

Chapter 3 - Part 2: Affected Environment and Environmental Consequences

CULTURAL RESOURCES

HISTORIC STRUCTURES

Affected Environment

The cultural resources area of potential effect (APE) is presented in figure 3-18, and includes the combined boundaries of the Mariposa Grove and South Entrance Station historic districts, and the individually listed Mariposa Grove Museum. The Mariposa Grove Historic District includes the approximately 4-square-mile area described in the original 1864 Yosemite Grant and includes the addition of the Mariposa Grove Road between the western grant boundary and the South Entrance Station Historic District (NPS 2004b, 2012c; California Office of Historic Preservation 2013). The Mariposa Grove Historic District also encompasses the Mariposa Grove Archeological District (see separate discussion under the Archeology section in this chapter). The South Entrance Station Historic District includes “the cleared area for the housing unit on the north side of Wawona Road and the area in the vicinity of the T-shaped intersection of the Wawona Road and Wawona Road, sufficient to include the comfort station and check station” (NPS 2004c). The Mariposa Grove and the South Entrance Station historic districts were previously determined eligible for listing in the National Register (Hart 1975; NPS 2004b and 2004c), and the expansion of the Mariposa Grove district boundary to include Mariposa Grove Road received concurrence from the California State Historic Preservation Officer (SHPO) in February 2013.

Building upon the initial listing on the Mariposa Grove Museum in the National Register (Hart 1975), the entire Grove was determined eligible for listing in the National Register as a historic district (NPS 2004b). Additional information, including a description of the setting, history, important characteristics, and National Register status and eligibility of the Mariposa Grove Historic District is provided in the Mariposa Grove Historic District subsection below.

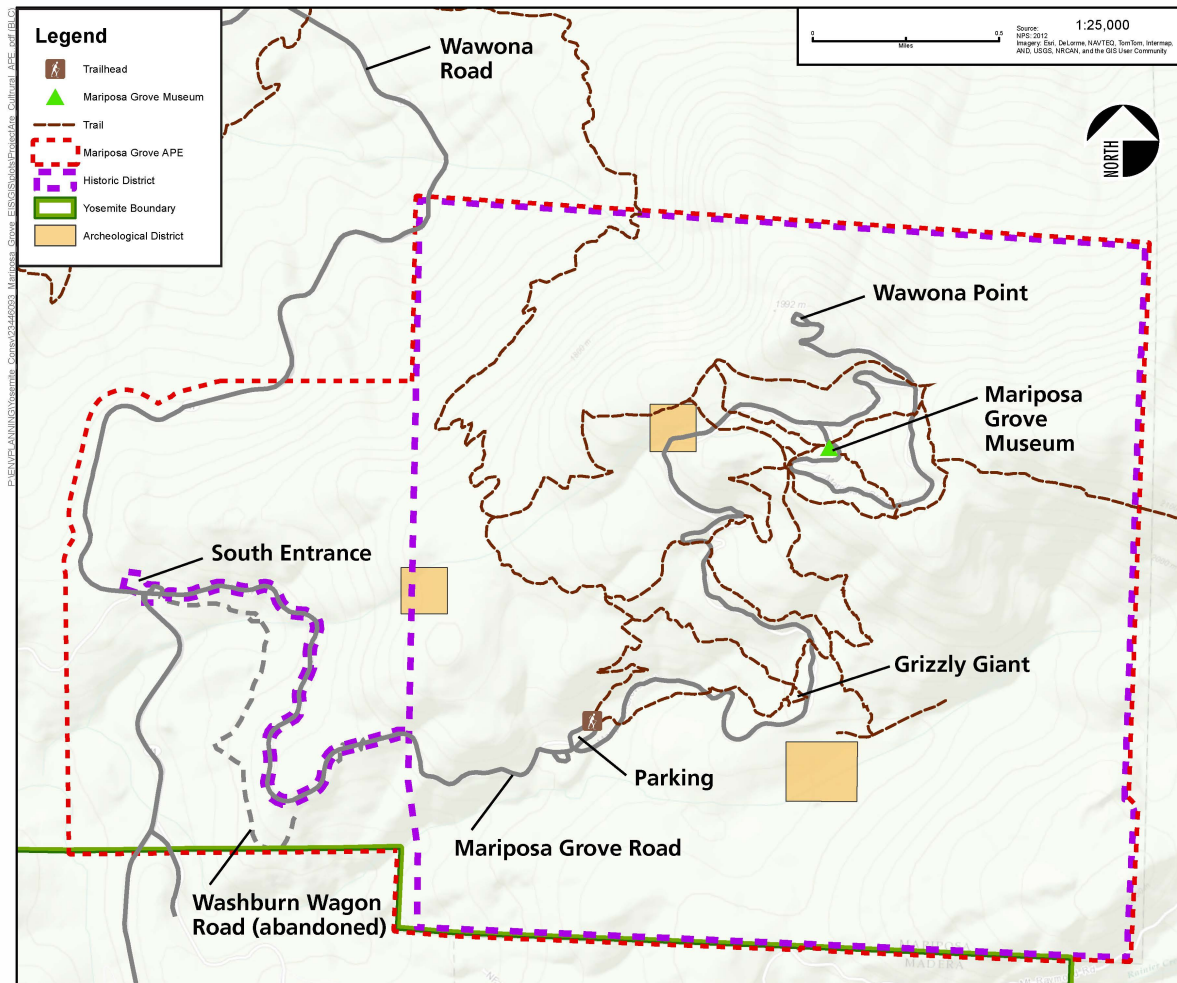


Figure 3-18 – Cultural Resources Area of Potential Effects

Note: The Mariposa Grove Historic District Boundary encompasses the Mariposa Grove Archeological District resources.

The Mariposa Grove and Yosemite Valley were the first public lands in American history set aside for the preservation of its natural and scenic values (Kirk and Palmer 2004; Greene 1987; NPS 2004b). In 1864, Congress passed landmark legislation to preserve Yosemite Valley and the Mariposa Big Tree Grove (Mariposa Grove of Giant Sequoias) (13 Stat. 325). This legislation granted the land to the state of California to “be held for public use, resort, and recreation” to be “inalienable for all time.”



Figure 3-19 – Mariposa Grove Road in Upper Grove Area

The State of California accepted the property in 1866, establishing the first state park and beginning the California State Park System, and state parks nationwide (Greene 1987). In the fall of 1890, Congress established Yosemite National Park (26 Stat. 650). The act excluded Yosemite Valley and the Mariposa Big Tree Grove, leaving them under the jurisdiction of the state of California. A Joint Resolution of Congress in June 1906 accepted the transfer of Yosemite Valley and the Mariposa Big Tree Grove from the state of California to the federal government, subject to the provisions in the 1890 act.

The management of the Grove through the years demonstrates a long tradition of balancing visitor use and nature. The State of California, and subsequently the United States Army and the NPS, have managed the Grove to achieve the dual—and sometimes conflicting—objectives of preservation and access. The Sierra Club, which was established in 1892, also influenced management of the Grove. In the early 1900s, a consortium of landscape architects, architects, and engineers led by Sierra Club President John Muir conceived a cohesive landscape design for the Mariposa Grove to fulfill the demands for national park development, while preserving the notable natural qualities (McClelland 1993). The intention was to maintain the natural quality of the park as best as possible while also providing infrastructure for lodging, camping, and supplies for park visitors. These objectives formed the foundation of future park policy and evolved into the creation of park development outlines and general development plans (McClelland 1993). Continued visitation to the Mariposa Grove of Giant Sequoias in increasing numbers has resulted in the construction and maintenance of roads and trails throughout the Grove. Increased visitation over the years also raised concerns over possible negative impacts on the trees and led to the decision in 1969 to prohibit private vehicles from entering the upper Grove area. Lodges and campgrounds also have been removed from the Grove to reduce visitor impact. The Mariposa Grove Museum, in the upper Grove area, continues to serve as a seasonal interpretive center for the Grove, and has been listed in the National Register since 1978 (figure 3-20). Additional information, including a description of the setting, history, and important characteristics of the museum, is included in the Mariposa Grove Museum subsection below.



Figure 3-20 – Mariposa Grove Museum

The South Entrance Station Historic District was determined eligible for listing in the National Register in 2004 for “expressing cultural values” through its architecture and landscape architecture (NPS 2004c). In 1932, President Herbert Hoover issued a proclamation to add 8,785 acres of the Wawona Basin to Yosemite National Park, which included lands surrounding the South Entrance area. A year earlier, Congress had approved this addition in the Interior Department Appropriations Act (Proclamation 2005, Aug. 13, 1932; Act of Feb. 14, 1931, 46 Stat. 1115, 1154). One of the reasons for approving the acquisition was to protect lands adjacent to Wawona Road, a road constructed in 1875 as a toll road to connect the Wawona Hotel area with Yosemite Valley, 30 miles to the northwest. Reconstruction of Wawona Road began in 1929, and was largely completed by 1932. The Mariposa Grove Road, between South Entrance and the Grove, was built in 1879 and reconstructed by 1933. The road was paved to facilitate snow removal plow and provide year-round access. In 1934, the South Entrance area was realigned, and new parking was added.

The number of visitors entering Yosemite National Park through the South Entrance station in 1933 exceeded 42,000, second only to the more than 197,000 visitors who entered the park via the Arch Rock Entrance station that year. A lack of funding necessitated temporary use of a checking kiosk that had been relocated to South Entrance from Alder Creek. By July 1934, federal relief funds became available to construct the South Entrance checking and comfort stations, as well as nearby housing for the rangers employed in the Wawona District of the park. A sanitary sewer system also was constructed for the South Entrance between 1933 and 1934. By 1937, a pipeline from Mariposa Grove supplemented the South Entrance Station water system, which resolved issues with insufficient water flow (NPS 2004b). Additional information, including a description of the setting, history, important characteristics, as well as the National Register status and eligibility of the South Entrance Station Historic District, is provided in the ‘South Entrance Setting’ subsection below.

Mariposa Grove Setting

The setting for the Mariposa Grove of Giant Sequoias encompasses the Mariposa Grove Historic District and the Mariposa Grove Museum, which is individually listed in the National Register and eligible as a contributor to the National Register-eligible Mariposa Grove Historic District. The following discussion reviews the setting, history, important characteristics, and National Register status and eligibility of these resources

Mariposa Grove Historic District

The Mariposa Grove Historic District was determined eligible for listing in the National Register in 2004 per the *Mariposa Grove Cultural Landscape Inventory* prepared by the NPS Pacific West Office, which received SHPO concurrence in August 2004 (NPS 2004b). In February 2013, the expansion of the Mariposa Grove Historic District boundary to include the length of the Mariposa Grove Road between South Entrance and the lower Grove area received concurrence from the California State Historic Preservation Officer (NPS 2004b, SHPO 2013). In addition, abandoned roads within the Mariposa Grove were added as contributing elements, and detailed site plans clearly illustrating the extent and location of the district’s contributing and noncontributing resources were provided (NPS 2012b).

The district is located on the western slope of the Sierra Nevada, approximately 2 miles from the South Entrance to Yosemite National Park. When the district was determined eligible for listing in the National Register in 2004, the period of significance was defined as 1864 (when the land was withdrawn from the public domain) to 1950; however, many of the historic features date to the 1930s. The district is considered significant under National Register Criterion A for its association with the “Conservation” and “Recreation” areas of significance. Specifically, the Grove embodies the birth of the American ideal that the best use of lands distinguished for their great scenic beauty is preservation, and that the best choice an enlightened federal government can make is to reserve such lands for all time for the enjoyment of the people. The district also is considered significant under National Register Criterion C under the “Architecture” and “Landscape Architecture” areas of significance. The design of the museum and the comfort station are representative of Park Rustic architecture, and Wawona Point embodies the work of the park service’s early “naturalistic” landscape design, which successfully balanced the need for development with the need to preserve the natural landscape. The Mariposa Grove Historic District is in fair condition and, with a few exceptions, retains its historical integrity of setting and design (NPS 2004b).

The most important landscape characteristics associated with the Grove are the natural systems and features of the district, and the site-specific ecology that continues to sustain the giant sequoias. Superimposed upon the natural landscape is a transportation system that represents a continuum of use dating to the nineteenth century, reflecting the presence of American Indians, entrepreneurs, the State of California, the U.S. Army, and the NPS in the area, and contributing buildings and structures that are collectively representative of NPS landscape design of the 1930s, much of it implemented by the Civilian Conservation Corps (figures 3-20 through 3-22).



Figure 3-21 – Wawona Point



Figure 3-22 – Comfort Station in Upper Grove

Contributing Elements of the Mariposa Grove Historic District:

- Mariposa Grove Comfort Station (WA04726) – A log building built in 1931 in the Park Rustic style and consisting of men’s and women’s lavatories, located in the upper part of the Grove. The building is an excellent example of the application of site-specific materials standards to a generally accepted “standard plan” building (NPS 2004b).
- Mariposa Grove Museum (WA04725) – A one-story, rectangular log building built in 1930 and rebuilt in 1980 in the Park Rustic style. The building is unique within the park service system because it was designed to mirror the design of the previous buildings at the site (Hart 1975 and NPS 2004b). Refer to the subsection ‘Mariposa Grove Museum’ below for additional descriptive information as an individually listed property.
- Mariposa Grove Road – The road that extends from its intersection with Wawona Road at South Entrance into the western edge of the land grant boundary all the way to Wawona Point). The road was constructed in 1931 and 1932 (NPS 2012c) and paved in 1933 and 1934.
- Other Roads – Within the Grove, there is a system of one- and two-lane historic paved roads. These additional roads include a spur road to the former construction camp and a one-way loop road in the upper Grove area that begins near Wawona Point and extends to the museum. The loop road was built in 1931/32 and was paved in 1933/34 to allow for year-round use. A spur road (non-contributing), that extends from the Mariposa Grove Road in the vicinity of the Grizzly Giant to the site of a former construction camp, is all that remains of the camp which was built circa 1931 and since demolished. (NPS 2004b and 2012).

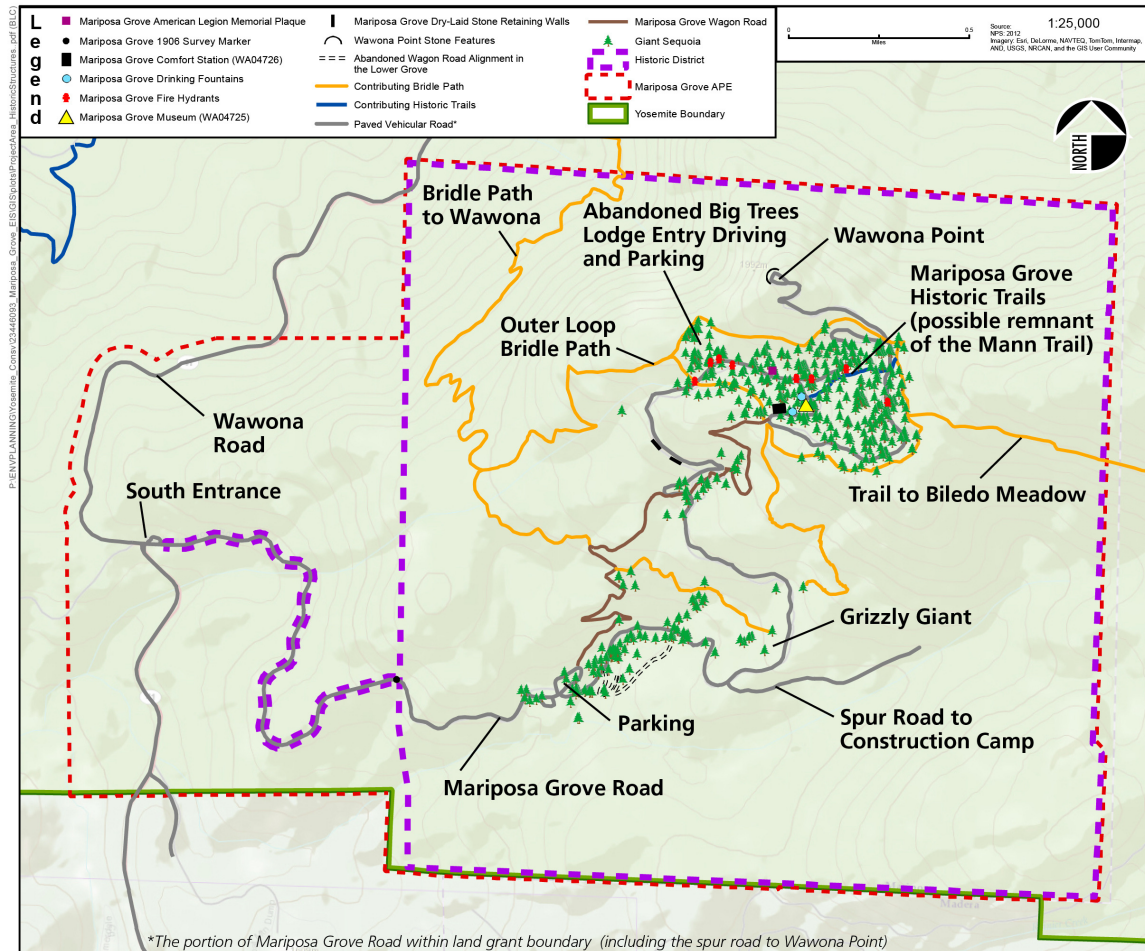


Figure 3-23 – Mariposa Grove Historic District

- Mariposa Grove Dry-Laid Stone Retaining Walls – Two sections of dry-laid stone retaining wall were built circa 1925 and incorporated into the road system between the Clothespin Tree and the Mariposa Tree (NPS 2004b).
- Mariposa Grove Bridle Paths – A group of circulation paths including the bridle path to Wawona, the outer loop bridle path, and the trail to Biledo Meadow. The bridle path to Wawona is a 3- to 6-foot-wide, natural-surface path built in 1933 and 1934 that enters the district from the north and ascends near Sunset Point, where it connects with the outer loop bridle path. The outer loop bridle path, a 3-to-6-foot-wide, natural-surface path built in 1933 and 1934, encircles the upper portion of the Grove. The trail to Biledo Meadow, built in 1931 and 1932, is a 6-foot-wide trail constructed during the installation of the water system for the upper Grove, and extends from the vicinity of the fallen Wawona Tunnel Tree east to the outtake point in Biledo Meadow (NPS 2004b).
- Mariposa Grove Historic Trail – A possible remnant of the Mann Trail, dating to 1870, that extends from the vicinity of the museum east to meet with the northeast section of the Mariposa Grove Road in the upper Grove area (NPS 2004b and 2012).

