Giant Forest during the summer, providing visitors with an alternative means of transport for a nominal fee. This shuttle service runs hourly in each direction and serves Lodgepole, Sherman Tree, Giant Forest Lodge, Giant Forest Village, Moro Rock, and Crescent Meadow.

## NATURAL RESOURCES

### VEGETATION

Giant Forest varies from 5,500 to 7,500 feet in altitude. The vegetation is primarily Sierran mixed conifer forest and is dominated by white fir, red fir, sugar pine, ponderosa pine, Jeffrey pine, and incense cedar. Giant sequoias grow in the more mesic portions of this forest, most commonly in association with white fir, red fir, and sugar pine. On dry slopes islands of oak and montane chaparral can be found. Nearly barren outcrops of solid granite add to the scene. Numerous montane meadows dot the forest, and the area's small (mostly seasonal) streams support narrow riparian corridors.

The vegetation in Giant Forest is significantly controlled by the climate of the area. The basic climate pattern is Mediterranean with relatively wet winters and dry summers. Winter precipitation in the grove is approximately two-thirds snow and one-third rain, with the average winter snowline being about 5,000 feet. The snow is usually heavy and wet and a snowpack is customary from late November into April. Extreme winter cold in the grove does not drop below 0°F. Summers are mild, with afternoon temperatures in the 70's or 80's. The frost-free growing season is three to four months long. Average annual precipitation is between 40 and 45 inches, with extremes from 20 to 75 inches.

Giant Forest contains significant wetlands in the form of both montane meadows and riparian corridors. The primary watercourse in the grove's development zone is Little Deer Creek, which is a permanent stream downstream from Round Meadow. Late summer flows in this drainage can be little more than a trickle. Round Meadow is a classic Sierran montane meadow — an area too wet to support conifer trees. The entire meadow is wet in early summer, and portions remain wet throughout the dry season. Smaller wetlands include a number of "pocket meadows" in the Giant Forest Lodge and Hazelwood areas.

Sierran mixed conifer forests contain numerous large old trees, many of which are hazardous to visitors to some degree. The Park Service conducts periodic inventories to evaluate conditions and identify tree hazards. These trees may be giant sequoia or other species. Trees are classified as hazards because of their proximity to places where people spend significant amounts of time. During the past 10 years 470 trees other than sequoias have been felled in the grove. Two giant sequoias have been felled as hazards during the past 50 years.

The existing vegetation in the developed portions of Giant Forest has been affected significantly by human activity. Woody vegetation has been removed to allow construction of roads, parking areas, and buildings. Additional woody vegetation has been removed over time to facilitate visitor safety. Herbaceous vegetation has been subject to trampling, which has also affected the reproduction of woody plants. Soils have been disturbed and displaced, resulting in the loss of native seedbank material, which is an important part of Sierran vegetation systems. Extensive fire suppression for most of the 20th century has also affected vegetation patterns.

Many forest diseases exist in the grove. Annosus root rot is of particular significance to development in the grove. Annosus root rot is a soil-born fungus that affects all conifers.

Resinous trees such as pine and giant Sequoia are resistant while nonresinous trees such as white fir are more susceptible. The annosus fungus is spread from root system to root system and root contact is considered the primary means of infection. Infection is increased by root damage. The National Park Service has mapped numerous root rot centers in Giant Forest.

A biological inventory resulted in identification of the following special status plants that may occur in the project area (Jones and Stokes 1994). Field surveys were conducted to determine their occurrence in the project area. The California Department of Fish and Game natural diversity database and U.S. Fish and Wildlife Service were consulted to establish this list. The database provides listings for both federal and state special status species. The grove has no known endemic plants.

#### PLANT STATUS DEFINITIONS

##### FEDERAL

- T Listed as threatened by the U.S. Fish and Wildlife Service
- E Listed as endangered by the U.S. Fish and Wildlife Service
- C1
- C2 Candidate species, data lacking to make determination on proposing as threatened or endangered
- C3 Removed from candidate status because species is extinct, does not meet USFWS definition of a species or taxonomically invalid, or determined not threatened

##### STATE OF CALIFORNIA

- SSC Species of special concern
- E Listed as endangered by state of California
- T Listed as threatened by state of California
- FP Fully protected

##### CALIFORNIA NATIVE PLANT SOCIETY

- 1B Rare, threatened, or endangered in California and elsewhere
- 3 More information required to determine status

Plant Species	Status: Federal/State/CNPS	Project Area
<i>Delphinium inopinum</i>	C3c//1B	none
Unexpected larkspur		
<i>Erigeron aequifolius</i>	C3c//1B	none
Hall's Daisy		
<i>Madera linanthus</i>	//3	none



<i>Oreonana puperascens</i> Purple-mountain parsley	C3c//1B	unsuitable
<i>Raillardella muirii</i> Muir's raillardella	C3c//1B	none
<i>Ribes tulareense</i> Sequoia gooseberry	//1B	none

## WILDLIFE

The Sierran mixed conifer forest supports an abundance of animal life, including not only large mammals such as mule deer, mountain lions, coyotes, and black bear, but also a wide variety of smaller mammals and birds. No animal species are known to be endemic to the grove.

A list of special status wildlife for the Giant Forest area was developed from information provided by the U.S. Fish and Wildlife Service and the natural diversity database of California Department of Fish and Game. Field surveys determined the occurrence in the project area. The Park Service has a policy to extend protection where possible to all species of concern, whether or not they are listed as threatened or endangered (NPS-77).

### WILDLIFE STATUS DEFINITIONS

#### FEDERAL

- T Listed as threatened by U.S. Fish and Wildlife Service
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- C1
- C2 Candidate species, data lacking to make determination on proposing as threatened or endangered.
- C3 removed from candidate status because species is extinct, does not meet USFWS definition of a species or taxonomically invalid, or determined not threatened

#### STATE OF CALIFORNIA

- SSC Species of special concern
- E Listed as endangered by state of California
- T listed as threatened by state of California
- FP Fully protected

Animal Species	Status Federal/State	Project Area
<i>Haliaeetus leucocephalus</i> Bald eagle	E/E	absent

Animal Species	Status Federal/State	Project Area
<i>Falco peregrinus anatum</i> American peregrine falcon	E/E	nest nearby
<i>Aquila chrysaetos</i> Golden eagle	/SC	uncommon
<i>Accipiter gentilis</i> Northern goshawk	C2/SC	present
<i>Accipiter cooperii</i> Cooper's hawk	/SC	present
<i>Accipiter striatus</i> Sharp-shinned hawk	/SC	present
<i>Strix occidentalis</i> <i>occidentalis</i> California spotted owl	C2/SC	present
<i>Strix nebulosa</i> Great gray owl	/E	very rare
<i>Oreortyx pictus</i> Mountain quail	C2/	present
<i>Empidonax traillii</i> Willow flycatcher	/E	absent
<i>Dendroica petechia</i> Yellow Warbler	/SC	present
<i>Euderma maculatum</i> Spotted bat	C2/	surveys needed
<i>Antrozous pallidus</i> Pallid bat	/SC	surveys needed
<i>Martes pennanti pacifica</i> Pacific fisher	C2/SC	present
<i>Gulo gulo luteus</i> California Wolverine	C2/T	present
<i>Bassariscus astutus</i> Ringtail	/FP	present
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	C2/T	unlikely

Animal Species	Status Federal/State	Project Area
<i>Lepus americanus</i> <i>tahoensis</i> Sierra Nevada snowshoe hare	C2/SC	absent
<i>Rana muscosa</i> Mountain yellow-legged frog	C2/	present
<i>Tetrix sierrana</i> Sierra pygmy grasshopper	C2/	absent

## HYDROLOGY

A biological inventory identified all streams and wetland areas in the surveyed area (Jones and Stokes 1994). There are 25.5 acres of wet meadow and 8 miles of stream in the study area. Existing trails and roads currently affect 0.34 acre of wetland. This document addresses those wetlands and streams that may be affected by the restoration effort.

## HAZARDOUS MATERIALS

Hazardous materials in the village area include linoleum that contains asbestos and asbestos insulation around flumes of heating units in some buildings. There are also some minor spills at the maintenance building (concessioner). A complete evaluation of hazardous materials in the developed area will be performed and appropriate methods of remediation applied during facility removal. Additional NEPA documentation will be prepared if necessary.



## CULTURAL RESOURCES

### PREHISTORIC ARCHEOLOGICAL RESOURCES

Native American peoples likely visited the area mainly during the summer season while engaged in hunting, gathering, and trading activities. Identified archeological sites support this conclusion and consist of bedrock mortars, thin scatters of stone flakes and tools, and some dark midden deposits. Much of the Giant Forest area is obscured by heavy pine needle cover, which makes observation of lithic scatters and other types of archeological sites impossible. No archeological excavations have been carried out in the grove; therefore, the potential for these sites to contribute to knowledge concerning prehistoric trade and diet is not known. No archeological sites or districts in the Giant Forest vicinity are listed on the National Register of Historic Places.

Since the 1980 *Development Concept Plan*, two archeological surveys have been conducted in the Giant Forest area. These include the *Generals Highway Archeological Survey, Sequoia National Park, California* (NPS 1990) and the *Generals Highway Archeological Survey Project, Sequoia-Kings Canyon National Parks* (NPS 1989b). The 1990 survey covered an area that included 75 to 100 meters on either side of portions of Generals Highway in the Giant Forest area. The 1989 survey included 100-meter coverage on either side of portions of Generals Highway in the Giant Forest area, as well as the Crescent Meadow, Moro Rock Loop, lower Kaweah, and Round Meadow roads, the General Sherman Tree entrance and parking areas, the Wolverton ski area access road, and the Wolverton corrals access road.

Five archeological sites and two isolated finds have been identified in the Giant Forest vicinity. Some of these sites, particularly those close to visitor use areas, have been impacted by foot or stock trails, vandalism, inadvertent damage, and rodent activity.

### HISTORIC ARCHEOLOGICAL RESOURCES

These same archeological surveys have identified one site and nine isolated finds in the Giant Forest area that have components relating to the historic period. The sites have been impacted by many of the same types of activities as the prehistoric archeological resources.

### NATIONAL REGISTER PROPERTIES

Two historic districts in Giant Forest have been listed on the National Register of Historic Places. These are (1) Giant Forest Lodge Historic District (entered May 5, 1978; NR-78000287) and (2) Giant Forest Village/Camp Kaweah Historic District (entered May 22, 1978; NR-78000311). Both districts protect multiple structures associated with the historic development of tourist facilities in the grove.

A number of additional buildings in Giant Forest were determined eligible for listing on the national register by the California State Historic Preservation Office on August 5,

1994. These include Buildings 50 years of age or older in lower Kaweah and Pinewood and comfort station (HS-181), the commissioner's residence (HS-59), and the Giant Forest ranger's residence (HS-73) in the Highland NPS housing area. In addition, it was determined that the boundaries of the Giant Forest Lodge Historic District should be expanded on its northeast side to include buildings that are 50 years of age or older.

In addition to the two historic districts, three isolated cabins/dwellings in Giant Forest are listed on the national register. The remote cabins/dwellings include Cattle Cabin (entered September 15, 1977; NR-77000150), Squatter's Cabin (entered March 8, 1977; NR-7700116), and Tharp's Log (entered March 8, 1977; NR-77000117). Another historic structure, the Moro Rock Stairway, was listed on the national register on December 29, 1978; NR-78000283.

Generals Highway, which passes through Giant Forest, was determined eligible for listing on the national register on October 21, 1992 by the California State Historic Preservation Office.

## SECTION 106 COMPLIANCE HISTORY

Several Section 106 compliance initiatives and related studies have been undertaken in the Giant Forest area during the past 16 years. These include:

- August 21, 1978 — memorandum of agreement among the National Park Service, California State Historic Preservation Office, and Advisory Council on Historic Preservation regarding the removal of overnight and visitor services' development from Giant Forest (with the exception of Giant Forest market, district ranger's residence and garage, and comfort station); memorandum of agreement amended in April 1982.
- 1984 — national register historic districts recorded by Historic American Buildings Survey; HABS CA-193 and HABS CA-2148
- 1989 — NPS staff prepared *Historic Structures Report*, documenting the history and condition of the market, comfort station, and ranger residence buildings at Giant Forest Village (Center)

Finally, although not listed on the national register, two sites in Giant Forest have become cultural curiosities and visitor destination points. These sites, both of which have become popular photographic spots, are the Auto Log and the Tunnel Log.

## **PARK FACILITIES AND OPERATIONS**

The following description of park facilities and operations in the affected environment assumes implementation of the 1980 *Development Concept Plan* to the point where all buildings except those specifically noted would be removed from the development zone in Giant Forest.

### **GIANT FOREST DEVELOPMENT ZONE**

All locations in the Giant Forest development zone have been the sites of extensive past development and are to be considered as previously disturbed and candidates for restoration.

#### **Giant Forest Village Center**

This area contains a 75-car capacity parking area. It also contains three historic structures: the old market building, comfort station, and ranger residence.

#### **Upper Kaweah**

Parking lots with a total capacity of 90 vehicles would remain at this site. A recreational hall with a seating capacity of 200 persons might also be present if it has not been removed.

#### **Lower Kaweah**

The area contains a parking area with a capacity of 100 vehicles.

#### **Giant Forest Lodge**

The parking lots in this area have been closed because they are all in the target range of leaning giant sequoias that have been determined to be tree hazards.

#### **Pinewood**

No structures would remain on the site.

#### **Hazelwood**

A self-guiding nature trail makes a loop through this old picnic area and campground. Unrestored road grades are present.

## **Round Meadow**

A parking lot with 35 spaces is at the south end of the meadow; an accessible trail with interpretive exhibits circles the meadow.

## **Puzzle Corner**

A parking lot with 30 spaces is present. This is the junction of number of abandoned or still-functioning secondary roads.

## **Giant Forest Highlands**

No development would remain on this site, which is connected with Puzzle Corner by a short road.

## **Giant Forest Campgrounds**

Four campground areas (Firwood, Paradise, Sunset Rock, and Sugar Pine) have abandoned roads and campsites.

## **OTHER LOCATIONS IN GIANT FOREST**

### **Giant Forest Trail System**

Altogether, the grove contains 42 miles of trail. The Sherman Tree loop trail, Congress Trail, Sunset Rock trail, Tharp's Log trail, Trail for All People (Round Meadow), and Village Center to Round Meadow trail all have hardened surfaces. The other trails are unsurfaced.

### **Sherman Tree**

Area facilities include a highway shoulder parking area with a capacity of 18 vehicles, an upper parking area, which holds 84 vehicles, a comfort station, and a hardened system of foot paths and fences to control visitor impacts. The 2-mile-long Congress Trail begins here.

### **Moro Rock**

Steps lead from a parking area with a capacity of 30 vehicles to the summit of the rock. A comfort station is adjacent to the parking area.



## **Crescent Meadow**

A parking lot complex with a capacity of 150 vehicles is found here together with a comfort station. Hardened trails lead to Tharp's Log. This is also the trailhead for wilderness users of the High Sierra Trail.

## **LOWER WOLVERTON (WOODLOT)**

This site, which is accessible by a 0.75-mile-long service road, is used for log and gravel storage. A no-longer-used borrow pit is nearby.

## **WOLVERTON CORRALS**

The site contains a 40-vehicle public parking lot, a corrals complex, and several residences and stock support buildings. The Wolverton pack station, an authorized park concessioner, operates from this site.

## **UPPER WOLVERTON**

A complex of large parking lots here have a capacity of 300 vehicles. Several dozen picnic tables are scattered along the edge of the parking areas and are served by two comfort stations. The concessioner maintains a cross-country ski center that consists of three buildings connected by raised decks. The National Park Service operates a water treatment plant that provides potable water for both Giant Forest and Wuksachi.

## **NPS OPERATIONS**

The National Park Service provides law enforcement and interpretive services in the grove from a base at the Lodgepole Visitor Center. Water is provided from the Wolverton water treatment plant and from a separate system known as the Log Meadow water system. The comfort stations at Sherman Tree, Moro Rock, and Crescent Meadow feed into septic systems. The Giant Forest Center facilities feed into the Giant Forest wastewater treatment plant, which is to be closed no later than October 31, 1998. Garbage and snowplowing services are supported from the NPS maintenance facility at Red Fir, two miles north of Lodgepole.

# **ENVIRONMENTAL CONSEQUENCES**



## IMPACTS COMMON TO ALL ALTERNATIVES

### VISITOR EXPERIENCE

None of the alternatives would reduce the capacity of Giant Forest as a whole to serve as many visitors as it does now during peak-season. Individual alternatives would shift areas of emphasis, limit access to individual sites, and encourage use of certain areas.

### NATURAL RESOURCES

#### Threatened and Endangered Species

There would be no adverse effect on threatened or endangered plants or animals under any of the alternatives. An inventory for special status bats would be carried out to determine their presence and allow an assessment of effect on those species. If required, mitigating and protective measures would be developed for special status bats in consultation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game. There would be no plans to introduce special status plants or animals to the project area.

#### Wetlands

There would be no construction in wetlands of buildings, roads, or parking areas under any of the alternatives.

#### Soils

Erosion problems would be corrected through stabilization activities.

#### Forest Diseases

The degree to which forest diseases would be spread is not quantifiable. Stabilization and restoration activities would be performed in a manner that would not disturb deeper root zones of trees.

### CULTURAL RESOURCES

All three alternatives would remove all historic buildings in the development zone in Giant Forest except for the market, comfort station, and ranger residence at Giant Forest Village. This is in conformity with the 1980 *Development Concept Plan* and associated section 106 compliance. All alternatives would complete a programmatic agreement to resolve remaining issues associated with the additional historic buildings identified in the development zone by the 1994 survey. None of the alternatives would have an adverse



effect on the other historic buildings in Giant Forest — Squatter's Cabin, Cattle Cabin, Tharp's Log, and Moro Rock Steps. None of the alternatives would have an adverse effect on Generals Highway.

All alternatives would maintain known archeological sites in the grove and surrounding areas in an unaffected state. Additionally, before earth-disturbing activities took place, archeological testing would be conducted to determine the nature and extent of the archeological resources that could be affected. Testing would be carried out in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation, as appropriate, to avoid, minimize, or mitigate effects.

## IMPACTS OF ALTERNATIVE A

### VISITOR EXPERIENCE

#### Access

**Focus.** The visitor experience would continue to focus on the features that currently receive the most attention — Sherman Tree, Moro Rock, and Crescent Meadow. With the exception of Giant Forest Village, where visitor congestion would be considerably reduced owing to the removal of commercial facilities at that site, most other visitor concentration/congestion patterns would continue in their current form. The summer pattern of midday gridlock at Sherman Tree, Moro Rock, and Crescent Meadow would continue. Round Meadow, Hazelwood, Beetle Rock, and Sunset Rock would continue in their current roles as secondary features; visitors would find these area relatively quiet, even during periods of heavy use. Private vehicle access to all these areas would support the goal of encouraging visitors to use park trails, but hikers could expect to encounter parking problems at trailheads during periods of heavy use.

Grove capacity would continue to be determined by parking capacity, and visitor access to areas would be rationed by first-come/first-served parking availability.

**Roads.** Visitors would continue to have the opportunity to drive on the Moro Rock/Crescent Meadow and Round Meadow/Puzzle Corner roads. This would allow auto touring in these areas but would also preserve existing parking problems and resource impacts and would discourage walking as a means of exploring the area. Anticipated continued increases in use levels would strengthen the need for vehicle size limitations on the Moro Rock/Crescent Meadow road, which are already under consideration.

**Parking.** Retention of the existing system of parking would preserve the current degree of access to the grove, but would also preserve the management and resource problems associated with that access. Visitors would be able to park close to the sequoias, but would also continue to find many of those roadside trees to be growing in impaired or damaged environments, with visible erosion and vegetation trampling. This would be particularly true at Sherman Tree, Moro Rock, and Crescent Meadow, where current use levels have resulted in highly visible resource and experience impairment. The closure of the Giant Forest Lodge parking lots and the Round Meadow parking area would limit access to those areas, but is necessary for long-term visitor safety.

**Shuttles.** This alternative would make only very limited use of shuttle systems to support visitation. Continuation of the existing seasonal lodging shuttle would allow overnight guests at Lodgepole and Wuksachi to visit Giant Forest without using private vehicles. As it does now, this would encourage these visitors to explore Giant Forest by a combination of walking and shuttle rides. This system would also have a limited capacity to serve day users but would not have sufficient capacity to offer large numbers of day users an alternative park experience.

**Trails.** Retention of the existing trail system would provide visitors with the same experiences that are now available. No additions would be made to the system to take

advantage of the removal of development from the Round Meadow area. No additional interpretive trails would be added. Many of the existing trails are in relatively poor condition, and this alternative would not address this problem. Trails to be removed would be in the Giant Forest Lodge and upper and lower Kaweah areas only. None of these trails are currently used by visitors.

**Backcountry Access.** The primary trailhead for the High Sierra Trail would continue to be at Crescent Meadow. This would facilitate easy access to the trail for backpackers but would also preserve the current parking and congestion problems at the site, which result from insufficient parking capacity.

**Access for Visitors with Disabilities.** The current situation provides only very limited access to the trails of Giant Forest. The only accessible trail in the grove is the Trail for All People at Round Meadow. This lack of accessible routes would continue under this alternative. The lack of trails would be partially mitigated by continued vehicle access to the Moro Rock/Crescent Meadow road. This alternative would not encourage visitors with disabilities to leave their vehicles to explore the grove.

**Winter Access.** Existing winter access emphasizes the Giant Forest Village center area, and this alternative would retain this focus. Winter access for most visitors would be limited to features immediately along the Generals Highway corridor. Cross-country skiing would start primarily at the village center. Winter weekend parking shortages at the Sherman Tree would continue.

## Interpretation

**Orientation.** Lack of orientation would continue to be a problem for visitors wishing to know how to explore the grove. Visitors would have to seek out the existing Lodgepole or Foothills (Ash Mountain) visitor centers during business hours and ask a ranger to receive orientation to the grove.

**Visitor Center.** The existing lack of any interpretive facility in Sequoia National Park that emphasizes the story of the giant sequoias would be perpetuated. The opportunity to interpret Giant Forest onsite with an all-year facility would be lost. Also lost would be the opportunity of those with mobility impairments to learn about the sequoias.

**Focus Areas.** This alternative would preserve the opportunity to interpret features at Sherman Tree and vicinity, Moro Rock, and Crescent Meadow, but would lose the opportunity presented by the removal of commercial facilities from Giant Forest to increase interpretation using the rich resources of the Round Meadow/Hazelwood area.

**Level of Interpretive Services.** The level of interpretive services available in Giant Forest is currently relatively low. The area has three self-guided trails, but only one (Congress Trail) receives heavy use. Continued reductions to ranger staffing mean that self-guiding opportunities are becoming more and more important. The opportunity to respond to the need for more interpretation would be largely lost in this alternative.

## **Picnicking**

The current lack of picnicking in or near Giant Forest does not meet visitor demand and results in frequent picnicking in undesignated sites, which often causes vegetation trampling and other resource damage. The existing picnic area at Wolverton is not well designed and is out of the way for many visitors. This alternative would make no improvements in this popular activity area.

## **Safety**

Tree hazard risk and bicycle/vehicle conflicts have been identified as the two major visitor risks that this planning effort could affect. This alternative would do nothing to resolve either issue. Parking areas retained in the grove would still run a high risk of being affected by tree hazards, and no improvement would be made in bicycling safety.

## **NATURAL RESOURCES**

### **Ecological Restoration**

This alternative would offer less potential for ecological restoration in the grove than under the 1980 *Development Concept Plan* or the other two alternatives. Retention of public parking at Giant Forest Village, upper and lower Kaweah, Sherman Tree, Moro Rock, and Crescent Meadow would mean that all these areas would be removed from the potential restoration list. Retention of both the Round Meadow/Puzzle Corner and Moro Rock/Crescent Meadow roads would have the same effect. Reliance on natural reproduction to achieve revegetation of areas disturbed by previous development would mean that these areas could be expected to revegetate more slowly than under alternatives that call for active revegetation. Because this alternative would not actively manage vegetation after removal of facilities, both reproductive failure owing to lack of natural seed and/or invasion by nonnative weedy species would be more likely to occur. Relying on natural revegetation in these areas could also result in long-term consequences on the forest in the form of unnatural forest structure and/or species mix. Revegetation would occur through natural processes on about 6 acres.

Not removing abandoned asphalt roads and trails in the grove would leave these manmade materials in the grove and could be expected to have long-term effects on soils and vegetation.

### **Development Remaining in the Grove**

Roads and parking lots would remain in the grove under this alternative. Parking lots and roads would continue to affect giant sequoia roots. Runoff would accumulate pollutants when coming into contact with the remaining asphalt surfaces, which could affect the water quality in nearby surface streams. The retention of these facilities would also reduce fire management opportunities, such as biologically necessary prescribed fires. The



## ENVIRONMENTAL CONSEQUENCES

diversion of surface water to support the comfort stations at Moro Rock and Crescent Meadow would continue to affect Tharp's Creek.

### **Tree Hazard Implications**

Because of the retention of extensive parking areas in the grove, this alternative would require more tree hazard work than the other alternatives. Considerable cutting of old and often large trees would continue in the grove. The result would be continued interference with the forest structure.

### **Wetlands**

No wetlands would be restored near the Giant Forest Lodge or at Round Meadow. There would be no new wetland impacts.

## CULTURAL RESOURCES

General experience suggests that the "mothballing" of historic buildings for possible future use usually has a detrimental effect on the structures. This would be particularly true in a wet climate like that of Giant Forest.

## PARK FACILITIES AND OPERATIONS

### **Road Reconstruction**

No road reconstruction would take place under this alternative. Minor erosion would continue near existing roads from cut and fill deterioration and runoff. The Park Service would minimize erosion by stabilizing the affected areas.

### **Parking Areas**

The physical impact in parking areas would be the same as noted above for roads.

### **New Trails**

No new trails are proposed under this alternative.

## **Trail Reconstruction**

No trail reconstruction would be conducted under this alternative. Problems resulting from the poor condition of existing trails and associated liability would continue and could reasonably be expected to intensify.

## **Potable Water**

Providing water for the Giant Forest Village center from the Wolverton water treatment plant would have no effect on the Giant Forest. The treatment plant and the waterline to Giant Forest are both relatively new facilities, which were designed to accomplish this task with minimal impact. Retaining the existing Log Meadow water system would have no construction impacts but would continue existing impacts that result from surface water diversion.

## **Wastewater Treatment**

Retention of existing septic tank systems at Sherman Tree, Moro Rock, and Crescent Meadow would have no identifiable impact on the grove. Development of a new system to handle the Giant Forest Center area would be required, and the consequences of this action would be less clear. Studies are still underway to determine how this would be done. Preliminary inquiries suggest that new septic tanks and a leachfield in either upper or lower Kaweah might work. Wherever it occurred, this work would result in about 1 acre of ground disturbance. The new systems would be designed to have no effect on wetlands.

## **Staffing Requirements**

NPS staffing requirements would be little changed from the current level under this alternative. Use of the grove would remain similar to current use and would require a similar level of law enforcement presence. Interpretative services would be unchanged except for the closure of the Giant Forest Village interpretive booth. Maintenance crews would still face the same load of road, trail, and utility support. The tree hazard program would be reduced from its current level, which protects buildings that would be removed. However, this program would still have the responsibility of protecting the extensive system of remaining parking areas in the grove.

## **CONCLUSION**

Under alternative A the visitor experience would remain basically the same and would continue to be affected by existing problems, such as lack of parking and poor interpretive services. Visitors would continue to enjoy vehicle access to most areas but would continue to be frustrated by congestion and local gridlock during periods and seasons of peak use.

## ENVIRONMENTAL CONSEQUENCES

No threatened or endangered species would be affected. Restoration would occur through natural processes on 6 acres. No wetlands would be restored; this would lead to slower recovery than under active ecological restoration.