- Mariposa Grove Wagon Road – A one-way wagon road abandoned for vehicle use in 1925, and currently used as pedestrian path. The path dates from 1879, 1892, and 1925, and passes in the vicinity of the giant sequoia Diamond Group (southwest of the Comfort Station) and descends southwest past the Clothespin Tree, continuing to the lower Grove parking area via series of switchbacks (NPS 2004b).
- Abandoned Roads within Mariposa Grove – Abandoned roads in the Grove include the Big Trees Lodge entry drive and parking area, constructed in 1932, and a wagon road alignment in the lower Grove area, dating to 1879, 1897, and 1925. The wagon road alignment was abandoned in the mid-1930s when the road was rerouted away from the Grizzly Giant to reduce damage to the tree (NPS 2012c).
- Wawona Point Stone Features – A system of stone retaining walls, stairs, and overlook platforms at Wawona Point Lookout built in 1931 of mortared, battered, and rubble masonry (NPS 2004b).
- Mariposa Grove 1906 Survey Marker – A brass-cap boundary marker, dating to the 1906 survey of the grant boundary. The marker is adjacent to the north side of the Mariposa Grove Road next to a large granite boulder above the road (NPS 2004b).
- Mariposa Grove Drinking Fountains – Two drinking fountains near the Mariposa Grove Museum, constructed in 1931, consist of small basins atop pedestals of granite boulders with granite slab bases (NPS 2004b).
- Mariposa Grove American Legion Memorial Plaque – A 1921 plaque mounted on a large granite boulder, set between the American Legion Tree and the edge of the road, that bears the American Legion seal and the words, “To the unknown dead of the World War/the American Legion, Department of California/Dedicates this Tree/August 26, 1921/Presented by Yosemite Post 258” (NPS 2004b).
- Mariposa Grove Fire Hydrants – The fire hydrants of the upper Grove area are red miniature versions of a standard city hydrant that were installed in 1931, and are located in the upper Grove area (NPS 2004b).

Overall, circulation is an important cultural landscape characteristic of the Mariposa Grove Historic District, and many of the roads and trails within the district boundaries are contributing elements of the district. Within the Grove, the Mariposa Grove Road materials and routes were poorly documented prior to 1925, though together they were described as a “vernacular” wagon road. In 1925, the NPS made minor modifications to the roads to create a 25-foot-wide, oiled grade in the two-way segments, and a 10-foot-wide, oiled travel-way in the one-way loop in the upper Grove area. The improvements were intended to address drainage problems and protect the roots of the trees in the upper Grove area. In the 1930s, the Mariposa Grove Road was first paved and slightly realigned in two locations: near the base of the Grizzly Giant to reroute the road away from the roots, and in the lower Grove area to provide better access to the Big Trees Lodge. The differences in the width of the road between the two-way and one-way segments reflect the historical pattern of development during the 1930s. The roads have been regularly repaved, and some sections have been reconstructed as part of routine maintenance. Modifications to the roads made during and prior to the 1930s are considered character-defining features of the historic district.

The following are the character-defining features of the Mariposa Grove Historic District:

- Giant Sequoias –Mariposa Grove consists of approximately 500 mature giant sequoia trees divided into two clusters generally referred to as the upper and lower Grove areas, which are significant collectively. Three trees are distinct because of their size or character: California Tunnel Tree, Grizzly Giant, and the fallen Wawona Tunnel Tree. The California Tunnel Tree and the Wawona Tunnel Tree have been culturally modified. The Grizzly Giant features prominently in the iconography of the Grove (NPS 2004b).
- Views and Vistas – Several important views, including first view of the Sentinels, from the west, view of lands outside the Grove from Wawona Point, and vista of the Grizzly Giant, are character-defining features of the district. The first view of the Sentinels is the first glimpse of the big trees that one encounters when entering the Grove on the Mariposa Grove Road from the west. Wawona Point is the only formally designed overlook within the Grove, completed in 1932, with extensive views over the Wawona basin and the South Fork of the Merced River, with additional panoramas of the east and south (now somewhat obscured by forest canopy). The vista of the Grizzly Giant is an interior Grove view of the Grizzly Giant looking down the access trail from the current commercial tram stop east of the tree (NPS 2004b).
- Native Roadside Landscaping – Roadside landscaping, consisting of plantings of native species by Civilian Conservation Corps crews, was accomplished along the road corridor in 1934 and contributes to the natural setting of the road within the Grove. There are no overhanging banks, no protruding root systems or stumps, and the slopes adjacent to the road have been reshaped to conform to the surrounding scenery.

The Mariposa Grove Historic District retains the following landscape characteristics: natural systems and features, vegetation, spatial organization, views and vistas, circulation, and buildings/structures. Clustering, or the grouping of buildings within the landscape, was once an important characteristic of the later, designed landscape of the Grove. However, the principal building clusters have been removed or altered and no longer retain historic integrity. For the most part, these changes are due to the elimination of some land uses, such as overnight guest accommodations, from the Grove. Similarly, the Grove once contained a wealth of small-scale features, including name signs affixed to certain trees and log benches constructed by the Civilian Conservation Corps. The majority of the tree name signs have been removed (NPS 2004b).

Mariposa Grove Museum

The Mariposa Grove Museum, constructed in 1930 and rebuilt in 1980, is in the upper Grove area within the historic district (figure 3-20). The building was designed to mirror the design of the previous buildings at the site (Hart 1975, NPS 2004b). The museum was individually listed in the National Register in 1978 (NPS 2004b), and also is considered eligible as a contributor to the Mariposa Grove Historic District under National Register Criteria A and C for its regional significance in the categories of exploration/settlement and social/humanitarian, and for its local significance in architecture. The museum is a one-story log building situated in the upper Grove area. The periods of significance for this property are 1864, 1881, and 1930, which correlate to the years when major construction occurred (Hart 1975 and NPS 2004b).

The museum building continues the tradition established at its location by Galen Clark and the State of California. Galen Clark, the first appointed guardian of the Grove, built the first shelter at the location in 1864 as an office/information center to assist visitors. In 1881, the State of California replaced the shelter with a one-room cabin “for the comfort and convenience of the visitor.” In 1930, the NPS replaced the unstable log cabin with a new museum building, which was described as a “guardian’s hospice”, and included exhibits that were devoted exclusively to the story of the giant sequoia. The building and its furnishings were designed to harmonize with the surrounding Grove. The Mariposa Grove Museum continues to function as an interpretive center as well as a rest area for visitors, and retains integrity of location and use initiated with the 1864 information center. It retains its 1930 historic integrity of design and workmanship (Hart 1975, NPS 2004b).

South Entrance Setting

The South Entrance Station Historic District encompasses the South Entrance site, and was determined eligible for listing in the National Register in 2004 (NPS 2004c). The district is eligible for listing in the National Register at the local level under Criterion C for embodying the theme of “expressing cultural values” through its architecture and landscape architecture. The South Entrance Station Historic District, depicted in figure 3-24, consists of a cluster of four historic buildings at the intersection of the Wawona Road and the Mariposa Grove Road: the ranger residence, a garage, a comfort station, and a checking station, all constructed in the early 1930s. The site is in a clearing of about 2 acres surrounded by steep forested slopes.

The period of significance for this property spans the years from 1934 through 1938, the era of public works. In 1934, the South Entrance area was realigned, and parking was added. Associated land uses include a housing area for NPS personnel, a checking station for visitors entering and leaving the park, a comfort station for the use of visitors and park employees, and a garage/service area. The housing area and garage are on the north side of Wawona Road, and the checking station and comfort station are south of the road. This entrance is the principal entry point for people entering the park via Wawona Road from the south. The historic district is in fair condition and, with a few exceptions, retains historical integrity (NPS 2004c).

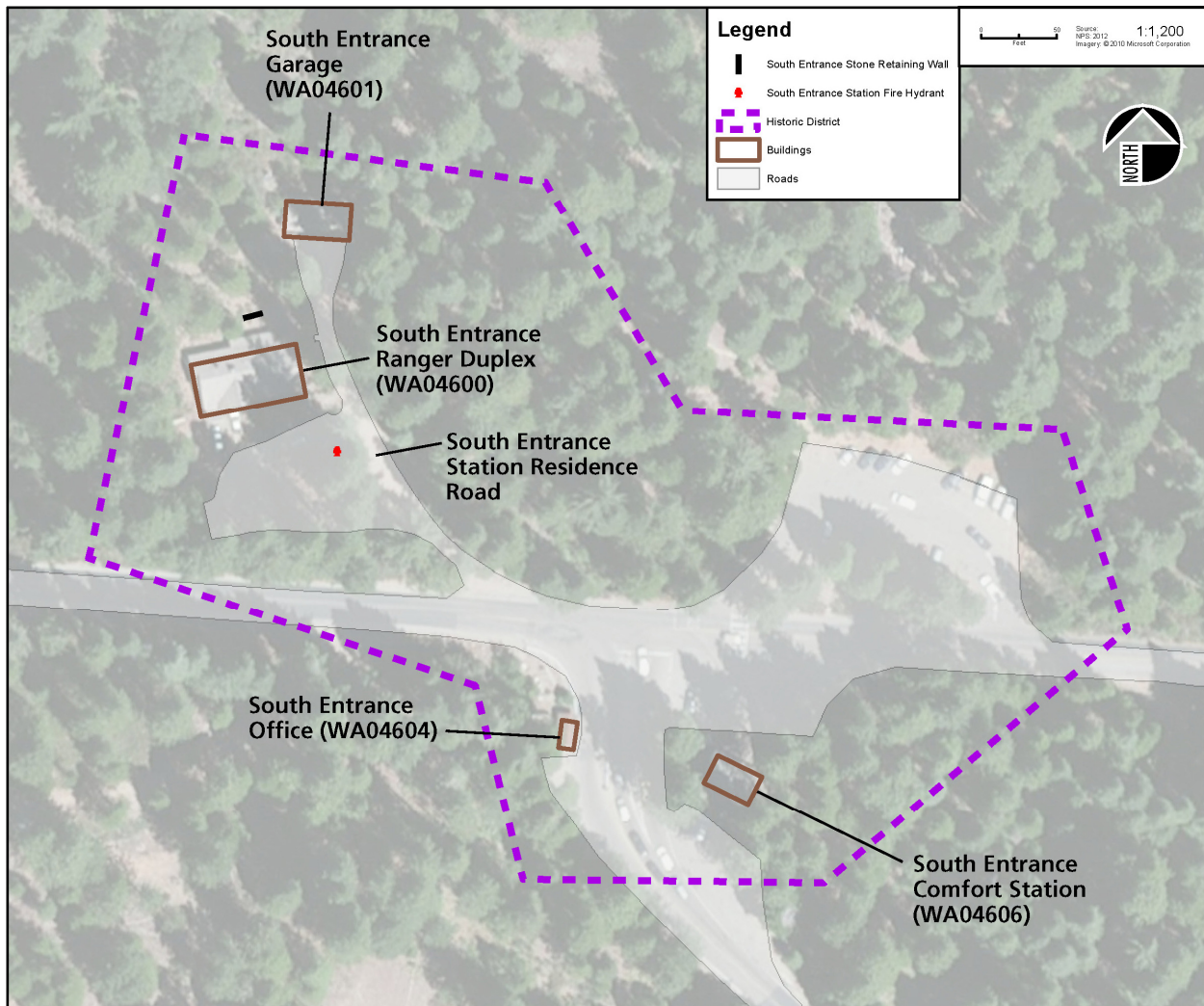


Figure 3-24 – South Entrance Station Historic District

Contributing Elements of the South Entrance Historic District

- South Entrance Office (WA04604) – A 1934 checking station built in the Park Rustic style. It has been remodeled to function as an office, resulting in the removal of some of the architectural details associated with its original function.
- South Entrance Comfort Station (WA04606) – A 1934 Park Rustic style building containing lavatories (figure 3-25).
- South Entrance Ranger Duplex (WA04600) – The 1934 Park Rustic style living quarters (dormitory) for Wawona District park rangers stationed at South Entrance.



Figure 3-25 – South Entrance Comfort Station

- South Entrance Garage (WA04601) – A 1934 garage constructed adjacent to the ranger duplex and built in the Park Rustic style.
- South Entrance Stone Retaining Wall – A stone retaining wall at the rear of the ranger duplex, designed to stabilize the cut in the hill slope north of the building.
- South Entrance Station Residence Road – A one-lane gravel road that leads from Wawona Road past the east side of the ranger duplex to the entrance of the garage that was constructed in 1934. The road has been altered by the addition of a loop road that branches from this main access road to provide access to the front of the ranger duplex.
- South Entrance Station Fire Hydrant – A historic-period fire hydrant in the vicinity of the Ranger Duplex that represents the only above-ground evidence of the South Entrance water system in direct proximity to the buildings.

The contributing buildings and structures were all built during the same time period, in a similar style, and possess a common association with development of the park's South Entrance area. The four historic buildings represent a unique style of Park Rustic architecture that was refined in the national parks during the early years of the NPS, and primarily constructed with native materials intended to blend harmoniously with their surroundings.

In addition to the contributing elements of the district, a lone giant sequoia, planted near the northwest corner of the comfort station after completion of the South Entrance station in 1934, is considered a character-defining element of the historic district landscape.

Circulation was an important landscape characteristic when the South Entrance station was developed. However, circulation features have lost their historical integrity because of multiple alterations to Wawona Road and the park entrance station infrastructure, and attributes of the location are not considered character-defining. Although the T configuration of the intersection has been retained, the number of lanes for Wawona Road has increased, and the widening of Wawona Road resulted in the loss of some historical landscape elements, including the original concrete-curbed traffic islands that directed the vehicles through the checking station and parking areas north and south of the comfort station. In general, the historic district retains integrity of location and setting, and the buildings and structures possess integrity of materials, workmanship, and design (NPS 2004c).

Environmental Consequences

Effects Assessment Methodology. Potential effects of the Mariposa Grove restoration project alternatives on historic buildings, structures, and cultural landscapes were analyzed qualitatively under Section 106 of the NHPA, in accordance with 36 Code of Federal Regulations (CFR) 800.5(a)(1) criteria for determining adverse effects, based on modifications that would be made to character-defining features (i.e. characteristics that qualify the buildings, structures, or landscapes for inclusion in the National Register).

The Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Treatment of Cultural Landscapes* (NPS 1996) include factors to consider, such as change and continuity, use, and management and maintenance. Cultural landscapes are dynamic, and preservation seeks to balance continuity with change. Current and proposed use can affect integrity and current conditions. Maintenance and management of a cultural landscape can result in a cumulative adverse effect, or well-conceived maintenance can sustain character-defining features over a long period of time.

National Historic Preservation Act Methods for Assessing Effect. The cultural resources investigations the assessment of potential effects of the project alternatives were undertaken in accordance with the NHPA Section 106 implementing regulations, 36 CFR 800, Protection of Historic Properties. As amended, Section 106 of the NHPA requires federal agencies with either direct or indirect jurisdiction over a proposed undertaking to take into account the effect of the undertaking on historic properties. Pursuant to Director's Order 12 (sections 2.14(6)(3), 6.2 F, and 6.3 F and Appendix 3); 40 CFR 1508.7, 1508.8, and 1508.27; and 36 CFR 800.8, effect intensity, duration, context, and type, as they relate to historic properties, are determined using the criteria established in 36 CFR Part 800. Per 36 CFR 800.5(a)(1), an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Compliance with Section 106 calls for implementation of a four-step process that includes consultation with appropriate parties (36 CFR 800.3); identifying historic properties in the area of potential effect of an undertaking (36 CFR 800.4); assessing adverse effects of the undertaking on historic properties within the area of potential effect (36 CFR 800.5); and resolving any adverse effects (36 CFR 800.6). These steps involve a range of activities, such as defining the undertaking, identifying the proper consulting parties (e.g., SHPO and American Indian tribes and groups), delineating the APE, identifying and evaluating properties in the APE, applying the effects criteria, and resolving any adverse effects.

Under this four-step process, there are three possible effects determinations:

No Historic Properties Affected – A “no historic properties affected” determination indicates that no historic properties are in the APE, or that there are historic properties in the APE, but the undertaking would not alter the characteristics that qualify the historic property for inclusion in or eligibility for the National Register.

No Adverse Effect – A “no adverse effect” determination indicates that there would be an effect on the historic property by the undertaking, but the effect does not meet the criteria of adverse effect in 36 CFR 800.5(a)(1) and would not alter any of the characteristics that make the property eligible for listing in the National Register in a manner that would diminish the integrity of the historic property.

Adverse Effect – An adverse effect indicates that the undertaking would alter, directly or indirectly, any of the characteristics that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property. Adverse effects may be resolved through development of a project-specific Memorandum of Agreement (MOA) or a Programmatic Agreement among the project proponent (NPS in this case), the SHPO, the Advisory Council on Historic Preservation (ACHP), and other consulting or concurring parties, such as American Indian tribes (36 CFR 800.6). The agreement would specify the mitigating actions that must be taken to resolve the adverse effects, and the implementation and documentation protocols to be followed. The agreement must be executed by all required signatories (i.e. consulting parties) before implementation of a proposed action can be initiated.

Alternative 1: No Action

Under Alternative 1, current buildings and infrastructure, concessioner services (i.e. gift shop and commercial tram) and maintenance, and park management would remain as is (see figures 2-1 through 2-4). No infrastructure improvement, ecological restoration, changes to visitor services, or accessibility upgrades would be implemented.

Operations-related Impacts. Effects on historic buildings, structures, and cultural landscapes under current and predicted future operations could occur as a result of visitor use and routine maintenance and repair. With continuing adherence to the Secretary of the Interior's *Standards for the Treatment of Historic Properties*, routine maintenance activities would cause no physical destruction or damage.

Impact Significance and Determination of Effect. Routine maintenance and repairs to historic buildings and structures within the Mariposa Grove and South Entrance Station historic districts would be implemented in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties* to avoid adverse effects.

Conclusion. Under Alternative 1, existing structures, buildings, and infrastructure at the South Entrance and in the lower and upper portions of the Grove would continue to serve their respective current functions and operations for the foreseeable future. No construction-related impacts would occur. Continued routine maintenance and repair of the museum, ranger residence, comfort stations, and other buildings and structures would be conducted in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties* to avoid adverse effects. Overall, Alternative 1 is expected to have no adverse effect on the Mariposa Grove Historic District, South Entrance Historic District, and Mariposa Grove Museum.

Cumulative Impacts. The cumulative effects on historic structures discussed in this section are based on an analysis of past, present, and reasonably foreseeable future actions in the Mariposa Grove region in conjunction with the potential effects of Alternative 1 (No Action). The Mariposa Grove Historic District (Determined Eligible, 2004), the Mariposa Grove Museum (National Register, 1978), and the South Entrance Station Historic District (Determined Eligible 2004) are the historic properties within the Mariposa Grove region.

A number of past projects took place in the area. In 1980, the Museum building went through significant repairs to replace logs and repair the structure and the building remains an interpretive facility for the Mariposa Grove. Repair work for the septic system at South Entrance has been ongoing since 2004. Work began in 2012 to relocate and replace the non-historic kiosks at the South Entrance. Within the Grove, new communications equipment was installed at Wawona Point in 2011. The NPS installed new interpretive and directional signs, starting in 2011. In addition, split-rail wood fences were installed in high use areas to direct the public and protect the surface roots of the giant sequoias. Appendix B describes these projects in more detail.

During project implementation of these past projects, the NPS avoided adverse effects, or otherwise carried out appropriate mitigations to minimize effects on historic resources in accordance with the park's 1999 Programmatic Agreement (*1999 Programmatic Agreement Between the National Park Service at Yosemite, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Planning, Design Construction Operations and Maintenance, Yosemite National Park, California*). The Scenic Vista Management Plan/EA (2010), which is not fully implemented, and the Wilderness Stewardship Plan (in progress) would implement actions consistent with the standard four-step process outlined in 36 CFR Part 800, Protection of Historic Properties, as described in the Effects Assessment Methodology for Historic Structures and Landscapes described earlier in this section. In the future, the NPS will rehabilitate access to the historic comfort stations at South Entrance and the upper Grove area to enhance accessibility. There are no additional, reasonably foreseeable plans and projects that may contribute to an adverse effect on historic properties in the Mariposa Grove and South Entrance area. Overall, past, present, and future plans and projects would have no adverse effect on historic structures and landscapes.

There would be no change in the treatment and management of historic buildings, structures, and cultural landscape resources as a result of Alternative 1 (No Action). The effects from past, ongoing, and potential future actions in combination with those of Alternative 1 would continue to result in no adverse effects on historic structures and landscapes in the Mariposa Grove area.

Alternative 2: South Entrance Hub (Preferred Alternative)

Alternative 2, the preferred alternative, would

- remove the non-contributing commercial tram staging area and gift shop
- substantially reduce the non-contributing in-Grove parking, and relocate primary visitor parking to the proposed transit hub at South Entrance
- discontinue commercial tram operations
- rehabilitate historic features, including repair of stone work at Wawona Point
- convert segments of the contributing road within the Grove to pedestrian trails
- rehabilitate a segment of the abandoned Washburn Road for use as a pedestrian trail
- construct a new trail segment from the picnic area to the lower Grove area
- make accessibility improvements to Grove trails
- improve path of travel accessibility to the upper Grove and South Entrance comfort stations
- install a new septic system/leach field at South Entrance
- refurbish the septic system and leach field in the upper Grove area
- construct a new septic/system leach field in the lower Grove area, or installation of a wastewater pipeline, within the right of way of Mariposa Grove Road, from the lower Grove area to the South Entrance leach field (may require a lift station near South Entrance)
- reconfigure the South Entrance station parking and other non-contributing infrastructure, and reconfigure the Wawona Road/Mariposa Grove Road intersection.

Certain actions under Alternative 2 would rehabilitate historic structures or features that contribute to the significance of the South Entrance Station and Mariposa Grove historic districts. The Secretary of the Interior's *Standards for the Treatment of Historic Properties* define rehabilitation as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

Historic rehabilitation and ecological restoration at Wawona Point would be components of this alternative. Historic rehabilitation of the Wawona Point overlook would include repointing historic rockwork, rebuilding historic steps, restoring historic pathways, replacing existing railing with code-compliant safety railing, removing excess pavement, and revegetation that could include screening of incompatible, modern communications equipment.

Paths of travel to the historic comfort stations at the upper Grove area and at South Entrance would be improved to better meet ABAAS requirements. Any modification of the paths of travel would be completed in a historically compatible manner that would not detract from the historic setting or feeling. Rehabilitation of the historic comfort stations, which is not included in this project, may be

undertaken in the future as a separate project as funding becomes available and would be addressed through a separate compliance process, as needed.

Ecological restoration actions such as improvement of hydrologic flow through road and trail modifications, repair and replacement of culverts, and replacement of leaking water lines; project-specific prescribed fire and hazardous fuel reduction treatments; reclamation of giant sequoia habitat through reduction of both non-contributing and contributing hardscape features; and soil decompaction; would be components of this alternative. Actions that remove incompatible buildings and structures from the lower part of Mariposa Grove and ecologically restore giant sequoia habitat would serve to restore giant sequoia groves that contribute to the Mariposa Grove Historic District.

Proposed modifications to the extension of the Mariposa Grove Road within the Grove, which is a circulation feature that contributes to the Mariposa Grove Historic District, would alter the historic design, materials, and workmanship of the historic paved road. These modifications include road realignment and installation of a new drainage crossing structure at the Sentinels, replacement of asphalt pavement with a hardened permeable surface, narrowing of the existing roadbed, removal of a road segment from wetlands in the lower Grove area, and conversion of road segments to pedestrian trails.

The parking lot to be relocated from the lower Grove area to South Entrance and the new visitor services would overlap the eastern boundary of the South Entrance Station Historic District, and would include modifications to Mariposa Grove Road for ingress/egress into the new parking facility and a new shuttle stop, and conversion of the existing overflow parking lot for bus turn-around. A new roundabout could be constructed west of the contributing office (former check station) building, replacing the existing T-intersection situated east of the office at the intersection of Wawona Road and Mariposa Grove Road. This intersection reconfiguration would be implemented if, based on monitoring of intersection capacity following relocation of the entrance kiosks, which was recently completed under a separate project, traffic volumes and flow result in back-ups to the new kiosks on a regular basis.

Construction- and Restoration-related Impacts. Actions under Alternative 2 that have the potential to affect historic buildings, structures, and cultural landscapes, and the nature of the effects, are summarized as follows:

1. *Reconfiguration of Intersection at South Entrance.* The existing T-intersection of Wawona Road and Mariposa Grove Road could be reconfigured and replaced by a roundabout, if future traffic conditions warrant. The existing intersection is east of the South Entrance office building; the proposed roundabout would be situated west of the office building. The office building, which is a contributing element of the South Entrance Historic District, would not be affected by an intersection reconfiguration.

Reconfiguration of the intersection would affect the setting and intersection design within the South Entrance Historic District. However, the historic circulation features in this area of the district are no longer extant, and the proposed changes represent minor alterations to the setting of the district overall. The redesign of the circulation features would not have an adverse effect on the historic district. In addition, the historical integrity of the office building would not be affected because no alterations to this contributing building would occur as a result of the road alterations. Therefore, there would be **no adverse effect** on the South Entrance Station Historic District from the proposed intersection reconfiguration.

2. *Construction of South Entrance Hub.* The new transit hub would include construction of a 295-space parking lot, a shuttle boarding and tour bus transfer area (including turnouts from Mariposa Grove Road), a bus turn-around area, visitor contact area, accessible comfort station and septic system/leach field, and a new pedestrian trailhead on the historic Washburn Wagon Road. Construction of the transit hub at South Entrance would occur partially within the southeastern part of the South Entrance Station Historic District (figure 3-24), and within the Mariposa Grove Historic District (i.e. at new turnouts from Mariposa Grove Road, a contributing element of that district).

The modification of roads within the historic districts would affect the district settings, but it would not introduce a new use to the area. The new parking and visitor facilities would be constructed outside the boundaries of both the South Entrance and Mariposa Grove historic districts. The South Entrance vicinity currently is heavily used for parking, shuttle boarding, restrooms, and visitor contact. The introduction of new infrastructure would not require the removal of any of the contributing elements of the South Entrance Historic District, such as the historic buildings and structures, and the turn-offs would not alter the integrity of Mariposa Grove Road location, design, setting, materials, workmanship, feeling, or association. The visual effect of the new transit hub on the South Entrance setting would be minimal and, therefore, construction of a South Entrance Hub and reconfiguration of the road intersection under Alternative 2 would have **no adverse effect** on the Mariposa Grove or South Entrance Station historic districts. The effects of rehabilitating the Washburn Wagon Road for use as a trail are also assessed in the Archeology subsection of this chapter of the *Mariposa Grove FEIS*.

3. *Removal/Replacement of Non-Historic Buildings and Infrastructure in the Lower Grove Area.* The parking lot, vault toilets, gift shop, and tram staging area are all non-contributing features within the Mariposa Grove Historic District. All of these features would be removed from the lower Grove area, and a smaller, accessible comfort station, a septic system and leach field (or a new sewer line from the lower Grove area to the South Entrance leach field within the Mariposa Grove Road right of way), a shuttle boarding/off-season parking area, and a trailhead for new accessible trails would be constructed. These actions would occur within the boundaries of the Mariposa Grove Historic District. Removal of incompatible and non-contributing buildings, structures, and hardscape, and replacement with restored lower Grove giant sequoia habitat and new, historically compatible, less intrusive comfort station and infrastructure are expected to affect the setting of the lower Grove portion of the Mariposa Grove Historic District. However, as these actions would reestablish a level and types of development in the lower Grove area closer to the level of development during the period of significance (i.e. roads, trails, limited parking, and comfort station), they may be considered to have **no adverse effect** on the district. The potential construction of a new wastewater line within the Mariposa Grove Road right of way from the lower Grove area to South Entrance would be below grade, and would have **no adverse effect** on the historic district.
4. *Conversion of Paved Vehicular Road in Lower Grove Area to an Accessible Trail.* An ABAAS-compliant trail would be constructed within the boundaries of the Mariposa Grove Historic District. It may be constructed as an at-grade trail with sections of boardwalk, or entirely as a boardwalk. Where the trail crosses the lower Grove area wetlands along the historic road, the road bed fill would be removed to allow for wetland restoration. An existing rock masonry wall would be removed to construct the boardwalk. Boardwalk construction would place the travel surface higher than the existing road surface, and would include redirecting vehicular traffic (e.g., service vehicles) onto a new bypass road around the lower Grove area. The bypass route would follow an abandoned road alignment. The effect from introduction

of a boardwalk as well as the removal of a segment of the road grade from the wetlands, would affect the integrity of design, materials, and feeling of this portion of the historic roadway. Therefore, this action would have an **adverse effect** on the Mariposa Grove Historic District.

5. *Rehabilitation/Construction of a Pedestrian Trail from South Entrance to the Lower Mariposa Grove Area.* A segment of the abandoned historic Washburn Wagon Road between the new South Entrance Hub and the existing picnic area along Mariposa Grove Road would be rehabilitated for use as a pedestrian trail, and a new trail segment would be constructed south of Mariposa Grove Road from the picnic area to the lower Grove area. The path of the new trail would lie partially within the boundaries of Mariposa Grove Historic District, but would not affect the historic integrity of contributing district features or introduce a new use to the district. The visual effect on the South Entrance Station and Mariposa Grove historic district settings would be minimal, and therefore this action would have **no adverse effect** on either historic district. The effects of rehabilitating the Washburn Wagon Road for use as a trail are also assessed in the Archeology subsection of this chapter of the *Mariposa Grove FEIS*.
6. *Engineered Hydrology and Road Improvements.* Road and drainage modifications within the Mariposa Grove Historic District would be undertaken under Alternative 2 to restore natural hydrologic flows as part of the ecological restoration of giant sequoia habitat. Actions and their potential effects on the historic district are summarized as follows:
 - a. *Culvert Repairs and Replacement.* The culvert repairs and replacement would occur within the boundaries of the Mariposa Grove Historic District. The culverts are not contributing elements of the Mariposa Grove Historic District and are difficult to associate with a particular time within the district period of significance, having been constructed and reconstructed as needed. In general, there are about 60 culverts along the road through the Grove that could be repaired or replaced. Some of the culverts are at the bases of giant sequoias. The culverts vary in construction style, but typically are riprap covered with dirt in rock channels, some with minor rock headwalls. The masonry headwalls are of standard, very simple construction that does not reflect significant engineering design or artistic construction, nor exemplify a design unique to the Civilian Conservation Corps period. Culvert repairs and replacement would be conducted in accordance with the Secretary's Standards for Rehabilitation and would not alter the integrity of the contributing road's location, design, materials, workmanship, feeling, or association. Therefore, culvert repair or replacement would have **no adverse effect** on the Mariposa Grove Historic District or its contributing features.
 - b. *Outsloping of Road and Trail Segments.* Outsloping would occur within the boundaries of the Mariposa Grove Historic District along selected contributing and non-contributing trails as well as those portions of the Mariposa Grove Road that function primarily as trails. Outsloping would require regrading, and would result in micro-changes in the road elevation and cross-section, but would not significantly alter the location, design, materials, workmanship, feeling, or association. Therefore, outsloping would have **no adverse effect**.
7. *Minor Road Realignment in Lower Mariposa Grove Area.* Mariposa Grove Road would be slightly realigned to accommodate construction of a new septic system and leach field, a relocated shuttle passenger drop-off / off-season parking area, comfort station, and accessible trailhead. The alterations to the road alignment would occur within the boundaries of the Mariposa Grove Historic District, and the road is a contributing element of the district. The shift in the alignment would affect the design of the roadway, but the changes would be minor. The character-defining circulation patterns of the Mariposa Grove Historic District

would be retained and the road's integrity of materials, workmanship, feeling, and association would be retained. Therefore, this road realignment would have **no adverse effect** on the district or its contributing elements.