There would be no cumulative effects outside those identified in the approved 1980 *Development Concept Plan* and the 1979 *Environmental Impact Statement*. This action would be within the general scope of the 1980 plan. A plan to eventually rehabilitate Generals Highway through the grove would have no additional impact.

## IMPACTS OF ALTERNATIVE B

### VISITOR EXPERIENCE

#### Access

**Focus.** This alternative proposes significant shifts in the pattern of visitor use. Visitors to the grove would find a new interpretive focus area featuring Round Meadow, Hazelwood, Sunset Rock, and Beetle Rock. Existing vehicle congestion at Sherman Tree, Moro Rock, and Crescent Meadow would end. Visitor vehicles would be concentrated in new parking areas scaled to meet current demand. The primary area of visitor concentration would be in the Round Meadow area between the Sunset Rock and the village center parking areas. Visitor use of the Sherman Tree area would remain significant, but would probably be reduced because of the longer walk required to visit the site. The same would be true of Moro Rock.

The new zone of emphasis would be entirely in the historic Giant Forest development zone, and the areas featured in this alternative would be those that were the focus of the original visitation patterns in the grove early in the 20th century. These areas, which include numerous large sequoias, beautiful meadows, and excellent mountain views, were overdeveloped and congested by the mid-1920s, and the current pattern of visitor emphasis on other features was developed in response to that congestion.

Concentration of visitors in the areas of Round Meadow, Beetle Rock, and Giant Forest would increase visitor contacts and interaction, creating a more social experience in these areas than in other areas of Giant Forest. The areas of Sherman Tree, Moro Rock, and Crescent Meadow would become more natural in character, and visitors to these areas would experience a less social experience because of reduced visitation.

The reliance on private automobiles would continue for most Giant Forest visitors, maintaining the ease and convenience of short-term stays and movement in Giant Forest, but lessening the quality of interaction with the resource. The majority of visitors using the parking lots would continue to stay for short periods in Giant Forest, not venturing far from their vehicles.

**Roads.** Closure of the two primary side roads in the grove would have an effect on the experience of area visitors. On the one hand visitors wishing nothing more than a quick auto tour through the grove would have fewer opportunities. On the other hand visitors seeking a quality environmental experience would find the grove significantly enhanced. Environmental and aesthetic disturbance at Round Meadow, Sherman Tree, Moro Rock, and Crescent Meadow would be greatly reduced. This would be seen in a wide range of indicators, including reduced ambient noise and improved vegetation conditions. The goal of encouraging walking as a means of experiencing the grove would be supported.

**Parking.** The Sunset Rock parking area would provide access for trails in the area containing Round Meadow, Hazelwood, and Sunset Rock. This would be the primary parking area for Giant Forest. The Pinewood parking area would provide access to trails into the Circle Meadow and Congress Grove areas. The lower Wolverton parking area



would provide access to the General Sherman Tree, which would be a relatively steep 10–15 minute walk from its parking area. The retained parking at the village center would serve the visitor center/museum at that site as well as provide access to the trails leading to Moro Rock and Crescent Meadow. The combined effect of these parking areas on visitor experiences would be to facilitate walking as a means of visiting the grove's major features. Parking space at trailheads could be expected to be plentiful. The dispersal opportunity for walkers starting at the parking areas would be high. The parking lot at the village center would support use of the visitor center/museum at that site.

As is the case now parking areas of varying size at dispersed locations would sometimes require the visitor to bypass full parking lots in search of available parking at other locations. The lack of alternative transportation from remote parking areas to choices of destination would reduce the ability of visitors to access resources in specific particular geographic areas, affecting the quality of the visitor experience.

**Shuttles.** This alternative proposes only limited use of shuttle systems to support visitation. Continuation of the existing seasonal lodging shuttle would allow overnight guests at Lodgepole and Wuksachi to visit Giant Forest without using private vehicles. As it does now, this would encourage these visitors to explore Giant Forest by a combination of walking and shuttle rides. This system would also have a limited capacity to serve day users, but would not have sufficient capacity to offer significant numbers of day users an alternative park experience. Lack of a shuttle system to Moro Rock and Crescent Meadow would reduce access to those areas.

**Trails.** The new trails proposed for Giant Forest would open up new opportunities for seeing the grove. The network of new trails proposed for the Round Meadow area would facilitate appreciation of this high-quality area. Although substantially longer than the existing trail to the Sherman Tree, the new trail from lower Wolverton would give the tree a much improved and more natural forest setting. Construction of a new trail from the Pinewood parking area to the Congress Grove would provide continuous high-quality foot trail from the lower Wolverton lot down to the Pinewood and Round Meadow areas. As a downhill, one-way walk, this route could be expected to be relatively popular.

**Backcountry Access.** Shifting the primary trailhead for the High Sierra Trail from Crescent Meadow to Wolverton would not lengthen the High Sierra Trail, but would make the first day's hike along the trail more strenuous since a Wolverton beginning for the route would require that hikers go over Panther Gap. Hikers still wishing to begin their hike in Giant Forest would need to park at Sunset Rock and walk to Crescent Meadow; this would add about 3 miles to High Sierra Trail destinations.

**Access for Visitors with Disabilities.** This proposal would make major access improvements for visitors with disabilities in much of the grove but would also make some areas harder to visit. The Round Meadow/Hazelwood area and surrounding sequoia forest would be made fully accessible by an extensive system of trails. This would provide a quality interpretive experience that currently is not available for visitors with disabilities in Giant Forest. Vehicle access for visitors with disabilities along the Moro Rock/Crescent Meadow road would be less than under alternative C. The overall result would be to facilitate out-of-vehicle experiences.

**Winter Access.** Winter access to the grove would be improved. Existing parking shortages would be alleviated by the addition of the Sunset Rock and Pinewood parking areas to the existing winter park base. No change would occur in the winter situation at Sherman Tree.

## **Interpretation**

**Orientation.** This alternative would result in a significant improvement in visitor orientation to Giant Forest. All summer visitors to the grove would use one of four major parking areas, which would have orientation exhibits. This would allow all visitors to the grove the opportunity to receive good information.

**Visitor Center.** The development of a visitor center/museum in the village center would fill a major gap in the interpretive system for Sequoia National Park. The existing lack of an interpretive center to interpret the park's best known feature would be corrected. The placement of the facility in a historic building in the grove would allow easy connection to the sequoias outside (including the trails leading to them) and would facilitate interpreting the human history of the grove.

**Focus Areas.** The alternative proposes redefining what is most important for interpretive purposes within Giant Forest. The grove's original focal point, the Round Meadow area, with its excellent giant sequoia and meadow features, would be restored as the central point for interpretation in the grove. The concentrated use in this area would justify an extensive system of trailside exhibits. Other popular features, like Moro Rock and Crescent Meadow, would become special features to see after visitors had received their basic Giant Forest experience at Round Meadow. Sherman Tree, at the end of a longer walk than in the past, would also be reduced somewhat in interpretive emphasis but would still remain the ultimate destination for many visitors.

**Level of Interpretive Services.** Formal orientation to the grove would be available at major parking areas, which is not now the case. The fully accessible trail network in the Round Meadow/Hazelwood area would provide excellent opportunities for the development of self-guided interpretive trails. A visitor center/museum would provide in-depth information about the giant sequoias and Giant Forest as a whole. All of this would result in a significant increase in the level of interpretive services in and near the grove.

## **Picnicking**

By placing picnicking facilities adjacent to the major parking areas serving the grove at the village center, Sunset Rock, lower Wolverton, and Pinewood, visitors would again have opportunities to enjoy picnicking in a developed site as a part of a visit to Giant Forest. This would improve support for this popular activity and reduce the impacts of roadside picnicking.

## **Safety**

The tree hazard risks to visitors would be reduced under this alternative, as would the risk of bicycle/motor vehicle collisions.

## **NATURAL RESOURCES**

### **Ecological Restoration**

This alternative would provide the highest level of ecological forest restoration potential of any of the alternatives and would result in the restoration of 50 acres. This would be from removal of almost all parking from the grove, as well as closure and naturalization of significant sections of roadway. Sherman Tree and Crescent Meadow would benefit especially, since both areas would see the restoration of parking areas that are close to prime resources. This alternative would come closest to the restoration goals of the 1980 *Development Concept Plan*.

Implementation of the draft *Guidelines for Ecological Restoration* would significantly accelerate the recovery of previously disturbed sites in the grove and lead to a general improvement in the overall ecosystem health of the grove.

The previously disturbed Sunset Rock campground area, which is just outside the grove, would be the site of extensive parking development and would not be available for restoration.

### **Development Remaining in the Grove**

Like the 1980 *Development Concept Plan* this alternative proposes to move nearly all grove support parking outside the giant sequoia area. Unlike the 1980 plan alternative B proposes placing the parking in multiple sites near the grove boundary rather than in a single concentrated site several miles farther away. The result would be a very low level of impact on lands in the grove but the presence of significant development at several adjacent previously developed sites. This alternative would leave least amount of development in the grove, compared to the other alternatives.

### **Tree Hazard Implications**

This alternative would require the lowest level of continued tree hazard activity in the grove. The direct effect on the grove would be minor. The effect of tree hazard work on the forests surrounding the new parking areas would be geographically limited because of the concentrated nature of the parking.

## **Wetlands**

Wetland restoration would occur under this alternative near the former lodge office and at Round Meadow. There would be no new wetland impacts.

## **CULTURAL RESOURCES**

Adaptive use of the Giant Forest Village market building as a visitor center/museum would have no adverse effects on the integrity of the structure. The action is authorized by previous cultural resource compliance for the structure.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

Reconstruction of the existing roads leading to the proposed Sunset Rock parking area would require limited widening of the existing road. Road work would entail reconstruction of 3,000 feet of roadway to meet road width standards and traffic requirements. Of this, 1,800 feet would fall in giant sequoia forest and 1,200 feet would be in mixed conifer forest. The current road width is 16 feet and would be widened to 24 feet, causing an additional 1.5 acres of disturbance. Twelve sequoias would be close to the roadway and could be affected by root zone disturbance if protection was not provided. A small number of seedling and sapling sequoias planted by NPS crews during previous revegetation efforts might be removed.

The new route would be designed to be compatible with other existing major routes in Sequoia National Park, which means that it would be a low-speed, park quality road. Widening the existing road would require limited excavation and some tree removal. The construction of a new junction with Generals Highway would require both fill and rerouting from the existing right-of-way. Road reconstruction work could be expected to produce temporary inconveniences to park visitors.

### **Parking Areas**

Redevelopment of up to 100 parking sites in the village center area would take place in the footprint of existing parking areas in Giant Forest Village and/or upper Kaweah.

Construction of three new parking areas (Sunset Rock — 380 spaces, Pinewood — 150 spaces, and lower Wolverton — 100 spaces) would take place in sites that have seen extensive past disturbance and development. About 12 acres of mixed conifer forest would be affected by construction of the three parking areas. Sunset Rock was a popular campground from about 1920 until 1971; Pinewood is the site of a cabin complex built in 1931; the lower Wolverton site has been used as a woodlot and gravel storage site for many decades. Displacement of the woodlot and gravel storage function from lower Wolverton would require the designation of another site for these necessary activities.



Parking lot construction could be expected to produce temporary inconveniences to park visitors.

## **New Trails**

The construction of a network of fully accessible trails connecting Sunset Rock, Round Meadow, Hazelwood, and the village center would require the placement of carefully designed trails in highly sensitive natural environments. To meet accessibility standards, the trails would need to have grades of no more than 5% and hardened surfaces. Trails would be designed to minimize impacts on vegetation and watercourses.

New primary foot trails connecting Sherman Tree with lower Wolverton and Pinewood with the Congress Grove would be built to a lesser standard than accessible trails. Surface hardening would be optional. Trails would be designed to minimize impacts on vegetation and watercourses.

## **Trail Reconstruction**

Reconstruction of the existing trail from Sunset Rock to the village center via Little Deer Creek would require limited rerouting of the trail to achieve grades of no more than 5% and resurfacing of the entire route.

## **Potable Water**

Providing water for the village center from the Wolverton water treatment plant would have no effect on Giant Forest. The treatment plant and the waterline to Giant Forest are both relatively new facilities that were designed to accomplish this task with minimal impact. Closing down the Log Meadow water system would end the diversion of surface water from Tharp's Creek, benefiting that watershed. Removal of the system would involve dismantling the water intake and storage tank. The existing underground line leading from Log Meadow to Moro Rock would be abandoned in place except where it is exposed by erosion. This would be done to lessen tree root damage, especially root damage to sequoias along the route.

## **Wastewater Treatment**

The existing septic tank at Sherman Tree would be maintained to serve the comfort stations there. At the village center, since the existing wastewater treatment plant serving the area is to close at the end of 1998, it would be necessary to develop a new low-volume treatment system to serve the visitor center/museum, comfort stations, and ranger residence at that site. New septic systems would be installed to serve the new comfort stations at Sunset Rock and Pinewood.

## Staffing Requirements

Overall use of the grove would remain similar to current use and would require a similar level of law enforcement presence. Interpretive services would be increased by the opening of a visitor center/museum, which would require additional staffing. Maintenance crews would face a shifted but still heavy workload. The new parking areas would require less work to maintain than the old, but a higher number of accessible trail miles, comfort stations, picnic areas, and wayside exhibits would result in an overall increase in required maintenance work. The tree hazard program would be reduced from the current level, but would still be responsible for protecting the remaining parking areas and development in the grove and the larger lots nearby.

## CONCLUSION

Visitor experience would differ significantly from the existing day use experience. Vehicle access would end in parts of the grove, and walking would become a more important means of seeing the grove. A new zone of interpretive emphasis would shift visitor focus. Some visitors would be frustrated by the loss of vehicular access to well-known features; however, others would appreciate the improvement in environmental conditions and the new interpretive emphasis at Round Meadow.

About 15 acres of Sierra mixed conifer forest would be affected by the construction of the parking lots at Sunset Rock, Pinewood, and lower Wolverton. Pinewood and lower Wolverton are currently disturbed, and Sunset Rock campground has been closed for 25 years.

No threatened or endangered species would be affected. Topography would be restored where appropriate on the sites of removed roads and buildings. Ecological restoration would involve about 50 acres at varying levels of intensity. About 0.25 acre of wetland would be restored. Wildlife would benefit from reduced human presence. No significant erosion problems would be expected to occur.

There would be no cumulative effects outside those identified in 1980 *Development Concept Plan* and the 1979 *Environmental Impact Statement*. This action would be within the general scope of the 1980 plan. A plan to eventually rehabilitate Generals Highway through the grove would have no additional impact.

## IMPACTS OF ALTERNATIVE C

### VISITOR EXPERIENCE

#### Access

**Focus.** Alternative C proposes major changes in visitor distribution in the Giant Forest area, although they would not be as significant as those proposed in alternative B. Existing private vehicle congestion at Sherman Tree, Moro Rock, and Crescent Meadow would end. Visitor vehicles would be concentrated in new parking areas that would be scaled to meet current demand.

In terms of access this proposal stands somewhere between alternative A and alternative B. Because access would be easier to the Round Meadow area (which could be reached directly by private vehicle) than to Sherman Tree, Moro Rock, or Crescent Meadow (which could be reached only by shuttle or by walking), it is believed that this alternative would shift visitation toward Round Meadow and the vicinity.

The new zone of interpretive emphasis at Round Meadow would be entirely in the historic Giant Forest development zone, and the areas featured in this alternative would be those that were the focus of the original visitation patterns in the grove early in the 20th century. These areas include many large sequoias, beautiful meadows, and excellent mountain views, were overdeveloped and congested by the mid-1920s, and the current pattern of visitor emphasis on other features was developed in response to that congestion.

By providing a new visitor emphasis area in Giant Forest and maintaining vehicle access to existing areas, this alternative would offer the greatest variety of visitor experiences of any of the alternatives.

**Roads.** The road along the west edge of Round Meadow would be closed to all vehicles; however, no major road corridors would be closed to visitors. Access along some routes would be restricted to obligatory shuttles. This might affect the visitor experience by requiring visitors to change transportation modes.

**Parking.** This alternative proposes significant changes in the existing parking patterns in Giant Forest. The Sunset Rock parking area would provide access for trails in the area containing Round Meadow, Hazelwood, and Sunset Rock. It would also serve as the primary parking area for visitors wishing to use the day use shuttle. The Pinewood parking area would provide access to trails into the Circle Meadow and Congress Grove areas and would provide additional parking for day use shuttle patrons. The retained parking at the village center would provide access to the visitor center/museum during periods of the year when parking during the same periods for the trails leading to Moro Rock and Crescent Meadow. The existing parking areas at upper Wolverton would provide peak demand overflow capacity for the shuttle and would ensure that parking was available under almost all conditions. The combined effect of these parking areas on the visitor experience would be to facilitate access to the grove both through trails from the parking areas and through the day use shuttle. The dispersal opportunity for walkers starting at the parking areas would be high.

**Shuttles.** A day use shuttle would have a major effect on visitors to Giant Forest. The day use shuttle would preserve vehicle access to features that could no longer tolerate large numbers of private vehicles. These sites include Sherman Tree, Moro Rock, and Crescent Meadow, each of which currently has too little parking to meet peak-season demand. The shuttle would maintain vehicle access to these areas; however, visitors would have to leave their own vehicles and pay a user fee. Continuation of the existing lodging shuttle would extend the day use shuttle opportunities to overnight guests at Wuksachi and Lodgepole. This would provide an alternative for these users to driving their own vehicles to Giant Forest.

Because it would allow visitors to move freely between trailheads in the grove without having to return to a point of origin to pick up their cars, the shuttle would free hikers to enjoy Giant Forest's trails. In this way the day use shuttle would support the experience goals for Giant Forest.

User fees could be a significant issue for potential shuttle users. The cost per individual would be lower if a shuttle support fee was added to all park entrances fees. An alternative would be an onsite user fee only for passengers. This would result in higher individual cost and might discourage shuttle use.

**Trails.** The additions to the existing trail system proposed in this alternative would facilitate the enjoyment of the Round Meadow area. Developing a new system of fully accessible trails at Crescent Meadow would facilitate enjoyment and appreciation of that area by a wider range of visitors. These changes would support the management goals for Giant Forest visitor experiences. The access system under this alternative would also facilitate continued use of all Giant Forest trails.

**Backcountry Access.** Shifting the primary trailhead for the High Sierra Trail from Crescent Meadow to Wolverton would not lengthen the High Sierra Trail but would make the first day's hike along the trail more strenuous since a Wolverton beginning for the route would require that hikers go over Panther Gap. Hikers still wishing to begin their hike in Giant Forest would need to park at Sunset Rock and either walk about 3 miles to Crescent Meadow or ride the day use shuttle.

**Access for Visitors with Disabilities.** Under this alternative major improvements in access to much of the grove would be made for visitors with disabilities. Access to the Sherman Tree would be available by private vehicle and by both shuttles. The development of a fully accessible trail system in the Round Meadow/Hazelwood area would provide a quality interpretive experience in Giant Forest that currently is not available for visitors with disabilities. Vehicle access for visitors with disabilities along the Moro Rock/Crescent Meadow road would be retained during the summer. The result would be an improvement in overall accessibility.

**Winter Access.** Winter access to the grove would be improved. Existing parking shortages would be alleviated by the addition of the Sunset Rock and Pinewood parking areas to the existing winter park base. No change would occur in the winter situation at Sherman Tree.



## Interpretation

**Orientation.** Under this alternative visitor orientation for Giant Forest would be greatly improved. All summer visitors to the grove would use one of three major parking areas, which would each have orientation exhibits. This would allow all visitors to the grove the opportunity to receive good information.

**Visitor Center.** The development of a visitor center/museum at the village center would fill a major gap in the interpretive system for Sequoia National Park. The existing lack of an interpretive center to provide information about the park's best known feature would be corrected. The placement of the facility in a historic building in the grove would allow easy connection to the sequoias outside (including the trails leading to them) and would facilitate the interpretation of human history in the grove.

Retention of the Beetle Rock facility as a classroom for environmental education would provide a setting in the village center area for use by school groups and others needing a staging center for educational activities in the grove. Retention of the building would also mean a continuation of its visual impacts on the Beetle Rock area.

**Focus Areas.** This alternative proposes redefining what is most important for interpretive purposes in Giant Forest. The grove's original focal point, the Round Meadow area, with its excellent giant sequoia and meadow features, would be restored as the central point for interpretation. The concentrated use in this area would justify an extensive system of trailside exhibits. Other popular features, like Sherman Tree, Moro Rock, and Crescent Meadow, would become special features to see after visitors had received their basic Giant Forest experience at Round Meadow.

**Level of Interpretive Services.** This alternative would result in a high level of interpretive services. Formal orientation to the grove would be available at the three major parking areas. The fully accessible trail network in the Round Meadow/Hazelwood area would provide excellent opportunities for the development of self-guiding interpretive trails. A visitor center/museum would provide in-depth information about the giant sequoias and Giant Forest as a whole.

## Picnicking

By placing picnicking facilities near the major parking areas serving the grove at Sunset Rock and Pinewood, visitors would again have opportunities to enjoy picnicking in a developed site as a part of a visit to Giant Forest. This would improve support for this activity and would reduce the impacts of roadside picnicking.

## Safety

The removal of most parking from in the grove and its concentration at two new sites on the grove's boundary would very greatly reduce the risk to visitors resulting from giant sequoia failure near parking areas. Only the village center and lower Sherman Tree parking areas would remain exposed to the sequoias. The construction of a bicycles-only

route from the Sunset Rock parking area to the village center and the designation of the existing road from the village center to Moro Rock as a shuttle/bicycle path only, would provide a safe route for recreational bicycling in the grove.

## **NATURAL RESOURCES**

### **Ecological Restoration**

Alternative C would offer a high level of forest restoration potential, but not quite as much as described under alternative B. Approximately 33 acres would be available for restoration. This difference results from the retention of more roads in the grove. Like alternative B this alternative would particularly benefit Sherman Tree and Crescent Meadow because parking areas close to prime resources would be restored in both areas.

Implementation of the draft *Guidelines for Ecological Restoration* would significantly accelerate the recovery of previously disturbed sites in the grove, which would lead to a general improvement in the overall ecosystem health of the grove.

The previously disturbed Sunset Rock campground area, which is just outside the grove, would be the site of extensive parking development and would not be available for restoration.

### **Development Remaining in the Grove**

Like the 1980 *Development Concept Plan* this alternative proposes to move nearly all grove support parking outside the giant sequoia area. Unlike the 1980 plan this alternative would place the parking in multiple sites near the grove boundary rather than in a single concentrated site several miles farther away. The result would be a low level of impact on lands in the grove but also the presence of significant development at several nearby, previously developed sites.

### **Tree Hazard Implications**

By moving most development outside the grove, this alternative would also move most tree hazard work out of the giant sequoia area. The level of management would be slightly less than that described under alternative B.

### **Wetlands**

Wetland restoration would occur under this alternative near the Giant Forest Lodge and at Round Meadow. There would be no new wetland impacts.

## **CULTURAL RESOURCES**

Adaptive use of the Giant Forest Village market building as a visitor center/museum would have no adverse effects on the integrity of the structure. The action is authorized by previous cultural resource compliance for the structure.

## **PARK FACILITIES AND OPERATIONS**

### **Road Reconstruction**

Reconstruction of the existing roads leading to the proposed Sunset Rock parking area would require limited widening of the existing road. The new route would be designed to be compatible with other existing major routes in Sequoia National Park, which means that it would be a low-speed, park quality road. Widening the existing road would require limited excavation and some tree removal. No mature sequoias would be threatened, but a small number of seedling and sapling sequoias planted by NPS crews during previous revegetation efforts might be removed. The construction of a new junction with Generals Highway would require both fill and rerouting from the existing right-of-way.

If reconstruction of the Moro Rock/Crescent Meadow road was to be required to sustain shuttle operations, the road would be rebuilt in its existing alignment.

### **Parking Areas**

Redevelopment of up to 70 parking sites in the village center area would take place in the footprint of existing parking areas in Giant Forest Village and/or upper Kaweah. Construction of two new parking areas (Sunset Rock — 380 spaces and Pinewood — 150 spaces) would take place in previously disturbed areas. Sunset Rock was a popular campground from about 1920 until 1971, and Pinewood is the site of a cabin complex built in 1931. Construction of Sunset Rock and Pinewood parking would affect 13.5 acres of mixed conifer forest.

Construction of parking areas could be expected to result in temporary visitor inconveniences.

### **New Trails**

The construction of a network of fully accessible trails connecting Sunset Rock, Round Meadow, Hazelwood, and the village center would require the placement of carefully designed trails in highly sensitive natural environments. To meet accessibility standards, the trails would need to have grades of no more than 5% and hardened surfaces. Trails would be designed to minimize impacts on vegetation and watercourses.

A new primary foot trail connecting Pinewood with the Congress Grove would be built to a lesser standard than the fully accessible trails. Surface hardening would be optional.

## **Trail Reconstruction**

Reconstruction of the existing trail from Sunset Rock to the village center by way of Little Deer Creek would require limited rerouting of the trail to achieve grades of no more than 5% and resurfacing of the entire route. Similar treatments would be applied to the existing trails at Round Meadow and Crescent Meadow.

## **Potable Water**

Providing water for the village center from the Wolverton water treatment plant would have no effect on Giant Forest. The treatment plant and the waterline to Giant Forest are both relatively new facilities that were designed to accomplish this task with minimal impact. Retaining the existing Log Meadow water system would have no construction impacts but would continue existing impacts from surface water diversion.

## **Wastewater Treatment**

The existing septic tanks at Sherman Tree, Moro Rock, and Crescent Meadow would be maintained to serve the comfort stations there. The existing Beetle Rock system also would be retained. No impacts would be associated with these actions.

At the village center, since the existing wastewater treatment plant serving the area is to close at the end of 1998, it would be necessary to develop a new low-volume treatment system to serve the visitor center/museum, comfort stations, and ranger residence. New septic systems would be installed to serve the new comfort stations at Sunset Rock and Pinewood. These new installations would require excavation and site disturbance.

## **Staffing Requirements**

NPS staffing requirements would be increased from the current level under this alternative. Overall use of the grove would remain similar to current use and would require a similar level of law enforcement presence. Interpretive services would be increased by the opening of a visitor center/museum, which would require significant additional staffing. Maintenance crews would face a shifted but still heavy workload. The new parking areas would be less work to maintain than the old, but a higher number of accessible trail miles, comfort stations, picnic areas, and wayside exhibits would result in an overall increase in required maintenance work. The tree hazard program would be reduced from the current level but would still be responsible for protecting the remaining parking areas and development in the grove and the larger lots nearby.

A large staff would be required to operate the day use shuttle system. In addition, a new shuttle maintenance and storage facility would have to be constructed in the park, outside Giant Forest. This facility would require approximately 1 acre of land and would be located at a later point in time. Additional environmental compliance would be required to carry out this action.



## CONCLUSION

Visitor experience would differ significantly from the existing day use experience. Vehicle access to many park features would become dependent on a day use shuttle system. A new zone of interpretive emphasis would shift visitor focus. Some visitors might be frustrated by the loss of private vehicle access to well known features; however, others might appreciate the opportunity to move about the grove without having to return to their cars after every stroll. Many visitors would appreciate the improvement in environmental conditions and the new area of interpretive emphasis at Round Meadow.

About 15 acres of Sierra mixed conifer forest would be affected by construction of the parking lots at Sunset Rock and Pinewood. Pinewood is currently a developed site, and Sunset Rock campground has been closed for 25 years.

No threatened or endangered species would be affected. Topography would be restored where appropriate on the sites of removed roads and buildings. Restoration would involve about 33 acres at varying levels of intensity. About 0.25 acre of wetland would be restored. Wildlife would benefit from reduced human presence. No significant erosion problems would be expected to occur.

A site outside the grove would need to be found to support the shuttle maintenance operations.

There would be no cumulative effects outside those identified in the 1980 *Development Concept Plan* and the draft *Environmental Impact Statement*. This action would be in the general scope of the 1980 plan. A plan to eventually rehabilitate Generals Highway through the grove would have no additional impacts.