8. *Relocation of Passenger Drop-Off /Off-Season Parking Area in Lower Mariposa Grove Area.* The relocation of passenger drop-off /off-season parking area would occur within the boundaries of the Mariposa Grove Historic District. Removal of the non-contributing existing shuttle/bus parking area and gift shop and replacement with restored lower Grove habitat, and relocation of a historically compatible, less intrusive drop-off /parking area to the northeast would occur under this alternative. Because of the addition of a new non-contributing circulation features within the pedestrian passenger drop-off area, an **adverse effect** is expected on the setting of the lower Grove portion of the Mariposa Grove Historic District.
9. *Conversion of North Portion of Parking Lot and an Old Road Alignment in Lower Mariposa Grove to New Grove Bypass Road.* The north portion of the existing lower Grove area 115-space parking lot would be converted to a new hardened, narrow Grove bypass road that would connect with an old, non-contributing road alignment, and subsequently merge with the existing Mariposa Grove Road to the northeast of the lower Mariposa Grove area. This wetland bypass would be used by accessible transport and service vehicles. The conversion of the portion of the parking lot and reuse of an old road alignment would occur within the boundaries of the Mariposa Grove Historic District; however, the parking lot and abandoned road are not contributing features of the district. Removal of non-contributing hardscape, and replacement with restored lower Grove giant sequoia habitat and restored wetlands, and a new, historically compatible, less intrusive road that follows an abandoned road trace, is expected to affect the setting of the lower Grove portion of the Mariposa Grove Historic District, but would have **no adverse effect** on the district or its contributing elements.
10. *Major Road Realignment.* Mariposa Grove Road would be realigned to reduce a sharp curve in the vicinity of the Sentinels at the approach to the lower Mariposa Grove area, and a new vehicular crossing structure (a box culvert or bridge) would be constructed to span the intermittent drainage at that location. These actions would improve safety, protect giant sequoias from erosion in the drainage, which could threaten their stability and long-term survival, and increase the roadway capacity for tour buses. The current road curve segment would be topographically and hydrological restored, eliminating the road prism. The realignment and drainage crossing construction would occur within the boundaries of the Mariposa Grove Historic District, and the Mariposa Grove Road and the giant sequoias are contributing elements of the district. This major realignment, eradication of the road prism, and addition of a new structure where there historically was none would affect the road's aspects of integrity including design, materials,, and feeling in the vicinity of the Grove entrance. Straightening the curve and introduction of a crossing structure would alter the sense of arrival into the lower Grove area, and the visitors' first view of big trees: the three giant sequoias known as the Sentinels. Therefore, this action would have an **adverse effect** on the historic district.
11. *Conversion of Paved Road to Accessible Trail in the Wetland of the Lower Grove Area.* The 10- to 20-foot-wide, asphalt-paved Mariposa Grove Road in the wetland area in the vicinity of the Fallen Monarch tree would be converted to an 8- to 10-foot-wide ABAAS-compliant accessible, hardened loop trail in the ecologically restored lower Grove area. The affected segments of this historic roadway are within the boundaries of the Mariposa Grove Historic District, and the road is a contributor to that district. The proposed conversion may require grade modifications and may introduce a boardwalk to reduce impacts on sensitive wetlands, but the road prism would largely be retained. An exception would occur where the road

crosses the wetlands; for that segment, the road bed and fill including a stone headwall where the creek crosses under the road would be removed to allow the wetland to be restored. To attain ABAAS compliance, the historic road alignment also may be altered to incorporate the use of switchbacks and curves not present in the existing road design. Narrowing, introduction of a boardwalk, removal of road materials from the wetland, and changes in alignment would result in a loss of integrity of historic road design and materials. Although the removal of the asphalt paving and replacement with a hardened surface in itself would not necessarily result in an adverse effect, the conversion of the roadway into a ABAAS compliant trail, I would likely alter the feeling and design in such a way that it would no longer feel or appear as a historic road. Therefore, conversion of this portion of the historic road into an ABAAS compliant pedestrian trails and boardwalks would have an **adverse effect** on the historic district.

12. *Conversion of Segment of Mariposa Grove Road and Loop Road between Grizzly Giant and Mariposa Grove Museum, and Wawona Point to a Hardened Trail.* The segment of Mariposa Grove Road between Grizzly Giant and Wawona Point, including a short spur to the Mariposa Grove Museum and nearby comfort station, would retain the historic road prisms. However, where possible, the travel-way would be narrowed to a minimum width of 11 feet, asphalt-paved surfaces may be converted to hardened surface, disturbed areas along the road would be allowed to revert to natural conditions, and existing pullouts would be assessed and removed where unnecessary. The segment of Mariposa Grove Road between Grizzly Giant and the museum, and the Wawona Point road, are within the boundaries of the Mariposa Grove Historic District and are contributors to that district. The integrity of location, setting, and association would be retained, and resurfacing would not result in an adverse effect. The character-defining circulation patterns of the Mariposa Grove Historic District would be retained, and these segments would continue to convey their feeling as historic roads. Therefore, proposed modification of these historic roadway segments under Alternative 2 would have **no adverse effect** on the historic district or its contributing elements.
13. *Conversion of the Loop Road in the Upper Grove Area to a Pedestrian Trail.* The portion of the loop road extending from the restrooms in the upper Grove area to the T-intersection with the road extending to Wawona Point, would be modified from a paved, one-way road (varies between 12 and- 20 feet wide) to a pedestrian trail (from 4 to 6 feet wide). Previously disturbed road areas would be revegetated. The loop road is within the boundaries of the Mariposa Grove Historic District, and is a contributing road circulation feature. Although the conversion of the road into a trail would retain the historic road prism, the road would no longer appear as such because of the combination of the removal of the asphalt surfacing, the significant reduction of its width into a dirt trail, and the revegetation of the disturbed areas along the trail. As a result, this loop road would no longer convey its feeling as a historic road. Therefore, this action would have an **adverse effect** on the historic circulation system within the Mariposa Grove Historic District.
14. *Ecological Restoration of Road Margins.* The road margins of Mariposa Grove Road between the lower Grove area and Grizzly Giant, the Mariposa Grove Road and loop road between Grizzly Giant and the Mariposa Grove Museum, the Wawona Point spur, and the east and south sections of a paved road loop that is being converted to pedestrian trail in the upper Grove area, may be modified to support revegetation. The historic road prism (cut, fill, and road bed) would largely be retained, but where narrowing occurs, road margins would be revegetated using native forbs, grasses and low shrubs to retain views into the adjacent forest, and thereby maintaining the character of the 1934 roadside landscape design.

Therefore, conversion of the historic roadway margins would have **no adverse effect** on character-defining roadside landscaping within the Mariposa Grove Historic District.

15. *Modify Path of Travel to Historic Comfort Station at South Entrance.* The historic comfort station at South Entrance is a contributor to the South Entrance Historic District. The path of travel to this structure would be upgraded to improve accessibility in compliance with ABAAS as part of this project. The comfort station is not proposed for rehabilitation at this time, but future accessibility improvement may be implemented under a separate future project as funds become available. The path of travel is not a contributing element of the historic district. Path-of-travel improvements could include minor grading, realignment to reduce grades, resurfacing with hardening materials, and providing ramping at existing curbs or other obstacles. Comfort station path-of-travel accessibility modifications would be completed using historically compatible design and materials, and would follow existing pathways to the extent practicable. These improvements would not alter location, workmanship, design, or association of the comfort station or the South Entrance Station Historic District. Realignment of the paths of travel could affect the setting and feeling of the district, but these actions would have **no adverse effect** on the district.
16. *Septic System/Leach Field Improvements at South Entrance and in the Upper Grove Area.* The septic system/leach field at South Entrance, which serves the historic ranger duplex and the historic comfort station, and the septic system/leach field in the upper Grove area, which serves the historic comfort station, would be improved. The South Entrance septic system would be relocated and expanded to accommodate the new visitor services at the South Entrance hub. The upper Grove system, which exceeds its service life, would be replaced pending geotechnical analysis. Neither of these systems is a contributor to the respective historic districts. These improvements would be conducted in a manner that would avoid impact on character-defining or contributing elements of the districts, and would therefore have **no adverse effect** on Mariposa Grove or South Entrance Station historic districts.
17. *Rehabilitation of Wawona Point Overlook.* Under Alternative 2, the masonry structures at the overlook would be rehabilitated in accordance with the Secretary of the Interior's treatment standards, which define rehabilitation to allow incorporation of other defined treatments, including preservation and restoration. Stone masonry would be restored by repointing and stabilization of side walls. Rehabilitation actions would include installation of compatible, code-compliant handrails. Landscape rehabilitation would involve ecological restoration of an abandoned parking area with low-growing plants that will retain the spatial characteristics of the former parking area, and revegetation that could include screening of incompatible, modern communications equipment. Historic overlook features would be stabilized and preserved to the extent possible. These rehabilitation actions would have **no adverse effect** on the historic features of Wawona Point, located within the Mariposa Grove Historic District.
18. *Change in Function of Mariposa Grove Museum.* Alternative 2 would include a possible change in the current use of the building as the Grove's primary interpretive center to another compatible use. Physical alteration of the building is not planned under this project, and any new use would be compatible with the historic use and rustic character of the building. Should alternations to the building become necessary once a use is determined, further compliance would be completed as a separate project. Therefore, there would be **no adverse effect** on the Mariposa Grove Museum or the Mariposa Grove Historic District under Alternative 2.
19. *Water Supply System Repairs and Modifications.* The water supply storage tank and chlorination unit are within the Mariposa Grove Historic District, and a water distribution pipeline traverses the Mariposa Grove Historic District at its upper end, and terminates at

the South Entrance Station Historic District, where it serves facilities at South Entrance. These water storage, treatment, and distribution systems are not contributing elements of either historic district. The water tank and chlorinator are to be relocated to a new location along the access road leading to Wawona Point as part of this action. The new location would be chosen so that none of the nearby contributing elements of the Mariposa Grove Historic District would be affected. The extent of water pipeline repairs needed and methods for repairs are not yet determined, but the repairs are not expected to require removal, realignment, or major alteration of any contributing elements of the Mariposa Grove Historic District, the Mariposa Grove Museum, or the South Entrance Station Historic District. Any effects on the setting of the districts caused by repairs to the pipeline would be temporary, and would not be adverse. The new buried water tank at the South Entrance would not impact the road, which is a contributing feature. Therefore, the water system modifications would have **no adverse effect** on historic properties.

20. *Structural Sustainability Improvements to Existing Infrastructure.* The NPS promotes the recognition of historic preservation as the best sustainable practice for the historic built environment. The retention of historic buildings, structures, and cultural landscapes conserves the natural, labor, and energy resources expended in the original construction and prior maintenance of these cultural resources, and minimizes the need for additional investment of raw materials and labor to replace such resources with new construction. The *National Park Service Guiding Principles of Sustainable Design* (NPS 1993) are primarily intended to be applied to new construction. Many of these sustainability guidelines, which call for designs such as re-orientating buildings or constructing vestibules, are not proposed for any of the contributing buildings of the Mariposa Grove and South Entrance Station historic districts or the Mariposa Grove Museum. Therefore, there are no historic properties affected by sustainability upgrades under Alternative 2.
21. *Construction Staging Areas.* Construction staging areas needed under Alternative 2 may be located within or adjacent to the South Entrance Station and Mariposa Grove historic districts, but staging areas would be sited to avoid historic features and would be temporary. These temporary staging areas are expected to affect both historic districts, but the effects would not be adverse. Therefore, there would **no adverse effect** on the historic districts from construction staging activities.

Impact Significance and Determination of Effect. Implementation of Alternative 2 is expected to have an adverse effect on the Mariposa Grove Historic District, predominantly through proposed modifications to the Mariposa Grove Road, which is proposed as part of the ecological restoration of giant sequoia and wetland habitat measures and accessibility improvements under this alternative. Although there would be adverse effects to the historic district as a result of this alternative, the combined actions do not result in a loss of integrity of the historic district as a whole. Ensuring the long-term health of the Grove remains a primary management objective for both the cultural and natural resources in all the action alternatives. The NPS is firmly committed to the responsible management of historic properties that may be affected by the proposed engineered hydrologic and road improvements, and acknowledges the delicate balance required to ecologically restore the Mariposa Grove of Giant Sequoias and to preserve the historic properties, of which the giant sequoias themselves are a key contributing component.

Alternative 2 would have no adverse effect on the South Entrance Station Historic District. The majority of improvements for the South Entrance Hub would be located outside the district. The accessibility improvements to the path of travel to the historic comfort station and reconfiguration of the Wawona Road/Mariposa Grove Road intersection would minimally affect the setting and feeling

of the historic district, but would not alter the integrity of contributing or character-defining features of the South Entrance Historic District.

All actions under Alternative 2 that would affect contributing historic structures or cultural landscape features and that are necessary either to ensure long-term survival of the giant sequoias or to meet current accessibility or safety codes would, to the extent practicable, be designed in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. When such design is not feasible, the park would choose the least invasive/disruptive option, and consult with SHPO to develop measures to resolve adverse effects.

Operations-related Impacts. No adverse effects on historic buildings, structures, or cultural landscapes are anticipated from park or concessioner operations under Alternative 2, as operating activities would not significantly alter, directly or indirectly, any of the characteristics of the historic buildings, structures, and cultural landscapes that qualify them for inclusion in the National Register in a manner that would diminish the integrity of the properties' location, design, setting, materials, workmanship, feeling, or association. Alternative 2 would decrease incompatible uses and operational stress on the Mariposa Grove Historic District through elimination of the gift shop and commercial tram service, relocation of most transit facilities to South Entrance, and substantial curtailment of vehicular access to and through the Grove.

Modifications to non-contributing South Entrance station infrastructure (existing overflow parking and road intersection design) and relocation of Mariposa Grove visitor parking to the South Entrance area, would be compatible with historic circulation patterns and 1934 parking patterns in the South Entrance Station Historic District. These improvements would alleviate traffic congestion and reduce traffic hazards associated with future anticipated visitor access to Yosemite National Park and the Mariposa Grove of Giant Sequoias. Operations under Alternative 2 would result in no physical destruction or damage; physical alterations inconsistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*; disposal of the property; incompatible change in the character of the historic properties' use or setting; introduction of incompatible visual, atmospheric, or auditory elements; or neglect or deterioration that would constitute an adverse effect on the Mariposa Grove or South Entrance Station historic districts. The management and routine maintenance and repair of historic buildings, structures, and cultural landscape features would continue to be implemented in keeping with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

Impact Significance and Determination of Effect. Operation of Alternative 2 would have no adverse effect on historic buildings, structures, or cultural landscapes.

Conclusion. Under Alternative 2, proposed ecological restoration and code-compliance actions would adversely affect contributing elements of the Mariposa Grove and the South Entrance Station historic districts. The actions would have no adverse effect on the Mariposa Grove Museum. It is expected that the following actions would have no adverse effect to historic properties:

- removal of the lower Grove area non-historic buildings and infrastructure, including the gift shop, comfort station, parking lot, and tram staging area
- possible installation of a wastewater pipeline within the Mariposa Grove Road right of way from the lower Grove comfort station to the South Entrance leach field (in lieu of a new leach field in the lower Grove area)
- engineered hydrology and road improvements including repair and replacement of culverts, outsloping, minor road alignment shifts, removal of road surface but retention of road prisms

- refurbishing of the upper Grove area septic system/leach field
- rehabilitation of Wawona Point overlook
- repurposing of the Mariposa Grove Museum
- modifications to/repair of the water supply system
- construction of new South Entrance Hub infrastructure, including new leach field, parking, bus turn-around area, Mariposa Grove Road turnouts, accessible comfort station, and improved path of travel to the historic comfort station
- reconfiguration of the T-intersection to a traffic circle at the South Entrance
- rehabilitation of Washburn Wagon Road (also see Archeology section in this chapter) and construction of a new trail segment from the picnic area to the lower Grove area
- temporary construction staging areas within Mariposa Grove and South Entrance Station historic districts

However, the following actions would constitute an adverse effect on the Mariposa Grove Historic District:

- relocation of Mariposa Grove out of the wetland in the lower Grove area, removal of the road fill within the wetland, and installation of a new ABAAS-compliant trail minimizing impacts on the wetland including the use of boardwalks, where needed.
- relocation of a smaller parking area and comfort station, and creation of a shuttle turnaround area to the northeast of the existing bus parking area
- engineered hydrology and roadway improvements that involve major road alignment shifts, such as straightening of the curve in Mariposa Grove Road near the Sentinels, and construction of a new Mariposa Grove Road drainage-crossing structure at the Sentinels
- narrowing of historic roads to less than 8 feet wide along the upper Grove loop road
- eradication of road prisms for topographic and hydrological or wetlands restoration (e.g., at the Sentinels and in the lower Grove wetlands).

Adverse effects on historic properties as a result of implementation of this project alternative would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be refined in consultation with the SHPO, ACHP, and associated American Indian tribes and groups. The draft MOA is in Appendix G. The final agreement will be signed before the Record of Decision is completed and will be included as a part of the decision document for this project.

Operation of South Entrance and Mariposa Grove under Alternative 2 would have no adverse effect on the Mariposa Grove Historic District or the South Entrance Station Historic District.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting historic structures and landscapes would be the same as those under Alternative 1 (No Action)—no adverse effects on historic structures and landscapes in the Mariposa Grove area. Under Alternative 2, some proposed actions would affect historic properties, such as demolition of non-historic buildings in the lower Grove area, but the effects would not be adverse. Some actions would constitute an adverse effect on the Mariposa Grove Historic District, such as the conversion of the Mariposa Grove Road to an ABAAS-compliant loop trail. Alternative 2 would not have an adverse

effect on the South Entrance Station Historic District because most actions are either outside the boundary, or involve updating circulation features which were not identified as contributing in the 2004 Determination of Eligibility. The Mariposa Grove Museum would have no physical changes made to the structure as a result of this alternative. The cumulative effect of past, present, and future projects (no adverse effect), in conjunction with of Alternative 4 (adverse effect), would be an adverse effect on historic properties. Adverse effects would be resolved through consultation with the California SHPO and traditionally associated American Indian tribes and groups in accordance with 36 CFR Part 800 (NHPA implementing regulations) and implemented through a project-specific MOA (Appendix G).

Alternative 3: Grizzly Giant Hub

Implementation of Alternative 3 would:

- remove the non-contributing gift shop and tram staging area/tram operations from Mariposa Grove
- remove parking lot from lower Grove area
- reduce the number of vault toilets in the lower Grove area
- convert the segment of the historic paved road between the lower Grove area and Grizzly Giant in to a pedestrian trail
- Remove a segment of the Mariposa Grove Road at the entrance to the lower Grove area and ecologically restore the area.
- build a new two-way, paved bypass road, including two new bridges, to a new visitor arrival area with parking and other visitor amenities located outside giant sequoia habitat near the Grizzly Giant

The Grove and South Entrance water supply system would be modified as described for Alternative 2, and the upper Grove leach field would be refurbished. New comfort stations at the lower Grove area and the new Grizzly Giant hub would use vault toilets, and would not require development of additional septic systems or leach fields.