**APPENDIXES • BIBLIOGRAPHY  
PREPARERS**

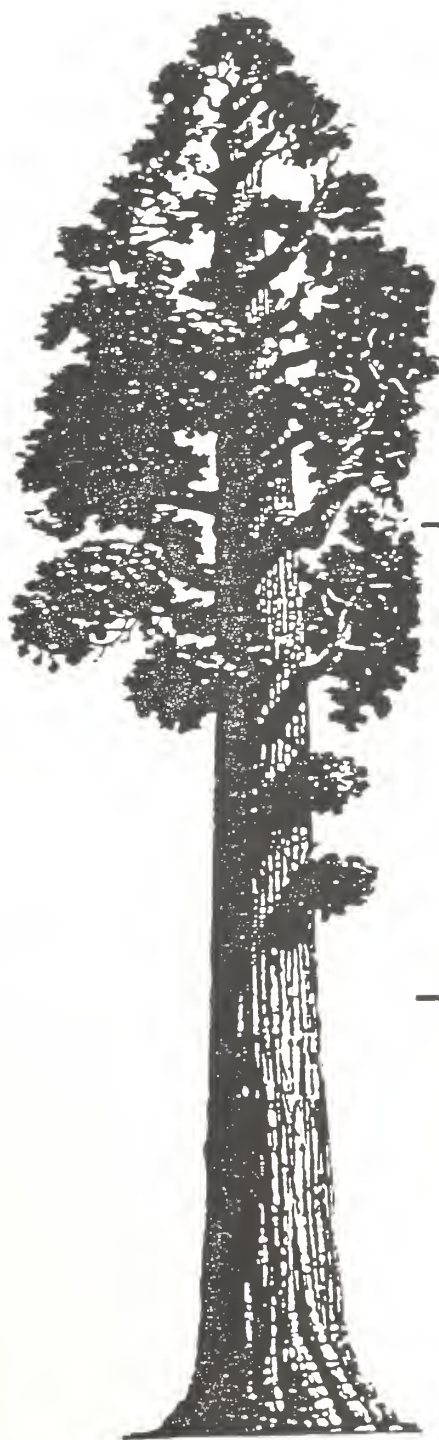


# APPENDIX A: COST ESTIMATES

	Alternative A	Alternative B	Alternative C
Visitor Services			
• Giant Forest Visitor Center	0	1,674,180	1,674,180
• Trail Upgrades	0	1,505,704	2,198,988
• Rest Rooms	314,400	471,600	550,200
Transportation			
• Parking Areas	0	1,768,260	1,457,244
• Lodging Shuttle	0	1,092,540	1,092,540
• Day Use Shuttle	0	0	5,458,770
• Road Improvements	0	211,081	758,590
Giant Forest Restoration			
• Facility Removal	1,230,044	2,417,985	1,752,725
• Parking Removal	64,588	351,789	372,521
• Site Stabilization	25,613	0	0
• Biological Restoration	0	999,865	662,848
Utilities			
• Utility Removal	18,100	18,100	18,100
• Utility Improvements	157,200	306,540	306,540
Contingencies	270,756	1,670,689	2,446,229
Gross Construction Subtotal	2,076,026	12,808,233	18,731,415
Advance and Project Planning	396,188	2,444,319	3,574,698
TOTAL	2,472,214	15,252,552	22,306,113







## **SEQUOIA NATIONAL PARK**

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### **GIANT FOREST**

### **GUIDELINES FOR ECOLOGICAL RESTORATION**

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#### **RELOCATE GIANT FOREST FACILITIES**

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**JULY 5, 1995 DRAFT**

NATIONAL PARK SERVICE  
UNITED STATES DEPARTMENT OF INTERIOR

**GUIDELINES FOR ECOLOGICAL RESTORATION  
GIANT FOREST  
SEQUOIA AND KINGS CANYON NATIONAL PARKS**

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Manager, Western Team, Denver Service Center Date

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Director, Western Region Date

---

Superintendent, Sequoia and Kings Canyon National Parks Date

**GUIDELINES FOR ECOLOGICAL RESTORATION  
GIANT FOREST  
SEQUOIA AND KINGS CANYON NATIONAL PARKS**

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**GUIDELINES FOR ECOLOGICAL RESTORATION  
GIANT FOREST  
SEQUOIA AND KINGS CANYON NATIONAL PARKS**

DRAFT: JULY 5, 1995

**1. SITE NAME: GIANT FOREST**

**2. PROJECT COORDINATOR:**

Suzanne M. Stutzman  
Landscape Architect  
Denver Service Center, TWE  
(303) 987-6671  
FAX 987-6679

**3. AREA IN ACRES: 60 acres restoration (approx. 20 acres/year)  
Giant Forest/Sherman Tree developed area total : 175 acres**

**4. MANAGEMENT ZONE CLASSIFICATION: Development and Natural**

**5. VEGETATION TYPES TO BE ESTABLISHED:**

Trees, shrubs, forbs and grasses.

**6. PROJECT DESCRIPTION:**

**A. Location, Site History, and Justification.**

The purpose of this Revegetation Project Plan is to provide a five-year direction for restoration of sites where development will be removed, and revegetation of sites disturbed by construction of replacement day-use facilities at Giant Forest. It provides coordination between the Denver Service Center and Sequoia and Kings Canyon National Parks. It also makes an estimate of needed plant materials, which require 2 to 3 years time for propagation, and identifies funds needed from future construction phases.

The approved 1980 Lodgepole/Giant Forest Development Concept Plan established the goal of restoring the Giant Forest sequoia grove to a more pristine state by relocating commercial functions located within the grove to other, less sensitive locations. Twelve phases of construction have developed infrastructure at Wuksachi Village for replacement concession facilities. Removal of facilities from Giant Forest will begin in the next phase, and will include removal of roads, structures, and some utilities. There will be some re-grading as part of site restoration. There will also be some construction of new day-use facilities such as parking lots, trails, comfort stations, renovation of existing comfort stations, and adjustments to existing roads.

A range of vegetation restoration strategies are needed to stabilize disturbed sites and re-establish a dynamic plant community.

**B. Site Analysis**

**1. Soils and Topography.** "The Giant Forest area rests on a southeast terrace above the Marble Fork at an elevation of 6,500 feet. There is an extensive area of relatively level terrain with local rises and swales. Slopes drop off steeply from the terrace to the east, south, and west while the ridge climbs to the north."

"Most of the soils in the Giant Forest area are a deep variant of the Shaver series, which are forest soils that have developed as residual from granitic rocks in moist portions of the region. This variant ranges in depth from 54 inches to well over 6 feet in some areas, and it receives moisture from groundwater sources. The soils have a surface litter 2 to 3 inches deep, with a sandy loam soil texture throughout the mineral portion. The bottom of the soil profile shows grayed colors indicative of a fluctuating water table ... Characteristically, Shaver soils have moderately thick surface soils (13 to 15 inches) with a coarse sandy loam texture and are slightly acidic and high in organic matter content." Meadow soils are also present and there are a few areas of Holland Series soils in the warmest and driest portions of the site near rock outcrops and exposed rock. 1980 DCP

A 1964 comparison of trampled versus untrampled soils (Hartesveldt) found significant changes in severely trampled soils which had approximately 2 percent less organic matter; .06 percent less nitrogen content; saturation percentage was 9 to 11 percent less; and potash was more limited.

2. Climate. The climate is characterized by warm, dry summers and moderately cold, wet winters. Heaviest precipitation occurs in the 5,000 to 8,000 foot elevations. Giant Forest has four seasons: spring generally begins the end of March with longer days and temperatures rising above freezing; summer is from June through September with daily temperatures in the fifties to seventies range and drier weather by August; autumn continues through late November; heavy winter snowfalls average 250 inches with 5 to 10 snowpacks and provide 40 to 50 percent of annual precipitation. Mild winter temperatures typically are in the teens to the thirties, rarely falling below zero. (see precipitation chart)

3. Vegetation. "Giant Sequoias are not the dominant vegetation within sequoia groves. Typically, they account for only 5 to 10 percent of the crown cover within a grove; however they account for more than 50 percent of the total basal area (Rundel 1971). White fir is usually the dominant tree species growing with sequoias, and it often composes up to 80 percent of the crown cover. Other species growing with the sequoia groves include red fir, sugar pine, Jeffrey Pine, and incense cedar. Understory vegetation is extremely variable, but chinquapin is the most consistent associate." 1980 DCP

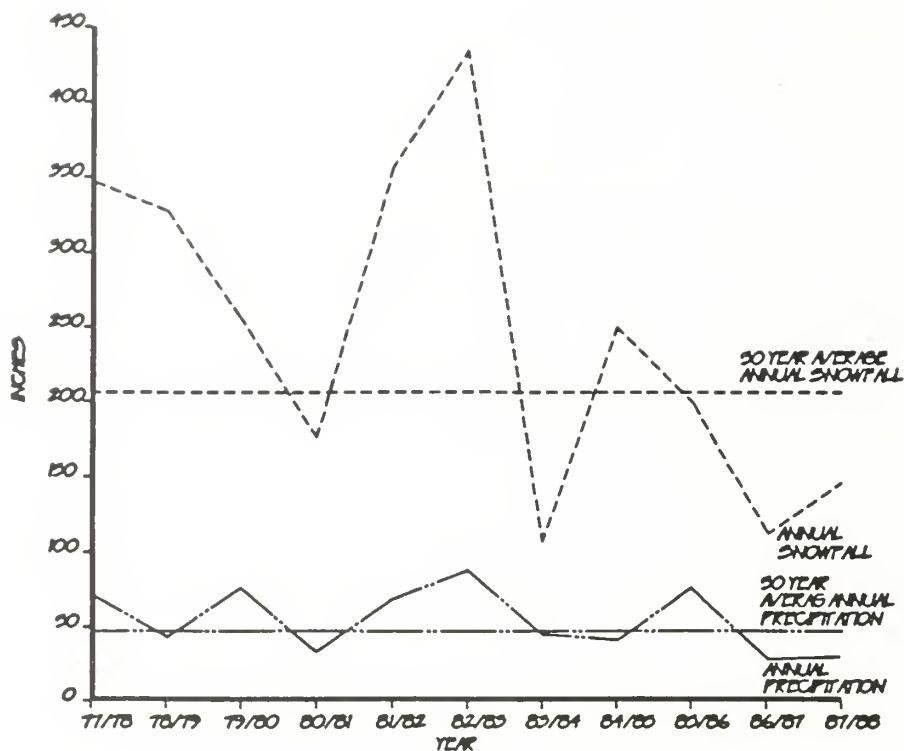
Eleven community types have been identified in the Giant Forest area, including giant sequoia forest, Sierran white fir (*Abies concolor*) forest, chaparral, montane riparian scrub, montane meadow, streams, cliffs and rock outcrops, and anthropogenic features. They have been mapped. Potential habitat for special status plant and wildlife species and sensitive wildlife communities and habitat have been identified (Jones and Stokes, 1994).

A threatened/endangered/rare plant survey will be completed in the summer of 1995 during the appropriate flowering/identification periods.

A forest structure/strategy study (gap analysis) study is underway, which characterizes fire-caused gaps in giant sequoia forests for determining restoration strategies. The study will be completed during the summer of 1995 by Athena Demetry. Restoration sites will be paired with similar fire-caused gaps, which will provide a model for restoration efforts.

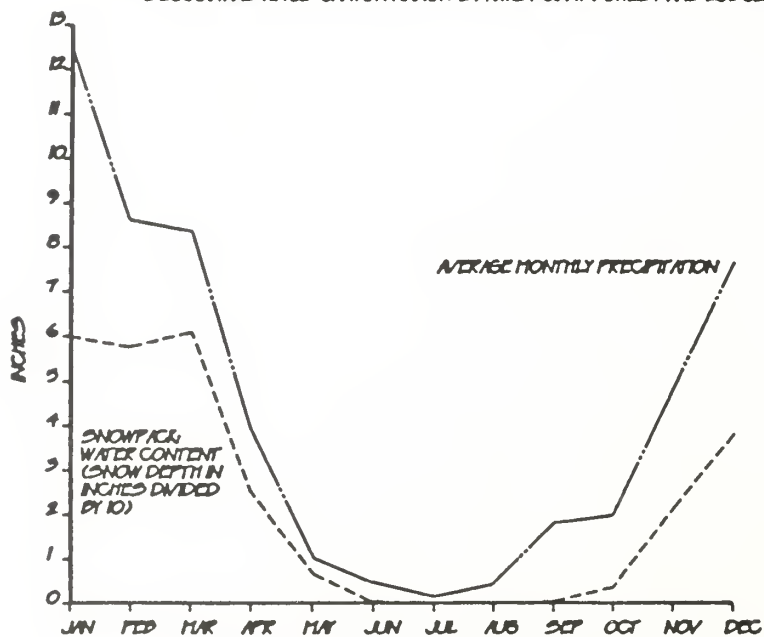
4. Hydrology and Wetlands. Giant Forest is primarily drained by Sherman Creek, Little Deer Creek and Crescent Creek. "It is of ecological importance to the giant sequoia that soil moisture is replenished by groundwater during later summer. More than any other single ecological factor, soil moisture availability determines the physiological limits of the giant sequoia survival and maintains present grove boundaries.... Large mortality rates of first-year seedlings can be attributed to desiccation during summer months, even within sequoia groves."

"High water table conditions, influenced by both surface water and groundwater, help create and maintain meadows throughout the Giant Forest / Lodgepole area. ...Meadow water table levels also exhibit large diurnal fluctuations." (Wood, 1975) 1980 DCP



### TOTAL ANNUAL PRECIPITATION

SEQUOIA AND KINGS CANYON NATIONAL PARKS, GIANT FOREST AND LODGEPOLE



### AVERAGE MONTHLY PRECIPITATION

SEQUOIA AND KINGS CANYON NATIONAL PARKS, LODGEPOLE 1969-1983

"Portions of the giant sequoia forest, lodgepole line forest, montane meadow, streams, and montane riparian scrub communities may be considered jurisdictional wetland or waters of the United States under section 404 of the Clean Water Act." (Jones and Stokes 1994)

5. Wildlife. Within the Giant Forest, over 25 species of mammals have been observed including opossum, bats, hare, chipmunk, marmot, squirrels, mice, fox, black bear, ringtail, racoon, marten, fisher, skunk, deer, and wolverine, all though some of these observations are extremely rare. Bats (including a few sensitive species) may roost in some of the crawl spaces of structures in Giant Forest. Over 75 species of birds have been observed, and raptors (including a few special status species) are known to nest in the area. Five species of reptiles and 6 species of amphibians have been observed. Certain wet meadows and creeks potentially provide habitat for sensitive species. (Jones and Stokes 1994)

Three species of bats known to occur in Giant Forest are Category 2 species threatened /endangered/rare and a survey will be undertaken during the summer of 1995 to assess the impacts of removal of structures.

6. Visitor Use In 1976 Sequoia had over a million visitors, but this figure dropped and has stabilized annually at just below a million visitors. Historically summer has had nearly 70 percent of visitation. During summer 45 to nearly 90 percent of users stay overnight; other times of year 70 to 80 percent are day users.

7. Expected changes as the result of facilities removal and day use of the Giant Forest. Lodging, store and eating facilities, some utilities, parking lots, roads and trails will be removed and the areas restored. A visitor center, NPS ranger house, Beetle Rock education center, and restrooms will remain in the Giant Forest Center area. Eventually concession housing will be removed. This will change the Giant Forest Center to a day use area. New parking facilities (on previously disturbed sites) and some sanitary sewer leach fields will be developed to support day use / visitor center needs. The overall result will be a major reduction in buildings and utilities, and a significant reduction in paved areas.

### **C. Goals and Objectives of Restoration**

#### 1. Create a structure and composition of vegetation at the restoration sites within the range of natural variability if development had not taken place and if fire had not been suppressed.

Establish composition and structure that falls within a range that would occur following fire or biological mortality in similar forest openings undisturbed by development (gaps as observed in the vicinity of Giant Forest) rather than attempt to identify and re-create an historic condition. Restoration would approximate 10 years following such disturbances.

Manage restored forest so that it functions dynamically and is subject to the same natural processes affecting the rest of Giant Forest area and ultimately becomes a self-perpetuating community ensuring the future of giant sequoias.

Base restoration on sound ecological principles.

Make decisions within a long-term time frame (50-100 years).

#### 2. Protect the surrounding environment.

Protect the genetic integrity of park resources.

Protect Wetlands, water quality, and minimize loss of topsoil.

Remove manmade materials to the degree possible, where removal methods will not cause excessive damage to the surrounding environment.



### 3. Enhance and enlighten visitor experiences.

Provide for high quality visitor use and enjoyment of Giant Forest.

Make restoration visible to the public and use as an educational tool during the transition of Giant Forest.

## **D. Goals Considered and Dismissed**

1. Recreate a pre-1860 condition. There is no dependable record identifying conditions as settlement and development took place. Extrapolation cannot be conducted scientifically or accurately because of that lack of data.
2. Create a condition that would reflect forest dynamics since 1860. There is a lack of knowledge and data to reconstruct events and the ability to accurately predict changes that would have occurred in the composition and structure of the communities.
3. Create an average composition and structure. Identifying an average composition and structure does not acknowledge the different site characteristics nor reflect the variability found in natural systems.

## **E. Restoration Zones**

Two major types of restoration zones will be identified in Giant Forest:

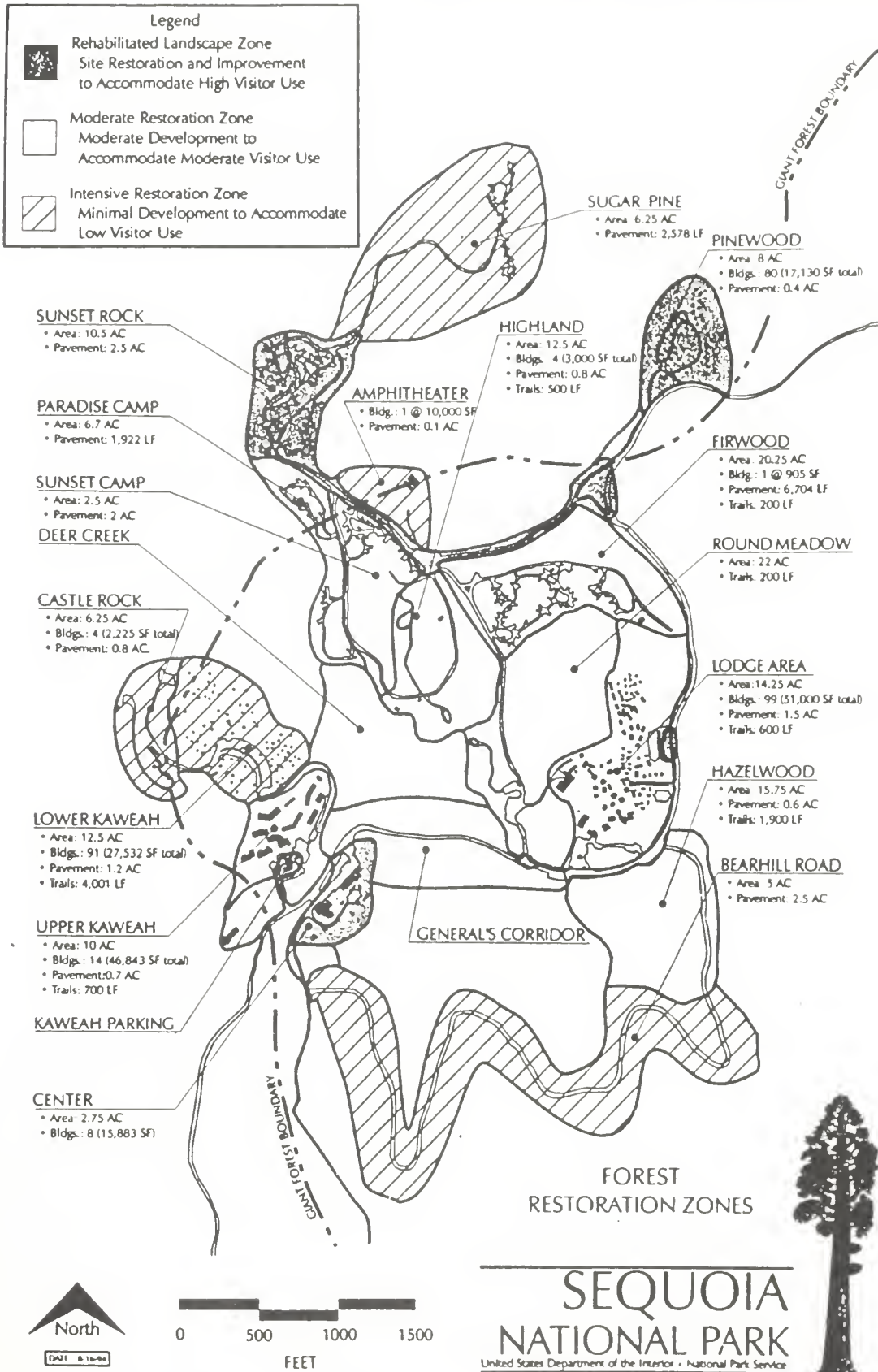
1. Biological Restoration Zone - The emphasis in this zone is to establish initial conditions that simulated natural post-disturbance conditions, and then allow the sites to function under natural processes. Establishing initial conditions may include a host of specific actions including land forming, amendments to soil conditions, replanting/reseeding to replace lost propagule sources, etc. The ultimate goal in this zone is a dynamic, unimpaired extension of the Giant Forest ecosystem.
2. Landscape Zone - areas which will be intensively managed during both initial establishment and long-term growth for specific purposes which are subservient but complimentary to the natural environment. This zone will be limited to specific areas where visitor use needs require management of vegetation, such as shrubs to discourage hikers, screening a comfort station, or clearing for a popular photo opportunity.

## **7. PROJECT SPECIFICATIONS**

Giant Forest Village has been divided into 18 planning areas where facilities will be removed and restoration will occur. During preliminary design for Giant Forest, more specific zoning recommendations will be made along with the most appropriate restoration strategy using one or more of the following techniques:

### **A. No Action**

Areas where removal or disturbance of a facility or structure will cause far greater long-term damage than leaving it extant will be left alone.



## B. Modify Existing Vegetation

1. Pruning. In some landscape zones, selective pruning may be used to clear obstructions to visitor activities or to remove hazards.
2. Vegetation Removal. Areas determined to have an unacceptable composition or structure resulting from past management practices will be modified to approximate the natural condition. This includes removal of human-influenced stands of species which would not normally be found in this area of Giant Forest.

## C. Fire Management

1. Fuel Manipulation. Openings left after removal of facilities and other areas lacking in fuels to carry fire may have fuel hauled onto 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.
2. Prescribed Fire. May be utilized to achieve project goals. Fire modifies the composition and structure of the forest by killing some tree species. Giant sequoia is fire resistant and tends to survive. Giant sequoia is a shade intolerant species that regenerates in openings and on the bare mineral seedbed created by fire.

## D. Landform Modification

1. Equipment. All equipment used for removal and stabilization purposes should have a low compaction factor. The intent is to minimize additional impacts prior to ecological restoration. Various equipment will be used in the process, ranging from hand tools to bulldozers. Compaction factors should be verified and included in future specifications. Some equipment options are:
 

Small equipment -	hand tools, bobcat, tractor, backhoe
Large equipment -	backhoe, excavator, chipper, dump truck, loader, truck-mounted cherry picker, hydraulic lift, bulldozer
2. No Landform Modification. In some areas, scarifying or modifying landforms may cause more long-term damage than no action. Such areas will not be modified.
3. Scarify. Following removal of pavements and structures, some areas will need to be scarified to mitigate compaction and restore conditions which will foster natural processes. Specific depth and tools will be prescribed.
4. Regrade With Existing Soils. Some areas with significant landform modifications, such as road cuts and fills and level building pads, will require recontouring to an approximation of original contour. To the greatest extent possible, this should be accomplished through re-balancing cuts and fills with extant soil. To avoid the need for additional fill material, finish grade may vary from the original grade.
5. Fill. Where additional fill material is needed, soils of the same type from within the Giant Forest area will be utilized. Fill imported from outside of the Giant Forest area will be avoided, and used only if it can be guaranteed to be free of pathogens.
6. Topsoil. Wherever removals or construction within Giant Forest will disturb topsoil, it will be stripped and salvaged. To preserve vital microflora in the topsoil, storage time must be kept to the minimum, number of times it is moved minimized, it must be stored to maximize air contact while protected from wind and water erosion, and not mixed with woodchips. It is likely that there will be insufficient quantities of topsoil generated within Giant

Forest to meet restoration needs. Local native topsoil must be very carefully conserved and re-applied at minimal depths. Topsoil from outside of Giant Forest will not be used.

7. Finish Grading. The final surface of restoration areas will be irregular, with humps and pockets to approximate original conditions and to provide micro-climates which will foster growth and variety of plants.

8. Stockpiling and Storage of Materials. During construction and removals, materials such as fill and topsoil will require an area for storage. Previously disturbed sites away from critical areas of the Sequoia grove must be identified.

#### **E. Soil Amendments**

1. No Amendments. Use of local native soil and topsoil will be sufficient in many areas.

2. Ash. In areas where it is not possible to burn limbs, litter and duff and amending the soil would be beneficial, fuel may be burned at a single location and the ashes mixed into the topsoil of restoration areas.

3. Fertilizer. Soils will be specifically tested and other amendments considered on a case-by case basis prior to seeding. Amendments will only be used to rectify changes caused by previous disturbances and bring soils back into the approximate range of adjacent, undisturbed soils. They will not be used to speed up or otherwise interfere with natural succession. Fertilizer tablets will be used when tree and shrub seedlings are planted to enhance survival rates.

#### **F. Revegetation Techniques Recommended**

1. Natural Regeneration. Rely on natural regeneration from adjacent seed sources and duff.

2. Seed Collection, Increase, and Direct Seeding. Plant (locally) native seed. It is not practicable to collect enough grass and forb seed for direct seeding of the acreage involved. Increasing seed from parent material collected in the Giant Forest vicinity can provide the necessary quantities of native seed which will protect the genetic integrity of park resources. This process requires three years. The Interagency Agreement with the Natural Resources Conservation Service (formerly Soil Conservation Service) Upper Colorado Environmental Plant Center for seed increase at Wuksachi can be amended to include additional species for Giant Forest.

Direct seeding may be feasible for sequoias, because of the large quantity of seedlings needed and the availability of seed from fallen cones. It may also be feasible for some shrub species, in conjunction with fire management.

3. Seed or Cutting Collection and Nursery Propagation. Plant (locally) native tree and shrub seedlings. Propagation of natives which will protect genetic integrity can be accomplished from seed or cuttings collected in the vicinity of Giant Forest, and grown through an existing agreement with the USDA Forest Service or with an existing indefinite quantities contract with a private nursery. This process requires 1 to 3 years, depending upon the size of plant material needed.

For wetland species which are not easy to propagate from seed, vegetative propagation into plugs, transplants, or rhizomes can be accomplished within the park in consultation with NRCS, or through an interagency agreement with the Natural Resources Conservation Service, Los Lunas Plant Materials Center, New Mexico.

4. Direct Transplants. Sources for transplants are places where trees and shrubs can be removed because they will be disturbed by construction or their removal will not cause excessive disturbance. There is not a significant quantity of source trees or shrubs in the vicinity of Giant Forest to provide direct transplants, but there are some opportunities along old road scars to move adjacent materials onto restoration sites.



## G. Revegetation Techniques Considered and Rejected

The following alternatives were considered but rejected because they were not practical or did not meet the revegetation goals and objectives:

1. Purchase of Commercially Grown Native Seed. Commercially grown native seed is likely to be genetically different from plants in the park, yet may be similar enough to cross with indigenous plants and erode the genetic integrity of park resources.
2. Purchase of Non-Native Seed or Plant Material. Non-native seed or plant material would not initiate processes for the goals of a natural system.