Numerous other historic rehabilitation and ecological restoration actions within the Mariposa Grove Historic District would be similar in scope to like actions described for Alternative 2. These would include rehabilitation of the Wawona Point overlook, and habitat restoration measures (including road and trail improvements to restore hydrologic flows. Development of accessible trails in the lower and mid-Grove areas would be less extensive than is proposed under Alternative 2.

Alternative 3 would not modify facilities at South Entrance. The existing South Entrance parking lot, shuttle stop, leach field, and intersection of Wawona Road and Mariposa Grove Road would be retained, as would all four of the historic buildings that contribute to the South Entrance Station Historic District (ranger duplex and associated garage, office building, and comfort station). There would be no adverse effect at the South Entrance under Alternative 3.

Construction- and Restoration-related Impacts. Construction and ecological restoration actions proposed under Alternative 3 are expected to affect contributing elements of the Mariposa Grove Historic District. Actions under Alternative 3 that have the potential to affect historic buildings, structures, and cultural landscape features include the following:

1. *Removal/Replacement of Non-Contributing Buildings and Infrastructure in the Lower Grove Area.* The non-historic gift shop, tram staging area, parking lot, and comfort station in the lower part of Mariposa Grove would be demolished and removed. A new, 10-space, dedicated ABAAS-compliant parking lot, a new accessible 2-vault comfort station, and a new trail head would be constructed, largely in the footprint of previous infrastructure at the lower Grove area. Construction would occur within the boundaries of the Mariposa Grove Historic District. While the introduction of new infrastructure in the historic district would affect the lower Grove setting of the historic district, it would not introduce a new use to the area, which is already heavily used for parking, shuttle boarding, restrooms, and visitor contacts, or remove any contributing elements of the historic district, and would restore the natural setting of the lower Grove area to a more historic condition. As these actions would reestablish a level and types of development in the lower Grove area more similar to those present during the period of significance (i.e. roads, trails, limited parking, and comfort station), they may be considered to have **no adverse effect** on the district. The visual effect on the South Entrance setting would be minimal and, therefore, there would be **no adverse effect**.
2. *Construction of New Grizzly Giant Bypass Road.* Under Alternative 3, the Mariposa Grove Road approach to the lower Mariposa Grove area, including the curve at the Sentinels, would be removed and the area ecologically restored, and a new two-way, paved road would be constructed to bypass the lower Grove area and to serve the new Grizzly Giant Hub. This removal, ecological restoration, and new road and bridge construction would occur within the Mariposa Grove Historic District. Although construction of the new bypass road would not directly affect contributing elements of the district, it would introduce a new roadway in the district that would indirectly affect the integrity of setting, feeling, and association of the district. Removal and ecological restoration of the historic entry road segment of Mariposa Grove Road would directly affect the contributing historic roadway, and eliminate the character-defining historic first view of giant sequoias on the approach to Mariposa Grove (i.e. view of the Sentinels), thereby altering the sense of arrival at the Grove and affecting the integrity of location, material, workmanship, association, and feeling of the Mariposa Grove Road. These actions under Alternative 3 would have **an adverse effect** on the Mariposa Grove Historic District.
3. *Construction of New Grizzly Giant Hub.* Construction of the new hub buildings and infrastructure, including a visitor parking lot, bus parking, a visitor contact area, a trailhead for a new accessible Grizzly Giant trail, a new comfort station, and removal of the existing vault toilet and the commercial tram turnout, would occur within the boundaries of the Mariposa Grove Historic District. The introduction of new infrastructure in the historic district would affect the setting of the district, but it would not introduce a new use to the area, which is already heavily used for parking, shuttle boarding, restrooms, and visitor contact, or remove any of the contributing elements of the historic district. Due to its location outside of giant sequoia habitat in a previously disturbed area to which views from the Grizzly Giant would be topographically screened, the important character-defining view of the Grizzly Giant would be minimally affected. Therefore, construction of the new hub facilities would have **no adverse effect** on the historic district.
4. *Engineering Hydrology and Road Improvements.* As described for Alternative 2, ecological restoration of giant sequoia habitat and wetlands would include engineered hydrology improvements including the repair and replacement of culverts, outsloping of road and trail surfaces, minor road alignment shifts, road narrowing, removal of asphalt pavement, localized modifications to historic road prisms, conversion of vehicular roads to pedestrian-only trails, soil decompaction, and revegetation. Specifically, ecological restoration actions

under Alternative 3 that could affect the Mariposa Grove Historic District would include the following:

- a. *Drainage Modifications.* Culvert repairs and replacement would occur within the boundaries of the Mariposa Grove Historic District. The culverts are not contributing elements of the Mariposa Grove Historic District and are not clearly associated with a particular timeframe within the period of significance, having been repaired and reconstructed as needed. There are about 60 culverts along the historic Mariposa Grove Road throughout the Grove that could be repaired or replaced. Some of the culverts are at the bases of giant sequoias. They vary in construction style but typically are soil-covered riprap in rock channels, some with minor rock headwalls. The masonry headwalls are of standard, very simple construction that does not reflect significant engineering design or artistic construction, or exemplify a design unique to the Civilian Conservation Corps period to which they are inferred to date. Culvert repairs and replacement would not alter the integrity of the contributing road's location, design, materials, workmanship, feeling, or association. Therefore, culvert repair or replacement would have **no adverse effect** on the historic property.
- b. *Outsloping of Road and Trail Segments.* Outsloping would occur within the boundaries of the Mariposa Grove Historic District along selected contributing and non-contributing trails and along the extension of Mariposa Grove Road through the Grove, which is a contributing element of the district. Outsloping would require regrading, and would result in micro-changes to the elevation and cross-grade, but would not significantly alter the integrity of the road location, design, materials, workmanship, feeling, or association. Therefore, outsloping would have **no adverse effect** on the Mariposa Grove Historic District.
5. *Conversion of Paved Road to Accessible Trail in Lower Grove Area.* The 10- to 20-foot-wide portion of the Mariposa Grove Road would be converted to an 8- to 10-foot-wide ABAAS-compliant accessible loop trail in the ecologically restored lower Grove area. The affected segments of this historic roadway are within the boundaries of the Mariposa Grove Historic District, and the road is a contributor to that district. The proposed conversion may require grade modifications and may introduce a boardwalk to reduce impacts on sensitive wetlands, but the road prism likely would be retained. To attain ABAAS-compliance, the historic road alignment also may be altered to incorporate the use of switchbacks and curves not present in the existing road. Narrowing to less than 8 feet, introduction of a boardwalk, potential removal of fill from the lower Grove area wetlands, and changes in alignment would result in a loss of integrity of historic road design, materials, and workmanship. The integrity of location, setting, and association would be retained and the removal of the asphalt paving and replacement with an alternative hardened surface would not result in an adverse effect, but the conversion from a road to a narrower pedestrian trail would alter the design of the road such that it no longer conveys the feeling of a historic road. Therefore, conversion of historic road segments to pedestrian trails would have an **adverse effect** on this contributing feature in the Mariposa Grove Historic District.
6. *Conversion of Existing Trail to Accessible Trail at Grizzly Giant.* A new, accessible trail would be developed that connects the new Grizzly Giant hub parking area with an existing pedestrian trail that connects the lower Grove area with the Grizzly Giant area within the Mariposa Grove Historic District. This trail would originate at the Grizzly Giant Hub and would require grading and resurfacing to meet ABAAS, but would not affect the historic views of the Grizzly Giant. This action would have **no adverse effect** on the Mariposa Grove Historic District.

7. *Conversion of Segment of Mariposa Grove Road and Loop Road between Grizzly Giant and Mariposa Grove Museum, and Wawona Point Spur to a Hardened Trail.* The segment of Mariposa Grove Road between Grizzly Giant and Wawona Point, including a short spur to the Mariposa Grove Museum and nearby comfort station, would retain the historic road prisms. However, where possible, the travel-way would be narrowed to a minimum width of 11 feet, asphalt-paved surfaces may be converted to hardened surface, disturbed areas along the road would be allowed to revert to natural conditions, and existing pullouts would be assessed and removed where unnecessary. The segment of Mariposa Grove Road between Grizzly Giant and the museum, and the Wawona Point road, are within the boundaries of the Mariposa Grove Historic District and are contributors to that district. The integrity of location, setting, and association would be retained, and resurfacing would not result in an adverse effect. The road would be narrowed to a minimum width of 11 feet. The character-defining circulation patterns of the Mariposa Grove Historic District would be retained, and these segments would continue to convey their feeling as historic roads. Therefore, proposed modification of these historic roadway segments under Alternative 3 would have **no adverse effect** on the historic district or its contributing elements.
8. *Conversion of the Loop Road in the Upper Grove Area to a Pedestrian Trail.* The portion of the loop road extending from the restrooms in the upper Grove area to the T-intersection with the road extending to Wawona Point would be modified from a paved, one-way road (varies between 12 and 20 feet wide) to a pedestrian trail (from 4 to 6 feet wide). Previously disturbed road areas would be revegetated. The loop road is within the boundaries of the Mariposa Grove Historic District, and is a contributing road circulation feature. Although the conversion of the road into a trail would retain the historic road prism, the road would no longer appear as such because of the combination of the removal of the asphalt surfacing, the significant reduction of its width into a dirt trail, and the revegetation of the disturbed areas along the trail. As a result, this loop road would no longer convey its feeling as a historic road. Therefore, this action would have an **adverse effect** on the historic circulation system within the Mariposa Grove Historic District.
9. *Ecological Restoration of Road Margins.* The road margins of Mariposa Grove Road between the lower Grove area and Grizzly Giant, the Mariposa Grove Road and loop road between Grizzly Giant and the Mariposa Grove Museum, the Wawona Point spur, and the east and south sections of a paved road loop that is being converted to a pedestrian trail in the upper Grove area, may be modified. The historic road prism (cut, fill, and road bed) would largely be retained, but where narrowing occurs, road margins would be ecologically restored. The modification of road margins could affect the Mariposa Grove Historic District's character-defining roadside landscaping, which was created in 1934 and is characterized by the absence of overhanging banks or protruding root systems of stumps, and reshaped slopes that conform to the surrounding topography. These landscape features would be reproduced in the case of modified road/trail shoulders, maintaining the character of the 1934 roadside landscape design. Therefore, conversion of the historic roadway margins would have **no adverse effect** on character-defining roadside landscaping.
10. *Improvement of Septic System/Leach Field in the Upper Grove Area.* The non-contributing septic system/leach field in the upper Grove area, which serves the historic comfort station, has exceeded its service life and would be replaced. These improvements would be conducted in a manner that would avoid impact on character-defining or contributing elements of the district, and would therefore have **no adverse effect** on Mariposa Grove Historic District.
11. *Rehabilitation of Wawona Point Overlook.* As described under Alternative 2, the masonry structures at the overlook would be rehabilitated under Alternative 3 in accordance with the

Secretary of the Interior's treatment standards. Stone masonry would be restored by repointing and stabilization of side walls. Rehabilitation actions would include installation of compatible, code-compliant handrails. Landscape modifications would involve ecological restoration of the abandoned parking area and revegetation that could include screening of incompatible, modern communications equipment. Historic overlook features would be stabilized and preserved to the extent possible. These historic rehabilitation actions would have **no adverse effect** on Wawona Point, located within the Mariposa Grove Historic District.

12. *Change in Function of Mariposa Grove Museum.* Alternative 3 would include a change in the current use of the building as the Grove's primary interpretive center to another compatible use, such as a hiker's shelter. Physical alteration of the building is not planned under this project, and any new use would be compatible with the historic use and rustic character of the building. Should alterations to the building become necessary once a use is determined, further compliance would be completed as a separate project. Therefore, there would be **no adverse effect** on the Mariposa Grove Museum under Alternative 3.
13. *Water supply System Repairs and Modifications.* As described for Alternative 2, the water supply storage tank and chlorination unit are within the Mariposa Grove Historic District, and water distribution pipeline traverse the Mariposa Grove Historic District at its upper end, and enters the South Entrance Station Historic District at its terminus, where it serves facilities at South Entrance. These water storage, treatment, and distribution systems are not contributing elements of either historic district. The water tank and chlorinator are to be relocated to the vicinity of the upper Grove comfort station as part of this action. The new location would be chosen so that none of the nearby contributing elements of the Mariposa Grove Historic District would be affected. The extent of water pipeline repairs needed and methods for repairs are not yet determined, but the repairs are not expected to require removal, realignment, or major alteration of any contributing elements of the Mariposa Grove Historic District, the Mariposa Grove Museum, or the South Entrance Station Historic District. Any effects on the setting of the districts caused by repairs to the pipeline would be temporary, and if any historic materials are removed, they would be replaced in kind/repared to their condition prior to construction. Therefore, the water system modifications would have **no adverse effect** on historic properties.
14. *Structural Sustainability Improvements to Existing Infrastructure.* The NPS promotes the recognition of historic preservation as the best sustainable practice for the historic built environment. The retention of historic buildings, structures, and cultural landscapes conserves the natural, labor, and energy resources expended in the original construction and maintenance of these cultural resources, minimizes the need for additional investment of raw materials and labor to replace such resources with new construction. The *National Park Service Guiding Principles of Sustainable Design* are primarily intended to be applied to new construction. Many of these sustainability guidelines, which call for designs such as re-orientating buildings or constructing vestibules, are not proposed for the contributing building of the Mariposa Grove Historic District or the Mariposa Grove Museum. Therefore, sustainability upgrades under Alternative 3 would have **no adverse effect** on the historic district.
15. *Construction Staging Areas.* Construction staging areas needed under Alternative 3 may be located within or adjacent to the Mariposa Grove Historic District, but staging areas would be sited to avoid historic features and would be temporary. These temporary staging areas are expected to affect the Mariposa Grove Historic District, but the effects would not be adverse. Therefore, there would **no adverse effect**.

Impact Significance and Determination of Effect. Construction and ecological restoration under Alternative 3 is expected to result in an adverse effect on the Mariposa Grove Historic District. Although there would be adverse effects to the historic district as a result of this alternative, the combined actions do not result in a loss of integrity of the historic district as a whole. Ensuring the long-term health of the Grove remains a primary management objective for both the cultural and natural resources in all the action alternatives. Adverse effects on the historic district as a result of implementation of this project alternative would be resolved through consultation with the California SHPO, in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Operations-related Impacts. As described for Alternative 2, Alternative 3 would decrease the use and operational stress on the setting of the Mariposa Grove Historic District and associated character-defining giant sequoias by eliminating the commercial tram operations and diverting the majority of vehicular traffic out of giant sequoia groves and habitat. Under Alternative 3, shuttle service to the Grove would be discontinued. Routine maintenance and repairs would continue, and repairs to historic buildings, structures, or cultural landscape features would be performed in accordance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. There would be no adverse effects on historic buildings, structures, or cultural landscapes from park or concessioner operations under Alternative 3 because operating activities would not significantly alter, directly or indirectly, any of the characteristics of the historic buildings, structures, or cultural landscapes that qualify them for inclusion in the National Register.

Impact Significance and Determination of Effect. Operation of Alternative 3 would have no adverse effect on historic buildings, structures, or cultural landscapes.

Conclusion. Under Alternative 3, construction-related actions would adversely affect contributing elements of the Mariposa Grove Historic District. There would be no modification of facilities at the South Entrance and no adverse effect in that location under Alternative 3. It is expected that the following actions would affect historic properties within the APE, but the effects would not be adverse:

- removal of non-contributing structures in the lower Grove area
- removal of parking lot in the lower Grove area and replacement with 10-space ABAAS-compliant parking area
- reduction in number of vault toilets at the lower Grove area
- conversion of Mariposa Grove Road between Grizzly Giant and Wawona Point, including the spur to the Mariposa Museum and upper Grove comfort station, to a hardened trail/service road
- historic rehabilitation of Wawona Point masonry features
- refurbishment of the upper Grove leach field
- compatible re-purposing of the Mariposa Museum building
- habitat restoration measures
- cessation of tram operations.

However, modifications to segments of the Mariposa Grove Road at the approach to the lower Grove and on the upper Grove loop road, and introduction of a new, paved, two-lane road to a new Grizzly Giant hub would result in:

- changes in circulation patterns, traffic, and visitor use,
- loss of historic design and feeling where historic road travel-ways are narrowed and converted to hardened roads and pedestrian trails, and
- loss of location, design, materials, association, and feeling along the segments of road to be abandoned and ecologically restored (e.g., near the Sentinels) when the new lower Grove bypass road to the Grizzly Giant hub is constructed, and where the historic road prism is to be removed (e.g., through the lower Grove wetlands).

These modifications would be considered **adverse effects** because they would impact the historic integrity of the road and would alter character-defining views and the sense of arrival at the giant sequoia grove in the Historic District. Additionally, introduction of a new two-lane, paved bypass road and bridges to the proposed Grizzly Giant hub would alter the setting, cultural landscape, and feeling of the Mariposa Grove Historic District, and as such would have an **adverse effect** on the integrity of the district.

Adverse effects on historic properties as a result of implementation of this project alternative would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be refined in consultation with the SHPO, ACHP, and associated American Indian tribes and groups. The draft MOA is in Appendix G. The final agreement will be signed before the Record of Decision is completed and will be included as a part of the decision document for this project.