## H. Erosion Control

1. Duff. Litter and debris from the forest floor will be collected from adjacent areas and spread over disturbed areas for erosion control as well as a source of seed. It is even more effective for erosion control if it is crimped into place, creating small pockets for seed germination. Source areas will be identified, which have a surplus of materials from lack of fire activity and where the material can be hauled without undue disturbance.
2. Rice Straw. If sufficient sources and quantities of duff cannot be found, rice straw mulch will be used. It is a relatively inert material that is crimped into the soil on the and will last for 1 to 2 years. There is some possibility of introducing non-native seed, but it would not likely persist at this elevation and the material can be fumigated before bringing it into the park. Rice straw can be used on shallow to moderate slopes of less than 3:1.
3. Wood Chips. Wood chips could be used for erosion control if it is recognized that they may inhibit new plant growth by depleting nitrogen if they are mixed into the soil. If applied, older, more decomposed chips will be used, spread over the surface no deeper than 2 inches, and not mixed into the soil.
4. Erosion Control Blankets. Erosion control blankets should be used sparingly, reserved for the steepest slopes (3:1 and greater) and unprotected drainages. Where possible, duff from adjacent areas should be raked over the surface prior to placing the mats, to provide a possible source of seed. Specifications should consider the size of mesh (larger to avoid entrapping small animals), rate of deterioration (long enough for protection but fast enough to recede from interference), and sustainability of mesh and filler.
5. Stones, Boulders, Limbs, Logs. In conjunction with any of the erosion control methods applied above, stone, boulders, limbs, and logs will be salvaged or hauled from adjacent areas and placed into the surface to provide a visual approximation of original forest openings, as well as provide microclimates for establishing a variety of plants. There will be no visible saw cuts on any limbs or logs applied.

## I. Follow-up Care

1. Irrigation. To enhance the chances of survival, temporary drip or spray irrigation will be installed in selected areas where tree and shrub seedlings will be planted. Irrigation will only be installed in these selected areas if the connection to water is practical and will not harm undisturbed areas. These systems will be automated to the greatest practical extent and maintained by park staff for a period of 2-3 years following planting. Irrigation materials used in early phases may be relocated to later phases of the project. Ultimately all equipment will be removed.
2. Protection and Fencing. Attention must be given to future patterns of visitor use, anticipating impacts to vegetation and minimizing adverse effects through design of trails and barriers. Protection may also be needed around certain plantings to prevent wildlife damage. Planning the protection of undisturbed and newly planted

vegetation in visitor use areas is crucial to the success of the restoration project. As fences are likely to be needed for a long time, they will be attractive and integral to the design.

## **8. MONITORING AND LONG-TERM MANAGEMENT**

### **A. Design of Monitoring Program**

As prescriptions are developed for each area of restoration, standards for completion should be included. A baseline should be established for reference and inventoried at the beginning of restoration. On an annual basis for the first 5 years, the baseline and selected restoration areas should be monitored an assessment should be made of how well standards for completion are being met. Monitoring and assessment should continue beyond the first 5 years at less frequent intervals. This will require careful planning to allocate part of restoration costs to the initial monitoring program, but eventually transfer it to park operations to ensure ongoing monitoring. The information is not only of interest to measuring the success of the project, but also adding to the body of knowledge about the Giant Forest ecosystem.

### **B. Develop Long-Term Management Plan**

In addition to long-term monitoring requirements, there will be a need for long-term management of the areas defined for the visitor use restoration zone. A plan for management should be developed following specific restoration prescriptions.

## **9. ADMINISTRATIVE REQUIREMENTS**

### **A. NEPA**

- 1979 *Final Environmental Statement/Development Concept Plan, Giant Forest/Lodgepole, Sequoia and Kings Canyon National Parks.* Denver Service Center.
- 1980 *Development Concept Plan, Giant Forest/Lodgepole, Sequoia and Kings Canyon National Parks.* Denver Service Center.
- 1995 *Draft Wildlife, Vegetation, and Wetland Inventories of the Giant Forest Area of Sequoia National Park, prepared for the National Park Service, Denver Service Center, by Jones and Stokes Associates, Sacramento, CA, August 25, 1994.*
- 1995 *Underway: Draft Implementation Plan and Environmental Assessment, Giant Forest, Sequoia National Park,* available for public review summer 1995.
- 1995 *Underway: Survey for threatened/rare/endangered bats and plants, summer 1995.*

### **B. 106 Compliance**

Section 106 compliance for removal of structures and restoration activities has been underway through planning package 200JA and will be completed during fiscal year 1995.

### C. Roles and Responsibilities

#### Denver Service Center

- Planning, design, compliance, and construction (and supervision) of Package 200L and future design packages
- Coordinate specific consultants
- Administer SCS Interagency Agreement
- Administer indefinite quantities contract for plant propagation
- Advise SEKI, WRO, WASO of fund transfers necessary to accomplish this plan
- Participate in post-project review

#### Sequoia and Kings Canyon National Park

- Provide overall vision and direction for planning, Package 200L and future design packages
- Participate in specific portions of plan, including specific prescriptions for restoration areas, monitoring strategies
- Provide assistance to specific consultants
- Collect seed or plant materials for propagation, or coordinate contractor collection
- Propagate wetland plants, when requested
- Provide holding for plant materials, when necessary
- Install plant materials with day labor where requested
- Administer USDA Forest Service interagency agreement
- Coordinate with SCS on delivery of collected seed
- Install drip tubing and emitters, where requested
- Maintain temporary irrigation systems
- Participate in post-project review
- Provide long-term monitoring of restoration work

#### Western Regional Office

- Oversight and fiscal control
- Provide review comments on budget, compliance, design documents

USDA Natural Resource Conservation Service (SCS), Environmental Plant Materials Center, Meeker, CO  
Increase grass and forb seed collected in the park

USDA Natural Resource Conservation Service (SCS), Los Lunas Plant Materials Center, New Mexico  
Propagate wetland plants, when requested

USDA Forest Service, Placerville, CA  
Propagate tree seedlings from seed collected in the park

Bitterroot Native Growers, Inc., MT (indefinite quantities contract)  
Propagate shrubs and trees from seed and cuttings from the park  
Collect seed and cuttings, when requested  
Install plant materials, when requested

#### Construction Contract (when bid)

- Remove structures, pavements, and utilities
- Perform earthwork, scarification
- Install plant materials, when requested
- Install irrigation lines, valve boxes, backflow preventors
- Install erosion control measures

## E. Cost Estimate and Funding Sources

See Appendix A

## F. Preparers and Consultants

Suzanne Stutzman, Landscape Architect, DSC-TWE  
Susan Spain, Landscape Architect, DSC-TWE  
Wendell Hassell, Revegetation Specialist, NRCS (SCS)/DSC  
David Lee, Natural Resource Specialist, DSC-TWE  
Jeff Manley, Natural Resources Management Specialist, SEKI  
Tom Warner, Park Forester, SEKI  
Dan Duriscoe, Biological Technician, SEKI  
Richard Thiel, Biological Technician, SEKI  
Athena Demetry, Graduate Student, Northern Arizona School of Forestry

## 10. REFERENCES CITED OR CONSULTED

- 1951 *Check List of Plants, Sequoia and Kings Canyon National Parks.* Sylvia Stanger, Sequoia Natural History Association.
- 1954 *Discovering Cone-Bearing Trees in Sequoia and Kings Canyon National Parks.* Wayne B. Alcorn, Commercial Printing Co., Visalia, California.
- 1969 *Wildflowers of Sequoia and Kings Canyon National Parks.* Stephen K. Stocking and Jack A. Rockwell, Sequoia Natural History Association.
- 1987 *Vegetation Management Plan (For the Developed Zone), Sequoia and Kings Canyon National Parks.* Thomas Warner, Sequoia and Kings Canyon National Parks.
- 1992 *Revegetation Project Plan, Sequoia and Kings Canyon National Parks.* Dan Duriscoe, Heidi Anderson, Joyce Lapp, Thomas Warner, Sequoia and Kings Canyon National Parks.
- 1993 *Revegetation and Reclamation Training Workshop,* Edward F. Redente, National Park Service, Denver Service Center.
- 1993 *1993 Guidelines for Revegetation in Disturbed Areas,* Western Region Directive #WR-094.
- 1994 *Wuksachi Village and Lodgepole Revegetation Project Plan,* Sequoia National Park, Denver Service Center, June 1994.
- 1994 *Draft Wildlife, Vegetation, and Wetland Inventories, Giant Forest, Sequoia National Park,* prepared by Jones and Stokes Assoc., Sacramento, CA, for Denver Service Center, August 1994.

## 11. APPENDICES

### A. Projected Costs and Timetable

### B. Species List



July 5, 1995

**APPENDIX A: PROJECTED COSTS AND TIMETABLE**  
**SUMMARY**  
**ECOLOGICAL RESTORATION**  
**GIANT FOREST - SEQUOIA NATIONAL PARK**

	FY 95	FY 96	FY 97	FY 98	FY 99	TOTAL
NRCS (CO)	\$ 6,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$42,000
USFS	---	\$3,000	\$21,500	\$21,500	\$21,500	\$67,500
CONTRACT	---	---	\$10,000	\$55,000	\$45,000	\$110,000
PARK	\$12,000	\$12,000	\$28,000	\$37,600	\$32,600	\$122,200
INSTALL.	---	---	---	\$97,000	\$77,000	\$174,000
ECOLOGIST	---	\$15,000	\$15,000	\$40,000	\$40,000	\$110,000
<b>TOTAL</b>	<b>\$18,000</b>	<b>\$57,500</b>	<b>\$83,500</b>	<b>\$260,100</b>	<b>\$225,100</b>	<b>\$625,700</b>
<b>SOURCE</b>	<b>200K Construction</b>	<b>200L Construction</b>	<b>Future Phase Construction</b>	<b>Future Phase Construction</b>	<b>Future Phase Construction</b>	

Total estimated acres for restoration: 60 (\$10,428/acre)

See following pages for more detailed information and supporting documentation of quantities and costs.

The majority of these costs are for the production of native plant materials, for the purpose of using current-year construction funds to begin propagation 2 - 3 years ahead of the construction package where they will be used. They also include park work for collection, installation, holding, and post-planting care for the purpose of transferring construction money to the park. These costs do not include planting design, developing specifications, and other DSC work directly related to each individual construction package, as these costs are part of programmed design services. They also do not include irrigation installation, which will be included with individual construction packages where the contractor will be performing this work. This plan covers work funded out of anticipated construction money. There will be a need for post-planting care two years beyond the final construction phase, and a source will need to be identified.

## COST ESTIMATE: ECOLOGICAL RESTORATION OF GIANT FOREST

Class "C" cost estimate 7/5/95						
	FY 95	FY 96	FY 97	FY 98	FY 99	TOTAL
NRCS (CO) (total 140 lbs. grass, 90 lbs. forb seed)	\$6,000	\$9,000	\$9,000	\$9,000	\$9,000	\$42,000
prepare seed, setup fields	x	x				
seed fields		x	x			
first harvest			x	x		
seed available (70 lbs. grass, 45 lbs. forb)				x	x	
Indefinite Quantities Contract - Shrubs (36,000 total)						
collect seed/cuttings (shrubs)			\$10,000	\$10,000		
propagate shrubs (15,000/yr @ \$2.50)				\$37,500	\$37,500	
deliver shrubs (15,000/yr @ \$0.50)				\$7,500	\$7,500	
Subtotal			\$10,000	\$55,000	\$45,000	\$110,000
USDA Forest Service - Trees (27,000 total @ \$2.50)		\$3,000.00	\$21,500	\$21,500	\$21,500	\$67,500
prepare seed		x	x	x		
propagate seedlings (9,000/yr)			x	x	x	
deliver seedlings				x	x	
Park work - day labor						
collect grass/forb/tree seed	\$10,000	\$10,000	\$10,000			
materials - wetland species			\$6,000			
collect wetland species			\$5,000	\$5,000		
grow wetland sp. (6,000/yr @ \$2.00)				\$12,000	\$12,000	
plant wetland sp. (6,000/yr. @ \$0.60)				\$3,600	\$3,600	
holding				\$5,000	\$5,000	
post planting care*			\$5,000	\$10,000	\$10,000	
admin. and reports	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	
Subtotal	\$12,000	\$12,000	\$28,000	\$37,600	\$32,600	\$122,200
Installation (by Park, IQ Contract, or Constr. Contr.)						
grass/forb seed (20 AC/98, 10 AC/99 @ \$2,000/AC)				\$40,000	\$20,000	
shrubs (15,000/yr @ \$2.00)				\$30,000	\$30,000	
tree seedlings (13,500/yr @ \$2.00)				\$27,000	\$27,000	
Subtotal				\$97,000	\$77,000	\$174,000
Restoration Ecologist (part of constr. supervision)						
Ecologist May-Sept. at Giant Forest		\$10,000	\$10,000	\$30,000	\$30,000	
Contract soils tests, misc.		\$5,000	\$5,000	\$10,000	\$10,000	
Subtotal		\$15,000	\$15,000	\$40,000	\$40,000	\$110,000
Total by Year	\$18,000	\$57,500	\$83,500	\$260,100	\$225,100	
GRAND TOTAL						\$625,700
cost/acre						\$10,428

\* There will be a need for continued post-planting care for a minimum of 2 years beyond the last installation.

## **COST ESTIMATE: ECOLOGICAL RESTORATION GIANT FOREST**

### **SUPPORTING DOCUMENTATION OF QUANTITIES AND COSTS**

Many assumptions have been made for the purposes of estimating the quantities and costs of propagating native plant materials for the restoration of Giant Forest. They are identified here for the purposes of establishing a 5-year plan and providing a basis for future adjustments to the plan. The major demolition/restoration years when plant material will be installed is assumed in this plan to be 1998 and 1999.