Park and concessioner operations under Alternative 3 would have **no adverse effect** on historic buildings, structures, or cultural landscapes of the Mariposa Grove Historic District because operating activities would not significantly alter, directly or indirectly, any of the characteristics of the historic buildings, structures, or cultural landscapes that qualify them for inclusion in the National Register. Ongoing maintenance of contributing features and buildings would be performed in accordance with the Secretary of the Interior's *Standards for Treatment of Historic Properties*.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting historic structures and landscapes would be the same as those under Alternative 1 (No Action)—no adverse effects on historic structures and landscapes in the Mariposa Grove area. Under Alternative 3, some proposed actions would affect historic properties, such as demolition of non-historic buildings in the lower Grove area, but the effects would not be adverse. Some actions would constitute an adverse effect on historic circulation patterns and visitor use, such as introduction of a new, paved two-lane road to a new Grizzly Giant hub. Alternative 3 would not have an adverse effect on the South Entrance Station Historic District or the Mariposa Grove Museum. The cumulative effect of past, present, and future projects (no adverse effect), in conjunction with of Alternative 4 (adverse effect), would be an adverse effect on historic properties. Adverse effects would be resolved through consultation with the California SHPO and traditionally associated American Indian tribes and groups in accordance with 36 CFR Part 800 (NHPA implementing regulations) and implemented through a project-specific MOA (Appendix G).

Alternative 4: South Entrance Hub with Modified Commercial Tram Service

Actions under Alternative 4 would be largely as described for Alternative 2, with a few differences:

- A new ABAAS-compliant lower Grove loop trail would be constructed with an at-grade, hardened surface rather than a boardwalk, and limited commercial tram service would be maintained.
- Tram staging would be relocated to a South Entrance Hub, and the tram would operate on an abbreviated seasonal and daily schedule and along a limited route within Mariposa Grove.
- The Mariposa Grove Road would remain asphalt-paved from the lower Grove area to the Mariposa Grove Museum in the upper Grove area, where a tram turnaround would be constructed. The upper Grove loop road would be closed to tram traffic, and would be narrowed and converted to a pedestrian trail, as described under Alternatives 2 and 3.

Construction- and Restoration-Related Impacts. Construction proposed under Alternative 4 is expected to result in adverse effects on the Mariposa Grove Historic District to the same extent described above in Alternative 2, with several exceptions, described as follows:

1. *Accessible Loop Trail in the Lower Grove Area.* A new accessible loop trail would be constructed at the lower Grove area on the same route as described for Alternatives 2 and 3 (see figure 2-16), but the trail would be at grade with a hardened surface and would not have a boardwalk finish. The historic road segment to be converted for this use would still be narrowed to 8 to 10 feet, and alignment and grade modifications to meet ABAAS criteria could be necessary. These changes could have an **adverse effect** on the historic integrity of design and feeling of the contributing road, but the road prism would be largely retained.
2. *Modify Path of Travel to Upper Grove Comfort Station for ABAAS Compliance.*
3. *Relocation of Commercial Tram Staging Area.* The commercial tram staging area would be moved from the lower Grove area to the new South Entrance Hub. Tram ticketing and boarding would be incorporated into the same hub footprint as described for Alternative 2, and effects on the South Entrance Station Historic District and Mariposa Grove Road would be as described for Alternative 2. Relocation of tram staging to the South Entrance Hub would have **no adverse effect** on either historic district.
4. *Shortened Commercial Tram Route in Mariposa Grove.* The commercial tram route would be shortened relative to the no action alternative (Alternative 1), and would operate on the existing paved road from the lower Grove area to the Mariposa Grove Museum in the upper Grove area. The tram would no longer travel the upper Grove one-way loop road from the water tank to the comfort station, which would be converted for use as a pedestrian trail, as described under Alternatives 2 and 3. The converted segments would retain the historic road prisms, and where possible, the travel-way would be narrowed to a minimum width of 11 feet, asphalt-paved surfaces may be converted to hardened surface, disturbed areas along the road would be allowed to revert to natural conditions, and existing pullouts would be assessed and removed where unnecessary. The affected segments of Mariposa Grove Road are within the boundaries of the Mariposa Grove Historic District and are contributors to that district. The integrity of location, setting, and association would be retained, and resurfacing would not result in an adverse effect. The road would be narrowed to a minimum width of 11 feet. The character-defining circulation patterns of the Mariposa Grove Historic District would be retained, and these segments would continue to convey their feeling as historic roads. Therefore, proposed modification of these historic roadway segments under

Alternative 4 would have **no adverse effect** on the historic district or its contributing elements.

5. *Modification of South Entrance Intersection.* Under Alternative 4, the existing T-intersection of Wawona Road and Mariposa Grove Road would be realigned as a modified T-intersection with Mariposa Grove Road located west of the contributing office building. The driveway to the ranger duplex would exit from Mariposa Grove Road just north of the modified T-intersection with Wawona Road. Intersection realignment would avoid effects on character-defining and contributing elements of the South Entrance Station Historic District that would diminish the attributes that make them eligible for listing in the National Register. As described under Alternative 2, modification to the circulation pattern within the South Entrance Station Historic District would have no adverse effect because the modified intersection would retain the primary historic circulation attribute of the junction of the three roads. Therefore, this intersection modification would have **no adverse effect** on the district or on Mariposa Grove Road, which is a contributing element of the Mariposa Grove Historic District.
6. *Retain Mariposa Grove Museum Function.* Under Alternative 4, the current museum function as an interpretive center and visitor rest stop would remain at the Mariposa Grove Museum. No physical alteration of the museum build would occur under this project, so there would be **no effect** on the historic property as a result of this action. Should alterations to the building become necessary once a use is determined, further compliance would be completed as a separate project.

Please refer to the discussion under Alternative 2: South Entrance Hub for detailed descriptions of actions common to both Alternative 2 and Alternative 4, and the associated effects on the Mariposa Grove and South Entrance Station historic districts. These shared actions, and the associated potential effects on contributing buildings, structures, and landscape features, include:

- remove the non-contributing commercial tram staging area and gift shop from the lower Grove area
- substantially reduce the non-contributing in-Grove parking, and relocate primary visitor parking to the proposed transit hub at South Entrance
- rehabilitate historic Wawona Point
- make accessibility improvements to Grove trails and the path of travel to the South Entrance comfort station
- replace the septic system/leach field at South Entrance
- refurbish (e.g., relocate and replumb) the septic system and leach field in the upper Grove area
- construct a new septic/system leach field in the lower Grove area, or installation of a wastewater pipeline, within the right of way of Mariposa Grove Road, from the lower Grove area to the South Entrance leach field (may require a lift station near South Entrance)
- reconfigure the South Entrance station parking and other non-contributing infrastructure, and reconfigure the Wawona Road/Mariposa Grove Road intersection.
- rehabilitate the segment of the Washburn Wagon Road between the South Entrance hub and the picnic area along Mariposa Grove Road for use as a pedestrian trail, and construct an extension of the trail from the picnic area to the lower Grove area

- replace and relocate the water storage and treatment units, and repair/replacement of the leaking water distribution line in the upper Grove area
- convert segments of historic roads for use as pedestrian trails, including removal of asphalt pavement and revegetation of trail margins within the historic road prism
- install an expanded septic system/leach field at South Entrance
- refurbish septic system and leach field in the upper Grove area
- construct a new septic/system leach field in the lower Grove area, or installation of a wastewater pipeline, within the right of way of Mariposa Grove Road, from the lower Grove area to the South Entrance leach field (may require a lift station near South Entrance)

Impact Significance and Determination of Effect. As with Alternative 2, construction of Alternative 4 is expected to result in adverse effects on the Mariposa Grove Historic District, which is a historic property under Section 106 of the NHPA. Although there would be adverse effects to the historic district as a result of this alternative, the combined actions do not result in a loss of integrity of the historic district as a whole. Ensuring the long-term health of the Grove remains a primary management objective for both the cultural and natural resources in all the action alternatives.

Alternative 4 would also affect the South Entrance Station Historic District, but the effects would not be adverse. Adverse effects on the historic district historic properties as a result of implementation of this project alternative would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Operations-related Impacts. As described for Alternatives 1, 2, and 3, no adverse effect on historic buildings, structures, or cultural landscapes are anticipated from park or concessioner operations under Alternative 4. Operational activities, including maintenance and repairs of infrastructure and facilities and monitoring of traffic/parking, would not significantly alter, directly or indirectly, any of the characteristics of the historic buildings, structures, or cultural landscapes that qualify them for inclusion in the National Register. Alternative 4 would decrease the use and operational stress on the setting of the Mariposa Grove Historic District and associated habitats by reducing infrastructure and visitor services within the Grove. Operations under Alternative 4 would not result in physical destruction or damage; alteration inconsistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*; disposal of the property; incompatible change in the character of the property's use or setting; introduction of incompatible visual, atmospheric, or auditory elements; or neglect or deterioration.

The management of and routine maintenance and repair of historic buildings, structures, and cultural landscapes would continue to be implemented in keeping with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

Impact Significance and Determination of Effect. Operation under Alternative 4 would have **no adverse effect** on historic buildings, structures, or cultural landscapes within the Mariposa Grove and South Entrance Station historic districts.

Conclusion. As described for Alternative 2, under Alternative 4, construction-related actions related to restoration of hydrologic function of giant sequoia habitat, and to accessibility upgrades to trails and facilities, would result in alteration of design, materials, workmanship, and/or feeling of the

contributing Mariposa Grove Road, and would therefore have an **adverse effect** on the Mariposa Grove Historic District.

It is expected that the following actions would affect historic properties within the APE, but the effects would not be adverse:

- reconfiguration of the intersection at the South Entrance
- construction of new South Entrance infrastructure
- removal of the lower Grove non-historic structures and infrastructure and construction of new lower Grove infrastructure
- rehabilitation of the Washburn Wagon Road for use as a pedestrian trail from South Entrance to the picnic area and extension of a new trail to the lower Grove area
- minor engineered hydrology and road improvements including repair and replacement of culverts and outsloping
- refurbishing of the upper Mariposa Grove leach field and expansion/relocation of the South Entrance leach field
- Construction of a septic system/leach field at the lower Grove area or installation of a wastewater pipeline from the lower Grove area to the South Entrance septic system/leach field along the right of way of the Mariposa Grove Road
- ABAAS improvements to paths of travel to the historic comfort stations in the upper Grove area and at South Entrance
- rehabilitation of Wawona Point overlook
- repair of the Mariposa Grove and South Entrance water supply system
- construction staging areas

Adverse effects on historic properties as a result of implementation of this project alternative would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups. Concessioner and NPS operations at Mariposa Grove and South Entrance under Alternative 4 would have **no adverse effect** on historic buildings, structures, or cultural landscapes.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting historic structures and landscapes would be the same as those under Alternative 1 (No Action)—no adverse effects on historic structures and landscapes in the Mariposa Grove area. Under Alternative 4, some proposed actions would affect historic properties, such as demolition of non-historic buildings in the lower Grove area, but the effects would not be adverse. Some actions would constitute an adverse effect on the Mariposa Grove Historic District, such as the conversion of the Mariposa Grove Road to an ABAAS-compliant loop trail. Alternative 4 would not have an adverse effect on the South Entrance Station Historic District or the Mariposa Grove Museum. The cumulative effect of past, present, and future projects (no adverse effect), in conjunction with of Alternative 4 (adverse effect), would be an adverse effect on historic properties. Adverse effects would be resolved through consultation with the California SHPO and traditionally associated American Indian tribes and groups in accordance with 36 CFR Part 800 (NHPA implementing regulations) and implemented through a project-specific MOA (Appendix G).

AMERICAN INDIAN TRADITIONAL CULTURAL RESOURCES

Introduction and Definitions

Traditional cultural resources are defined as “objects and places, including sites, structures, landscapes, and natural resources, with traditional cultural meaning and value to associated peoples” (NPS 2006). Traditional cultural practices involve resources that are:

- culturally valued tangible locations,
- involve social use of the biophysical, geophysical, or built environment, and
- reflect socio-cultural attributes, including social cohesion, lifeways, religious practices, and other social institutions, such as education and recreation, that play out in the biophysical and built environments, but are not tangible in and of themselves.

If an American Indian traditional cultural resource or practice meets any of the eligibility criteria for listing in the National Register (36 CFR 60.4), it is considered a historic property with traditional cultural or religious significance. However, many resources and practices that are significant to contemporary American Indian tribes or groups do not meet the National Register criteria, but the cultural value of these resources may have acquired a historic merit through repeated use over time.

The NPS (2006) is committed to protecting and preserving traditional cultural resources that do not qualify as historic properties, but that are culturally significant to traditionally associated American Indian peoples.

Affected Environment

Although no previous ethnographic research has been identified that focuses exclusively on the Mariposa Grove of Giant Sequoias, other source materials have been identified that demonstrate that numerous tribal groups have, and continue to, value and utilize giant sequoia groves regionally. The presence of multiple prehistoric archeological sites and extensive fire scarring in the Mariposa Grove, as well as information learned from recent interviews and consultations with contemporary traditionally associated peoples, confirm that Mariposa Grove was a traditionally significant area, beginning at least 3,500 years ago (Hull 1989, Anderson 1993, Goldberg et al. 2012).

Tribal groups identified as historically frequenting giant sequoia groves on the western slopes of the central and southern Sierra Nevada include the Nisenan or Southern Maidu; the Western Mono; various Foothill Yokuts cultural groups; the Southern, Central, and Northern Sierra Miwok; the Tubatulabal; and several groups from the eastern side of the Sierra Nevada, including the Washoe, the Northern Paiute (e.g., the Mono Lake Kutzadikaa), and the Owens Valley Paiute (Anderson 1993, Latta 1977, Powers 1976). Recent ethnographic interviews conducted with park-associated American Indians note the particular salience of giant sequoias and Mariposa Grove to Southern and Central Sierra Miwok, Chukchansi Yokuts, and Western Mono peoples (Anderson 1993). These groups are directly related to contemporary American Indian groups, nearly all of whom have documented traditional associations with Yosemite National Park and the Mariposa Grove of Giant Sequoias. The park currently consults with seven traditionally associated American Indian tribes and groups: The American Indian Council of Mariposa County, Inc. (also known as the Southern Sierra Miwok Nation), Bishop Paiute Tribe, Bridgeport Indian Colony, Mono Lake Kutzadikaa Tribe, North Fork Rancheria of Mono Indians of California, Picayune Rancheria of the Chukchansi Indians, and Tuolumne Band of Me-Wuk Indians.

There likely are numerous reasons why the ethnographic record is largely lacking specific data about traditional use of the Mariposa Grove and other giant sequoia groves. Early non-indigenous visitors to Mariposa Grove did little to document native use of the area beyond vilifying the Indians' deliberate use of fire (Brace 1869; Muir 1961). By the time outsiders first saw the Mariposa Grove circa 1855, American Indian lifeways had been drastically disrupted in the region due to missionization, disease, reduced access to resources, and the subsequent population decline and changes in marriage patterns and other cultural practices (Bunnell 1859; Davis-King 1999).

The limited ethnographic information that is available indicates that the giant sequoias were considered sacred by the American Indian peoples (Anderson 1993; Goode 1992). It further suggests that the giant sequoia groves were areas where initiations or other important ceremonies were performed (Anderson 1993).

Ethnographers have documented at least 12 different words for the giant sequoia in American Indian languages (Powers 1976, Bunnell 1990, Anderson 1993, Davis-King 1999). At least 7 of these words are variations of the word *wah-wo-nah*, suggesting connections to the Mariposa Grove of Giant Sequoias in the area now known as Wawona. Powers (1976:398) reported that the Western Mono variant—*woh-woh'-nau*—was meant to imitate "... the hoot of the owl, which is the guardian spirit and deity of this great monarch of the forest."

The Mariposa Grove of Giant Sequoias contains extensive evidence of anthropogenic fires. These fires were undoubtedly started by American Indians who understood that giant sequoia seedlings and giant sequoia habitat thrive in response to frequent fires. American Indians ignited fires in the giant sequoia groves in order to prolong the lifecycles of the big trees, to clear brush from trails, to attract game, and to improve the growth of specific plant materials. Data from ethnographic interviews conducted previously also show that most fires in the giant sequoia groves burned in the late growing season, between early August and October or November (Anderson 1993, Goldberg et al. 2012).

Indigenous uses of giant sequoias include use of the bark for housing material by Central Sierra Miwok, Yokuts, and Paiute tribes (Barrett and Gifford 1933, Anderson 1993). It has also been reported that Yokuts groups used the pitch from the giant sequoia bark as a medicine, and that the fumes from burning the gum were used to treat neuralgia (Hudson 1901, Anderson 1993:257).

Besides the giant sequoias themselves, numerous plants and animals valued by park-associated American Indians are found in or in close proximity to giant sequoia groves. These plants include, but are not limited to, elderberry, wild onion, sugar pine, hazelnut, chinquapin, soaproot, strawberry, grass seeds, sedge, mushrooms, alder, dogwood, currant, and raspberry. Many plants had multiple uses, and filled needs for medicine, subsistence, and/or spiritual purposes (Goldberg et al. 2012). Important basketry plants are also found growing in or around giant sequoia groves including willow, hazelnut, black oak, buck brush, deer brush, maple, and bitter cherry (Goldberg et al. 2012:38).

Much of the fauna that historically inhabited giant sequoia groves also played a major role in American Indian traditional practices and beliefs. Many faunal species have spiritual significance, in addition to filling subsistence and other needs. Research has identified several traditionally significant faunal species including, but not limited to, owls, falcons, eagles, bears, beavers, deer, elk, fish, coyote, and caterpillars. As an example of spiritual significance, the North Fork Mono (a band of Western Mono) considered the golden eagle to be the creator and the chief of the birds. This species was revered by both of the North Fork Mono moieties, while they considered the bald eagle a totem of the *Pakwihu* moiety (Gifford 1932). The Chukchansi Yokuts moieties were eagle and

coyote (Gayton 1948). Several American Indian groups (e.g., Western Mono, Miwok, and Yokuts) are reported to have collected caterpillars, grubs, or worms for food.

Extensive changes since the arrival of Anglo-Americans and other cultural and ethnic groups have affected the ability of American Indian tribes and groups who traditionally used the Mariposa Grove to access resources there. However, contemporary tribal groups have maintained strong connections to Mariposa Grove as part of their continuing cultural heritage. Recent ethnographic interviews conducted with park-associated American Indians note the particular importance of the Mariposa Grove to Southern and Central Sierra Miwok, Chukchansi Yokuts, and Western Mono peoples (Goldberg et al. 2012). It is important to note that archeological resources are highly valued by American Indians who have traditional associations with Yosemite National Park. Archeological sites, including those within and near the Mariposa Grove of Giant Sequoias and South Entrance, continue to be vital components of American Indian cultural patrimony, and reflect tangible links to ancestral occupation, burial grounds, and places of prayers and other ceremonial activities. The importance of these sites was affirmed during consultation meetings among Yosemite National Park staff and associated American Indian tribes and groups in 2011, and a consultation site visit to the Mariposa Grove of Giant Sequoias in January and May 2012, and April and July 2013. Several tribal representatives stated that the “protection of documented prehistoric archeological resources in the Grove from future development is of paramount concern” (Goldberg et al. 2012:11). Park-associated American Indians have expressed a cultural connection to Mariposa Grove, which indicates that the Grove would have high value for continuing traditional cultural practices.

Environmental Consequences

Impact Analysis Methodology

No historic properties with traditional cultural or religious significance (beyond archeological sites) have currently been identified within the Restoration of the Mariposa Grove of Giant Sequoias project area, therefore, impacts on traditional cultural resources are assessed under NEPA in this *Mariposa Grove FEIS*.

Pursuant to NEPA regulations (40 CFR 1500-1508), project impacts are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long-term), and other consideration of context. Beneficial and adverse effects are considered. When no measurable effect is identified, impact is found not to occur. The intensity of impacts is the degree or magnitude of a potential impact, described as negligible, minor, moderate, or substantial. Context and intensity are considered together when determining whether an impact is significant under NEPA.

The impact intensities criteria for those traditional cultural resources within the project area that are significant to park-associated American Indians are defined below. Note that archeological resources are evaluated in a separate section of this *Mariposa Grove FEIS*:

- Negligible Impact Intensity – the impact would be at the lowest levels of detection, barely measurable, with no perceptible consequences either adverse or beneficial to the resources.
- Minor Impact Intensity – the impact is measurable or perceptible, but it is slight and affects a limited area of a resource or group of resources.

- Moderate Impact Intensity – the impact is measurable and perceptible.
- Major Impact Intensity – the impact is substantial, noticeable, and permanent.

Alternative 1: No Action

Alternative 1, existing infrastructure; current Mariposa Grove concessioner facilities, operations, and maintenance; and current NPS management and shuttle operations would remain unaltered. No infrastructure renovation or improvements or ecological restoration actions, such as modification of Grove transit and parking operations; removal or upgrading of existing facilities; construction of new facilities and infrastructure; improvement of visitor way-finding, interpretation, and universal access; improvement of hydrologic flows; project-specific prescribed fire and hazardous fuel reduction treatments, or soil decompaction, would be implemented.

Operations-related Impacts. Current concessioner and park operations at the Mariposa Grove would be maintained under the no action alternative (Alternative 1). American Indians who are traditionally associated with the Mariposa Grove have maintained a strong connection to the Grove and have expressed a special, vital relationship with the Grove, and specifically with the giant sequoias, which are considered sacred. Traditionally associated American Indian tribes and groups also have continuing cultural connections with all of the prehistoric archeological sites within the project area (see Archeology section of this chapter), especially site CA-MRP-0661/H in the lower portion of the Grove. Under Alternative 1, current assured access to the Mariposa Grove afforded by the NPS to American Indians with local cultural associations would remain unchanged. However, many of the values that American Indians associate with the Grove, such as the general health of the giant sequoia ecosystem, continued availability of flora and fauna important for traditional uses, and archeological site conditions at South Entrance and Mariposa Grove, would continue to be affected by visitor facilities (e.g., parking areas, the gift shop), visitor use, and operational practices (e.g., commercial tram and gift shop operations, use of the Grove and South Entrance areas, lack of ecological restoration throughout the Grove and at Wawona Point). Furthermore, the current lack of interpretation of traditional cultural practices and resources within Mariposa Grove would continue.

Impact Significance. Giant sequoia groves have been important to native cultures over the millennia. The trees themselves are considered sacred, and ethnographic data suggest that the groves were areas where initiations or other important ceremonies were performed. The giant sequoia ecosystem also supports a number of fauna and flora species that have traditional importance, both spiritual and subsistence-related, to traditionally associated American Indians. The American Indian archeological sites within the project area also are important to traditionally associated tribes and groups. Alternative 1 would have long-term, moderate, adverse impacts on Mariposa Grove habitat, and long-term negligible adverse impacts under NEPA on archeological sites that are traditionally significant to associated American Indians.

Conclusion. Under the no action alternative (Alternative 1), the current conditions and operations at the Mariposa Grove would remain unchanged. The health of the giant sequoia ecosystem at the Mariposa Grove would continue to be impacted by unnecessary infrastructure located within the Grove, and the potential for adverse impacts at archeological sites would continue through unauthorized collection of artifacts or vandalism. There would continue to be limited interpretation of American Indian traditional cultural resources and practices in this area of the park. Current access to the Mariposa Grove by American Indian tribes to pursue traditional cultural practices would not be altered. Overall, Alternative 1 is the only alternative that would not result in noticeable (i.e. more than negligible) adverse impacts on culturally significant characteristics of archeological sites that are considered important traditional cultural resources by American Indians associated

with the project area. However, moderate adverse impacts on the giant sequoia habitat would continue.

Cumulative Impacts. The cumulative impacts on American Indian traditional cultural resources discussed in this section considers past, present, and reasonably foreseeable actions in the Mariposa Grove area (Appendix B), in combination with potential impacts of Alternative 1 (No Action). The timeframe for this analysis encompasses the period after the Mariposa Grove became a part of the Yosemite Land Grant in 1864, and the period after 1932 for areas near the South Entrance, after the NPS acquired the area. Before these periods, the ability for American Indians to hunt, gather, conduct controlled burns, and practice traditional ceremonies was already dramatically reduced. Significant logging had occurred near the South Entrance. Installation of the South Entrance Station and ranger residence provided controlled access into the park through this southern portal.

Current plans and projects in the Mariposa Grove area would have beneficial and adverse impacts on areas of traditional plant use (Appendix B). The *Parkwide Invasive Plant Management Plan Update* and the Wawona Meadow Restoration Project would result in long-term beneficial impacts on areas of traditional plant use. Activities associated with the *Fire Management Plan/Operational Fire Management Plan* and U.S. Forest Service fuels reduction projects would greatly reduce the threat of large high-severity catastrophic fires, and reduce the potential for vegetation type conversion. These actions would have a long-term beneficial impact on areas of traditional plant use.

There would be adverse impacts on areas of traditional plant use associated with the current South Entrance Station Kiosks Replacement project, the *Scenic Vista Management Plan* due to the localized loss of vegetation. Site-specific adverse impacts on vegetation could be short-term (during construction) and long-term (direct displacement of vegetation). The NPS would endeavor to avoid adverse impacts on traditional cultural resources such as areas of traditional plant use during the design phase for these projects. Where such avoidance is not feasible, the NPS, in consultation with traditionally associated American Indian tribes and groups, would mitigate the impacts to the greatest extent possible. Overall, there would be a long-term minor beneficial impact on traditional cultural resources as a result of past, present, and current projects.

Under Alternative 1 (No Action), there would be a long-term moderate adverse impact on traditional cultural resources in the Mariposa Grove. These impacts include ongoing impacts to giant sequoia habitat, the availability of flora and fauna important for traditional uses, and archeological site conditions that would continue to be affected by visitor facilities in the grove such as parking lots and the gift shop.

In summary, past impacts on traditional cultural resources in the region have been adverse, long-term, and minor. Present and foreseeable future actions would contribute to reversing the adverse impacts of past actions in the Mariposa Grove area. Under Alternative 1, there would be a long-term moderate adverse impact on traditional cultural resources in the Mariposa Grove. Past, present, and future impacts, in conjunction with the impacts of Alternative 1 (No Action), would result in a long-term moderate adverse impacts on traditional cultural resources in the Mariposa Grove area.

Alternative 2: South Entrance Hub (Preferred Alternative)

Alternative 2 would remove the commercial tram operations and reduce the amount of impervious surfaces and structures in the lower portion of the Grove, while relocating primary visitor parking to South Entrance. New visitor services at the South Entrance area would include visitor information, educational, and other sales items. The water tank and chlorination unit on the loop road in the upper portion of the Grove would be moved to a nearby location outside of sequoia habitat, and the gift shop in the lower portion of the Grove and existing vault toilets at Grizzly Giant and in the upper

portion of the Grove would be removed. Numerous other repairs, renovations, and ecological restoration actions, such as water line repair or replacement, replacement of the lower Grove vault toilets with flush toilets, installation of a new septic system and leach field in the lower portion of the Grove, historic rehabilitation of Wawona Point features, and soil decompaction would be components of this alternative. Interpretation of cultural and natural resources would be enhanced. The intersection of Mariposa Grove Road and Wawona Road at South Entrance would be realigned, and a roundabout could replace the existing T-intersection if needed to address traffic congestion near the South Entrance.

Construction-related Impacts. Demolition and removal of structures and pavement, staging of materials and equipment, construction of redesigned facilities, renovation of existing structures, installation of a new leach field, grading and recontouring for hydrological and ecological restoration purposes, and development of new accessible trails in the lower Grove area all would involve ground disturbance, which carries with it the potential to adversely impact archeological resources, including two archeological sites for which local American Indian tribes have expressed a vital connection and a desire for better protection from development and vandalism. Construction activities also could temporarily disturb wildlife and plant communities. Recontouring and replanting of reclaimed areas currently covered by pavement or buildings at the conclusion of construction would ensure that these are temporary impacts.

Construction of a new parking area at the South Entrance would impact nearly half of site CA-0660/H. In addition, extensive clearing would be required prior to construction would be a moderate adverse impact on traditional cultural resources. Actions in the lower Grove area that have the potential to adversely impact CA-MRP-0661/H include installation of a new shuttle turnaround, removal of existing roads and parking areas, and ecological restoration of modified areas. Parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. Black oak trees would be left in place in the vicinity of the archeological site, and elsewhere where feasible. The gift shop at the lower portion of the Grove would be removed from the vicinity of site CA-MRP-0661/H.

Impact Significance. Construction activity under Alternative 2 would adversely affect two archeological sites important to culturally associated American Indian tribes and groups who have expressed concern about protecting these resources from future development. There is potential for moderate adverse impacts on site CA-MRP-00660/H from construction of the parking lot at the South Entrance. In addition, extensive clearing of the site would be a moderate adverse impact on traditional cultural resources.

Impacts to site CA-MRP-0661/H in the lower Grove area would be minor, as design would avoid ground-disturbance and impacts to black oaks in the vicinity of the site. Removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove would be a beneficial impact.

Restoration-related Impacts. Restoration activities, under Alternative 2 would improve the overall health of the giant sequoias at the Mariposa Grove. These actions, which would include increasing habitat area, decompaction of soils, improving hydrology, reforestation, and prescribed burns, would enhance values important to American Indians with a cultural association to the groves, some of whom are interested in the restoration and preservation of flora and fauna species for traditional uses. The use of prescribed burns to restore habitat is particularly supported by traditionally associated American Indians. The park would work with associated tribes and groups to improve conditions in the Grove for flora and fauna species important to American Indian tribes and groups. Alternative 2 restoration of the lower portion of the Grove would, on the other hand, have

temporary adverse impacts on traditionally significant archeological site CA-MRP-0661/H through reconditioning of soils where facilities have been removed, and the planting of native vegetation. While reclamation and revegetation of surfaces for ecological restoration purposes would further disturb archeological resources and giant sequoia habitat (see impact significance described above for construction impacts), these actions would lead to long-term beneficial impacts as more natural conditions are restored and site surfaces are stabilized.

Impact Significance. An improved giant sequoia ecosystem through restoration, especially prescribed burns, would have a beneficial impact on those characteristics of Mariposa Grove that are important to traditionally associated American Indians by restoring native vegetation, which in turn would attract native fauna. Temporary, minor adverse impacts on traditionally significant site CA-MRP-0661/H would occur from restoration actions at the lower portion of the Grove.

Operations-related Impacts. Operations under Alternative 2 would continue to allow traditionally associated American Indian tribes and groups to have access to the Mariposa Grove and the South Entrance for traditional practices. There is the potential for continued unauthorized collection of surface archeological artifacts from sites CA-MRP-0660/H and CA-MRP-0661/H under Alternative 2. American Indians traditionally associated with these sites have expressed a desire that the sites be protected from vandalism. If construction and operation of a leach field cannot be designed to avoid impacts on the traditionally significant archeological site (CA-MRP-0661/H), then a sewer line or vault toilets would be installed instead. Implementation of Alternative 2 would provide for additional public information about and interpretation of American Indian traditional cultural resources and practices, which would be a beneficial impact under this alternative. The need for increased public information about American Indian history and cultural practices has been repeatedly expressed by tribal representatives during project consultation. The reduced concentration of visitor parking at the lower portion of the Grove would enhance the natural ambience of the Grove and, thus, enhance the features of the Grove that are important to traditionally associated American Indians.

Impact Significance. Potential vandalism would have a long-term, minor, adverse impact on significant cultural resources under Alternative 2. Enhanced interpretation of traditional cultural resources and practices would have a long-term, beneficial impact on these resources at both the lower Grove area and at South Entrance. Removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove would have a beneficial impact.

Conclusion. Restoration activities to improve the health of the giant sequoia ecosystem at the Mariposa Grove would have long-term, moderate to major beneficial impacts on those values attributed to the Grove by American Indians with cultural associations to the Grove. Alternative 2 would continue to allow traditionally associated American Indians to have access to Mariposa Grove, Wawona Point, and South Entrance to pursue traditional cultural practices, and the expansion of visitor education and interpretation would enhance understanding and appreciation of archeological and traditional cultural resources at the Mariposa Grove. These actions would have long-term, moderate beneficial impacts. The removal of the parking area and gift shop from site CA-MRP-0661/H in the lower Grove area would also have a beneficial impact.

Alternative 2 construction actions, including to the removal of structures and paved areas, would have a long-term, moderate to major adverse impact on archeological site CA-MRP-0660/H. In addition, extensive clearing of the site would be a moderate adverse impact on traditional cultural resources.

There would be a short-term, minor adverse impact on archeological site CA-MRP-0661/H. Final design of facilities in the vicinity of this site would avoid or minimize potential impacts on the site. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. Mature black oak trees would be left in place in the vicinity of site CA-MRP-0661/GH and elsewhere, where feasible. Traditionally associated American Indian tribes and groups have specifically expressed concern about future development at these sites.

Overall, there would be a long-term moderate to major adverse impact on traditional cultural resources, largely from the loss of site CA-MRP-0660/H at the South Entrance, and the extensive clearing required as part of the South Entrance parking lot construction. Adverse effects would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting traditional cultural resources would be the same as those under Alternative 1 (No Action)—an overall long-term minor adverse impact on traditional cultural resources in the Mariposa Grove area. Under Alternative 2, there would be a long-term beneficial impact on the giant sequoia ecosystem with respect to restoration of giant sequoia habitat. The NPS would work with tribes and groups to improve accessibility to important resources and enhance interpretation of American Indian traditions and practices in Mariposa Grove. The reduction of automobile traffic within the Grove's giant sequoia habitat would improve the overall Grove experience. There would be major adverse impacts to the historic archeological site at the South Entrance in the lower Grove area, and minor impacts to the archeological site in the lower Grove area. In addition, loss of trees during construction of the South Entrance parking lot would be a long-term adverse impact on traditional cultural resources. Overall, there would be a long-term moderate to major impact on traditional cultural resources under Alternative 2.

The impacts of Alternative 2, in conjunction with the impacts from other past, present, and reasonably foreseeable projects affecting traditional cultural resources, would have an overall long-term moderate to major adverse impact on traditional cultural resources in the Mariposa Grove area. Mitigation developed in consultation with traditionally associated tribes and groups would be applied during project implementation, as described in a project-specific MOA (Appendix G).

Alternative 3: Grizzly Giant Hub

Alternative 3 would remove the commercial tram operation and build a new bypass road, including two new bridges, and a new parking lot near the Grizzly Giant, but outside of giant sequoia habitat. This alternative would make the Grizzly Giant the primary arrival point for visitors to the Grove. The current South Entrance parking lot would remain as is, and the parking lot in the lower Grove area would be removed and a small lot of ABAAS-compliant spaces would be constructed. The gift shop and commercial tram staging area in the lower portion of the Grove also would be removed, and the comfort station would be replaced. Numerous other repair, renovation, and ecological restoration actions, such as improvement of hydrologic flow, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, utility upgrades and relocations, universal access, and improvement of visitor orientation and interpretation, would be components of this alternative.