**TOTAL AREA OF RESTORATION: 60 acres**

Package 200 JA generated a map of forest restoration zones within Giant Forest village	
The total of the zones in Giant Forest Village is 161 acres	
Total pavement to be removed:	17.1 AC
Total area buildings to be removed:	<u>3.6 AC</u>
Total exposed ground:	20.7 AC
Double total exposed ground to account for recontouring, work limits:	40 AC
Add Sherman Tree, Moro Rock, Crescent Meadow:	<u>20 AC</u>
Total area of restoration:	60 AC

#### **GRASS/FORB SEED**

Grasses and forbs are not a major component of existing forests or natural gaps. Shrubs and trees are more frequently found in gaps and will be used to a larger extent in restoration because they more closely represent the goals of the project of initiating natural systems. Excessive planting of grasses and forbs may compete with the establishment of shrubs. Of the total acres of restoration, some of the smaller areas will not be seeded but rather covered with litter and duff from the adjacent forest. When all of these factors are combined, it has been assumed that grass/forb seed would only be used on about 50% of the total area for restoration, or about 30 acres.

If seed is collected the summer/fall of 1995, the first available seed will be 1998, the second year of demolition/restoration. Therefore, delivery would be planned for 1998 and 1999, with 15 acres in each year.

Seed Mixture/Rate	<u>160 seeds/SF</u>	<u>lbs./AC</u>	<u>lbs./yr.(15 AC)</u>
5 grasses minimum, est. 300,000 seeds/lb.	60% mix	14 lbs./AC	210 lbs./year
4 forbs minimum, est. 1,000,000 seeds/lb.	40% mix	3 lbs./AC	45 lbs./year

Total production costs for 30 acres (does not include collection)

Grass seed	420 lbs.	\$ 50/lb.	\$21,000	
Forb seed	90 lbs.	\$140/lb.	\$12,600	
Overhead (20%)			\$ 6,800	
<u>Shipping</u>			<u>\$ 1,600</u>	
Total for 30 acres			\$42,000	(\$1,400/AC)

This would be produced through an amendment to the interagency agreement with the Upper Colorado Plant Materials Center, NRCS, Meeker, CO.

#### **WETLAND PLANTS**

In areas such as Round Meadow and the lower Lodge area, wetlands will be needed for restoration. Various techniques for vegetative propagation are available, such as plugs or rhizomes. These can be collected from adjacent wet areas, increased, and returned either within the park by park staff (in consultation with NRCS) or through propagation at the Los Lunas Plant Materials Center, NRCS, New Mexico. It is estimated that about 6,000 plants per year would be needed over a two year period, for a total of 12,000 plants.

## SHRUB SEEDLINGS

Shrubs will be a major component of restoration of disturbed sites, especially in medium and large gaps. It is also assumed that 10 cubic inch container plants, produced in one year, will generally be the most successful. The gap study estimates that about 15,000 square meters of shrub cover is needed for restoration. Assuming 3 shrubs/square meter for small gaps, 2 shrubs/square meter for small gaps, and 1 shrub/meter for large gaps, a total of about 24,000 shrubs would be needed. Add 20% to allow for some mortality, for a total of 30,000. It would be possible within this estimate to substitute for a portion of the 1-year seedlings half as many 2-year seedlings at twice the price, if larger plants are needed. These would be collected and grown through the indefinite quantities contract with Bitterroot Native Growers, Inc., Montana.

## TREE SEEDLINGS

Tree seedlings, particularly sequoia, will be a major component of restoration, especially in large gaps. The gap study indicates a need for about 22,500 seedlings. Add another 20% to allow for some mortality, for a total of 27,000 seedlings. They would be 1 or 2 year seedlings, with seed collected by the park and the seedlings grown through an interagency agreement with the USFS, Placerville, CA.

## RESTORATION ECOLOGIST

The restoration of Giant Forest involves removal of numerous buildings and pavements and some new construction of parking areas and comfort stations through construction contracts managed by the Denver Service Center. A key component is the ecological restoration - including establishing baseline data, ensuring removals have minimal impact to adjacent sites, testing site-specific soil conditions and making recommendations for amendments, providing oversight to collection and placement of limbs, litter, and duff, managing controlled burning, coordinating delivery, holding, and installation of plant materials, and ongoing monitoring and documentation of the restoration process. This adds up to responsibilities which differ from most typical construction supervision and will require a trained restoration ecologist. This ecologist should be on-site for a minimum of one month the summer before demolition/restoration begins to develop a complete monitoring and inventory design and establish baseline sampling, and a similar amount of time during the next year of light restoration of campground areas. During the two seasons of major demolition/restoration the ecologist should be present at least 3 days a week May through September. The other two days could be spent overseeing the completion and revegetation of Wuksachi. This position would be funded through construction supervision and could be either an A/E contract for Title 3 services, an interagency agreement with another governmental agency such as the Natural Resource Conservation Service, or the assignment of a National Park Service employee.



## APPENDIX B: SPECIES LIST

## GRASSES

## Sequoia: Giant Forest

Scientific Name	Common Name	Fre.	GF	Prp.	Pri.
<i>Achnatherum occidentale</i>	Western stipa	A	C	B	1
<i>Bromus carinatus</i>	California brome			A	1
<i>Bromus orcuttianus</i>	Orcutt's brome-grass			A	1
<i>Calamagrostis stricta</i> ssp. <i>inexapansa</i>	Narrow-spike reedgrass			C	
<i>Carex multiacaulis</i>	Many-stemmed sedge	B	C	C	2
<i>Danthonia</i> sp.	Oatgrass			C	
<i>Deschampsia danthnoidoides</i>	Annual hairgrass			C	
<i>Elymus elymoides</i> ssp. <i>californicus</i>	Squirreltail			B	2
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	Blue wildrye			A	1
<i>Elymus glaucus</i> ssp. <i>jepsonii</i>	Jepson's blue wildrye			A	1
<i>Festuca occidentalis</i>	Western fescue			A	2
<i>Fetuca rubra</i>	Red fescue			A	2
<i>Juncus effusus</i> var. <i>exiguus</i>	Soft rush	B		C	
<i>Juncus mertensianus</i>	Merten's rush			C	
<i>Melica</i> sp.	Melic grass			A	1
<i>Scirpus micorcarpus</i>	Small-fruited bulrush	C		C	

**Fre.** FREQUENCY (Presence in number of polygons) based on Jones and Stokes, 1994

A Frequent (10+)

B Common (5-9)

C Infrequent (1-4)

(other than the 3 species noted, specific species were not identified for polygons; the general category "grasses" were present in 10+ polygons)

**GF** FREQUENCY IN GIANT FOREST TEST PLOTS (Presence in up to 7 test plots) Dr. Nate Sephenson, NPS. Note that the data is taken from relatively closed canopy and does not reflect gaps. May need to be updated following 1995 analysis of gaps by Athena Demetry.

A Frequent (5-6)

B Common (3-4)

C Infrequent (1-2)

**Prp.** PROPAGATION - recommendations of Upper Colorado Environmental Plant Center, NRCS (SCS)

A Prefer to work with

B Neutral

C Prefer not to work with

**Pri.** PRIORITY - for collection and propagation (note - a maximum quantity of 5 different grass species will eventually be collected and propagated, determined by the availability of seed sources and final agreements with NRCS (SCS) for propagation)

1 Target species for collection

2 Alternate species for collection

(none) Not good candidates for collection/propagation

## FORBS

## Sequoia: Giant Forest

Scientific Name	Common Name	Fre.	GF	Prp.	Pri.
<i>Adenocaulon bicolor</i>	Trail plant	E	C	C	
<i>Arabis repanda</i> <i>Arabis sparsiflora</i>	Rock cress	B	C	C	
<i>Castilleja applegatei</i> spp. <i>disticha</i>	Wavy-leaved Indian paintbrush	F		B	2
<i>Chamaebatra foliolosa</i>	Mountain misery	D		B	
<i>Chimaphila umbellata</i>			B	B	
<i>Corallorhiza maculata</i>			C	C	
<i>Cryptantha affinis</i>			B	C	
<i>Draperia systyla</i>	Draparia	A		C	
<i>Eriogonum nudum</i> spp. <i>nudum</i> <i>Eriogonum nudum</i> var. <i>deductum</i>	Naked-stemmed buckwheat	E		A	1
<i>Galium biflora</i> <i>Galium Trifloru</i>	bedstraw Sweet-scented bedstraw	A	C C	C	
<i>Gayophytum eriospermum</i>			B	C	
<i>Hackelia mundula</i>	Pink stickseed				1
<i>Helenium bigelovii</i>	Sneezeweed	D		C	
<i>Hieraceum albidiflorum</i>	White-flowered hawkweed	C	B	C	
<i>Lotus crassifolius</i>	Broad-leaved lotus	C		C	2
<i>Lupinus fulcratus</i> <i>Lupinus latifolius</i> <i>Lupinus polyphyllus</i> var. <i>burkei</i>	Large-leaved lupine	D	C B	A	1
<i>Osmorhiza chilensis</i>	Mountain sweet-cicely		C	A	2
<i>Potentilla glandulosa</i>	Sticky cinquefoil	D		A	1
<i>Pyrola picta</i>	White-vein. wintergreen	D	A	B	2
<i>Stachys albens</i>	White hedge nettle	D		A	1
<i>Viola lobata</i> <i>Viola glabella</i>	Smooth yellow violet		C C	A	2

## FORBS - legend

## Sequoia: Giant Forest

Fre. FREQUENCY (Presence in number of polygons) Jones and Stokes, 1994

- A Most Common (25+)
- B Frequent (10-24)
- C Common (5-9)
- D Less Common (3-4)
- E Infrequent (2)
- F Uncommon (1)

(ferns, saprophytes, and *Equisetum* have been omitted)

- GF** FREQUENCY IN GIANT FOREST TEST PLOTS (Presence in up to 7 test plots) Dr. Nate Sephenson, NPS. Note that the data is taken from relatively closed canopy and does not reflect gaps. May need to be updated following 1995 analysis of gaps by Athena Demetry.
- A Frequent (5-6)
  - B Common (3-4)
  - C Infrequent (1-2)
- Prp.** PROPAGATION - recommendations of Upper Colorado Environmental Plant Center, NRCS (SCS)
- A Prefer to work with
  - B Neutral
  - C Prefer not to work with
- Pri.** PRIORITY - for collection and propagation (note - a maximum quantity of 4 different forb species will eventually be collected and propagated, determined by the availability of seed sources and final agreements with NRCS (SCS) for propagation)
- 1 Target species for collection
  - 2 Alternate species for collection
  - (none) Not good candidates for collections/propagation

**SHRUBS****Sequoia: Giant Forest**

Scientific Name	Common Name	Fre.	Gap	Prp.	Quantity
<i>Apocynum androsaemifolium</i>			C		150
<i>Arctostaphylos patula</i>	Green-leaved manzanita	B	A	B-C	500
<i>Arctostaphylos viscida</i> spp. <i>mariposa</i>	Mariposa manzanita	C			
<i>Ceanothus cordulatus</i>	Mounain whitethorn	B	A	B-C	10,500
<i>Ceanothus parvifolius</i>	Small-leaved ceanothus	B	B	B-C	6,000
<i>Cornus nuttallii</i>	Mountain dogwood	A	C	A-B	700
<i>Chrysolepsis sempervirens</i>	Bush chinquapin	B	B	C	10,000
<i>Penstemon newberryi</i>	Mountain pride	F	D		
<i>Prunus emarginata</i>	Bitter cherry		C	A-B	50
<i>Rhamnus tomentella</i> ssp. <i>cuspidata</i>	Hoary coffeeberry	A			
<i>Ribes nevadense</i>	Mountain pink currant	D	B	A	150
<i>Ribes roezlii</i>			A	A	800
<i>Ribes viscosissimum</i>			C	A	250
<i>Rubus glaucifolius</i>	Raspberry				100
<i>Rubus parviflorus</i>	Thimbleberry				50
<i>Salix</i> spp.	Willows		D	A	100
<i>Sambucus mexicana</i>	Elderberry		C		150
<i>Symphoricarpos mollis</i> <i>Symphoricarpos rotundifolius</i> var. <i>parishii</i>	Creeping snowberry	A	B	A	500
<b>TOTAL</b>					30,000

**SHRUBS - legend****Sequoia: Giant Forest**

**Fre.** FREQUENCY (Presence in number of polygons) Jones and Stokes, 1994

- A Most Common (10+)
- B Frequent (5-9)
- C Less Common (3-4)
- D Infrequent (1-2)

**Gap** GAP - initial findings of relative abundance for shrubs in gaps being studied by Athena Demtry. May need to be updated following 1995 analysis of gaps by Athena Demetry.

- A Most Common
- B Frequent
- C Less Common
- D Infrequent

**Prp.** PROPAGATION - relative ease of propagation

- A Easy to propagate
- B Moderate to propagate
- C Difficult to propagate

**Quantity** Estimate from gap study, plus 20%.

**TREES****Sequoia: Giant Forest**

Scientific Name	Common Name	Fre.	Gap	Prp.	Quantity
<i>Abies concolor</i>	White fir	A	A	B-C	1,440
<i>Abies magnifica</i>	Red fir		C	B-C	-
<i>Calocedrus decurrens</i>	Incense cedar	B	B	B	410
<i>Pinus jeffreyi</i>	Jeffrey pine	C		A	40
<i>Pinus lambertiana</i>	Sugar pine	A	A	A	1,320
<i>Pinus ponderosa</i>	Ponderosa(yellow) pine	B	D	A	50
<i>Quercus chrysolepsis</i>	Black oak		D	A-B	-
<i>Quercus kelloggii</i>		C	D	A-B	10
<i>Sequoiadendron giganteum</i>	Giant sequoia	A	A	B-C	23,730
<b>TOTAL</b>					27,000

**Fre.** FREQUENCY (Presence in number of polygons) Jones and Stokes 1994

- A Most Common
- B Frequent
- C Less Common

**Gap** GAP - initial findings of relative abundance for trees in gaps being studied by Athena Demtry. May need to be updated following 1995 analysis of gaps by Athena Demetry.

- A Most Common
- B Frequent
- C Less Common
- D Infrequent

**Prp.** PROPAGATION - relative ease of propagation

- A Easy to propagate
- B Moderate to propagate
- C Difficult to propagate

**Quantity** Estimate from gap study, plus 20%.



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