Construction-related Impacts. Construction of Alternative 3 would adversely impact one archeological site for which local American Indian tribes have expressed a vital connection and a desire for better protection from development and vandalism. Potential impacts on

CA-MRP-0661/H would occur at the lower Grove area from construction of a new bypass road to the Grizzly Giant Hub, which would bisect this site and alter the character of the topographic features in the immediate site vicinity. The installation of a smaller, relocated comfort station and accessible parking area, and the removal of the gift shop, exiting comfort station, commercial tram staging area, and existing roads and parking areas that are located on or near the site would also impact the site.

Some traditionally associated tribal representatives have questioned the need to construct a new road through a section of older growth forest when one already exists (the historic road). To damage the old growth mixed conifer forest to benefit sequoia restoration seemed inappropriate because the forest habitat had already begun recovery from previous road construction.

Impact Significance. Removal, road and facility construction, and reclamation of areas for ecological restoration in the lower Grove area under Alternative 3 would have a short-term, minor to moderate adverse impact on one archeological site that is traditionally significant to associated American Indians who expressed concern about protecting such resources from future development, and in particular about creating a second road corridor that would damage and degrade the natural setting.

Restoration-related Impacts. Restoration activities under Alternative 3 would improve the overall health of the giant sequoias at the Mariposa Grove. These actions, which include increasing habitat area, decompaction of soils, improving hydrology, reforestation, and prescribed fires, would enhance values important to American Indians with a cultural association to the groves, some of whom are interested in the restoration and preservation of flora and fauna species for traditional uses. The use of prescribed burns to restore habitat in particular is supported by traditionally associated American Indians. The Park would work with tribes and groups to improve conditions in the Grove for flora and fauna important to American Indians. Alternative 3 ecological restoration in the lower portion of the Grove would, on the other hand, have short-term, minor adverse effects on traditionally important archeological site CA-MRP-0661/H due to contouring, soil reconditioning, and the re-establishment of native flora.

Impact Significance. Improved giant sequoia habitat through restoration, especially prescribed burns, would have a beneficial impact on those characteristics of the Grove that are important to the traditionally associated American Indians by restoring native vegetation, which, in turn, would attract native fauna. Short-term, minor adverse impacts on traditionally significant site CA-MRP-0661/H would occur due to restoration actions in the lower portion of the Grove.

Operation-related Impacts. Operations under Alternative 3 would continue to allow traditionally associated American Indians to have access to the Mariposa Grove and the South Entrance for traditional practices. There is the potential for continued unauthorized collection of surface archeological artifacts from site CA-MRP-0661/H under Alternative 3. American Indians traditionally associated with these sites have expressed a desire that they be protected from vandalism. Improved information about native cultures and traditional resources and practices would also occur under Alternative 3.

Impact Significance. Archeological site CA-MRP-0661/H, which is of interest to traditionally associated American Indian tribes and groups, would likely be subject to long-term, minor adverse impacts by unauthorized collection of artifacts. Use of the new bypass road and Grizzly Giant Hub would have direct, moderate to major long-term adverse impacts on the archeological site and on forested areas at the edges of the giant sequoia groves. However, improved interpretation would

have a long-term beneficial impact on traditional cultural resources by improving visitor understanding and appreciation of these resources.

Conclusion. Restoration activities to improve the health of the giant sequoia ecosystem at the Mariposa Grove would have a long-term beneficial impact on those values attributed to the Grove by American Indians who have a cultural association with the Grove, Alternative 3 would continue to allow traditionally associated American Indian tribes to have access to the Mariposa Grove and the South Entrance for traditional practices, and the consolidation and expansion of visitor education at Grizzly Giant would enhance the interpretation of archeological and traditional cultural resources at the Mariposa Grove. These actions would have long-term, moderate beneficial impacts on traditional cultural resources.

Alternative 3 construction actions would have a short-term, minor to moderate, adverse impact on archeological site CA-MRP-0661/H, for which traditionally associated American Indian tribes and groups have specifically expressed concern about future development. Continued use of the new bypass road to Grizzly Giant would also have a long-term moderate to major long-term impact on archeological site CA-MRP-0661/H and traditional cultural resources, as it would introduce high volumes of visitor traffic into an area of known cultural use by American Indian people, as indicated by the presence of archeological resources.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting traditional cultural resources would be the same as those under Alternative 1 (No Action)—an overall long-term minor adverse impact on traditional cultural resources in the Mariposa Grove area. Under Alternative 3, there would be a long-term beneficial impact on the giant sequoia ecosystem with respect to restoration of giant sequoia habitat. The NPS would work with tribes and groups to improve accessibility to important resources and enhance the interpretation of American Indian traditions and practices in Mariposa Grove. The reduction of automobile traffic within the Grove's giant sequoia habitat would improve the overall Grove experience. The loss of trees required during construction of the Grizzly Giant hub and access road would be a long-term major adverse impact on traditional cultural resources. Overall, there would be a long-term major impact on traditional cultural resources under Alternative 3.

The impacts of Alternative 3, in conjunction with the impacts from other past, present, and reasonably foreseeable projects affecting traditional cultural resources, would have an overall long-term moderate to major adverse impact on traditional cultural resources in the Mariposa Grove area. Mitigation developed in consultation with traditionally associated tribes and groups would be applied during project implementation, as described in a project-specific MOA (Appendix G).

Alternative 4: South Entrance Hub with Modified Commercial Tram Service

Alternative 4 would remove the tram staging, gift shop, and the majority of visitor parking from Mariposa Grove, and would relocate primary visitor parking and tram staging to the new South Entrance Hub. New visitor services at the South Entrance area would include visitor information, educational, and other sales items. The commercial tram would continue to operate on a reduced schedule and route, originating at South Entrance and extending to the Mariposa Grove Museum, with stops at the lower and mid-Grove areas. The water tank and chlorination unit on the loop road in the upper portion of the Grove would be moved to a location near the museum building, and existing comfort stations at Grizzly Giant and in the upper portion of the Grove would be renovated, rehabilitated, or replaced. Numerous other repair, renovation, and ecological restoration actions, such as water line repair or replacement, replacement of the comfort station and installation of a new septic tank and leach field in the lower Grove area, historic rehabilitation of Wawona Point features, hydrologic improvements, and soil decompaction and revegetation would be components of this

alternative. An accessible trail would be developed in the lower Grove area, and accessible overlook at Grizzly Giant would be provided. The intersection of Mariposa Grove and Wawona roads at South Entrance would be realigned and a roundabout would replace the existing T-intersection if traffic conditions warrant this action.

Construction-related Impacts. Alternative 4 would affect two archeological sites for which local American Indians have expressed a vital connection and a desire for better protection from development and vandalism.

Construction of a new parking area at the South Entrance would impact nearly half of site CA-0660/H. In addition, extensive clearing required prior to construction would be a moderate adverse impact on traditional cultural resources. Actions in the lower Grove area that have the potential to adversely impact CA-MRP-0661/H include installation of a new shuttle turnaround, removal of existing roads and parking areas, and ecological restoration of modified areas. Parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. Black oak trees would be left in place in the vicinity of existing vegetated island west of the gift shop, and elsewhere where feasible. The main parking area and gift shop at the lower portion of the Grove would be removed from the vicinity of the site CA-MRP-0661/H.

Impact Significance. Construction activities under Alternative 4 would adversely affect two archeological sites important to culturally associated American Indian tribes and groups who have expressed concern about protecting these resources from future development. There is potential for moderate adverse impacts to site CA-MRP-0660/H from construction of the parking lot at the South Entrance. In addition, extensive clearing of the site would be a moderate adverse impact on traditional cultural resources.

Impacts on site CA-MRP-00661/H in the lower Grove area would be minor, as design would avoid ground disturbance and impacts to black oaks in the vicinity of the site. Removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove would be a beneficial impact.

Restoration-related Impacts. Ecological restoration activities under Alternative 4 would improve the overall health of the giant sequoia at Mariposa Grove. These actions, which include increasing habitat area, reconditioning soils, improving hydrology, reforestation, and prescribed burns, would enhance values important to American Indians with a cultural association to the Grove, some of whom are interested in the restoration and preservation of flora and fauna species for traditional uses. The use of prescribed burns to restore habitat in particular is supported by traditionally associated American Indians. The Park would work with tribes to improve conditions in the Grove for flora and fauna species important to American Indian tribes and groups. Alternative 4 restoration in the lower portion of the Grove would, on the other hand, have adverse impacts on traditionally significant archeological site CA-MRP-0661/H through recontouring, reconditioning of soils, and revegetation where facilities have been removed and the planting of native vegetation. These impacts would be considered temporary adverse impacts.

Impact Significance. Improved giant sequoia habitat through ecological restoration would have a positive impact on those characteristics of the Grove that are important to the traditionally associated American Indians by restoring native vegetation, which, in turn, would attract native fauna. Traditionally significant site CA-MRP-0661/H would be subject to short-term minor adverse

impacts by restoration actions in the lower portion of the Grove. Revegetation of areas at Wawona Point also would be beneficial.

Operation-related Impacts. Operations under Alternative 4 would continue to allow traditionally associated American Indian tribes to have access to the Mariposa Grove and the South Entrance for traditional practices. There is the potential for continued unauthorized collection of surface archeological artifacts from sites CA-MRP-0660/H and CA-MRP-0661/H under this alternative. American Indian tribes and groups traditionally associated with these sites have expressed a desire that they be protected from vandalism. If construction and operation of a leach field cannot be designed to avoid impacts to the traditionally significant archeological site (CA-MRP-0661/H), then vault toilets or a sewer line to South Entrance would be installed instead. Reduced concentration of visitor parking at the lower Grove area would enhance the natural ambience of the Grove, and thus enhance the features of the Grove that are important to traditionally associated American Indians. Also, improved information about native cultures would also occur under Alternative 4. Alternative 4 would provide for additional public information about American Indian traditional culture, which would be a beneficial impact. The need for increased public information about American Indian history and cultural practices has been repeatedly expressed by tribal representatives during project consultation.

Impact Significance. Potential vandalism is a long-term, minor, adverse impact on significant traditional cultural resources. Enhanced interpretation of traditional cultural resources and practices would have a long-term, beneficial impact on these resources at both the lower Grove area and at South Entrance. Removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove would be a beneficial impact.

Conclusion. Restoration activities to improve the health of the giant sequoia ecosystem at the Mariposa Grove would have long-term, moderate to major beneficial impacts on those values attributed to the Grove by American Indians with cultural associations to the Grove. Alternative 4 would continue to allow traditionally associated American Indians to have access to the Mariposa Grove and the South Entrance for traditional practices, and the enhancement of visitor education would enhance the understanding and appreciation of traditional cultural values and archeological resources at Mariposa Grove. These would be long-term, beneficial impacts. Other beneficial impacts included removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove.

Alternative 4 construction actions, including to the removal of structures and paved areas, would have a long-term, moderate to major adverse impact on archeological site CA-MRP-0660/H. In addition, extensive clearing of the site would be a moderate adverse impact on traditional cultural resources.

There would be a short-term, minor adverse impact on archeological site CA-MRP-0661/H. Final design of facilities in the vicinity of this site would avoid or minimize potential impacts on the site. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. Mature black oak trees would be left in place in the vicinity of the site CA-MRP-0661/H and elsewhere where feasible. Traditionally associated American Indian tribes and groups have specifically expressed concern about future development at these sites.

Overall, there would be a long-term moderate to major adverse impact on traditional cultural resources, largely from the loss of site CA-MRP-0660/H at the South Entrance, and the extensive clearing required as part of the South Entrance parking lot construction. Adverse effects would be

resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Cumulative Impacts. The regional past, present, and reasonably foreseeable projects affecting traditional cultural resources would be the same as those under Alternative 1 (No Action)—an overall long-term minor adverse impact on traditional cultural resources in the Mariposa Grove area. Under Alternative 4, there would be a long-term beneficial impact on the giant sequoia ecosystem with respect to restoration of giant sequoia habitat. The NPS would work with tribes and groups to improve accessibility to important resources and enhance interpretation of American Indian traditions and practices in Mariposa Grove. The reduction of automobile traffic within the Grove's giant sequoia habitat would improve the overall Grove experience. There would be major adverse impacts to the historic archeological site at the South Entrance in the lower Grove area, and minor impacts to the archeological site in the lower Grove area. In addition, the loss of trees required during construction of the South Entrance parking lot would be a long-term adverse impact on traditional cultural resources. Overall, there would be a long-term moderate to major impact on traditional cultural resources under Alternative 4.

The impacts of Alternative 4, in conjunction with the impacts from other past, present, and reasonably foreseeable projects affecting traditional cultural resources, would have an overall long-term moderate to major adverse impact on traditional cultural resources in the Mariposa Grove area. Mitigation developed in consultation with traditionally associated tribes and groups would be applied during project implementation, as described in a project-specific MOA (Appendix G).

ARCHEOLOGICAL RESOURCES

Affected Environment

To date, at least 10 percent of Yosemite National Park lands, including the Mariposa Grove, have been inventoried for cultural resources, and more than 1,700 archeological sites have been documented. Most of the inventories have focused on lower-elevation, developed areas and road corridors, however, some wilderness and higher-elevation areas also have been surveyed. In most cases, inventories have been conducted in support of park development projects as part of the environmental and historic preservation compliance processes. The park-wide archeological research design developed by Hull and Moratto (1999), titled *Archeological Synthesis and Research Design for Yosemite National Park, California*, provides guidance for assessing the research potential of these sites. This document provides the most recent comprehensive overview of Yosemite National Park's archeological resources and their informational value.

Yosemite National Park Archeology

Prehistoric archeological sites within Yosemite National Park include lithic scatters and milling stations (granite boulders with mortar cups or milling slicks), the most common site features documented to date; artifact caches and scatters (including obsidian waste flakes, obsidian and ground stone tools, soapstone vessel fragments, and dietary faunal remains); midden soils; rock shelters; pictograph panels; human burials; house floors; fire hearths; and rock alignments. Historical archeological sites include refuse deposits, building foundations, privy pits, utilities, human burials, and landscape features such as ditches, roads, rock alignments, and trails. Individual sites vary by type, size, depth, complexity, length of occupation, variety of remains, and potential to yield important scientific information.

James Bennyhoff of the University of California at Berkeley presented the first cultural chronology for prehistoric sites in the park, which was based on his excavations at Crane Flat that were conducted in the early 1950s (Bennyhoff 1956). Bennyhoff identified three cultural complexes for the region. Though the dating was tenuous, from oldest to youngest, these were the Crane Flat (circa A.D. 500), Tamarack (circa A.D. 500-circa 1200), and Mariposa (circa A.D. 1200-circa 1850) complexes. Since that initial effort to characterize temporal associations of archeological resources in the park, numerous studies have contributed to improved understanding of the past human occupation. These studies have included cultural resource management studies within the Park; overviews of the southern and central Sierra; and excavations of sites at Mariposa Grove, Glacier Point Road, Dana Meadows, Tuolumne Meadows, Tamarack Flat, Crane Flat, Yosemite Valley, and El Portal.

Based on the expanded database of archeological information, Hull and Moratto (1999) proposed a new cultural chronology that reflects the complexity of human occupation throughout the park over the millennia. The periods of occupation identified by Hull and Moratto (1999:182) include: the Early Prehistoric (>9500-6000 B.C.), represented by the El Portal and other as-yet-unidentified complexes or phases; the Intermediate Prehistoric (6000-1200 B.C.), as reflected by the Merced, Clyde, Wawona, and other unidentified phases; the Late Prehistoric (3500-1200 B.C.- A.D. 1800), expressed by the Crane Flat, Cowhorn, Tamarack, Baker, Mariposa, and Klondike complexes; the Protohistoric (A.D. 1800-1847), representative of the cultural changes in response to the Gold Rush and the “discovery” of Yosemite, and identified as the Yosemite phase; and the Historic period (post A.D. 1848), referred to as the Tenaya complex, which encompasses the ethno-historic period following the Gold Rush. Hull and Moratto (1999:181) cautioned that “the culture history ... must be viewed as tentative and subject to revision as archeological research continues.”

Archeological studies conducted at three sites within the area of potential effect established for this project at South Entrance and in the Mariposa Grove of Giant Sequoias (figure 3-18; Hull 1989) indicate that the area has been inhabited by American Indians for at least 3,500 years (Bane 2012:5). Site CA-MRP-660/H, located at the South Entrance, was occupied between 500 A.D. and 1500 A.D., while materials recovered at Mariposa Grove sites CA-MRP-199 and CA-MRP-661/H reflect a different pattern of use. Three periods of occupation were identified at CA-MRP-199; two were dated between 1500 B.C. and A.D. 500, and the third was from A.D. 1500 to A.D. 1850. The CA-MRP-661/H deposits, on the other hand, suggest sporadic occupation since 1500 B.C.

Historical archeology is closely tied to the nineteenth and twentieth century development of Yosemite, beginning with vestiges from early explorers and continuing through NPS management of the park. In addition to Anglo-American historical use of Yosemite, a subset of historical archeology represented at the park includes historical American Indian sites. Hull and Moratto (1999:507-510) present an integrated list of historical archeological resource types documented in Yosemite National Park that include transportation, exploration and survey, historical Native American, hunting/trapping, residential, water diversion/use, mine and quarry, logging, ranching/herding/farming, environmental management, tourism, park operations and administrative, and other types such as cemeteries. Hull and Moratto (1999:511-531) then developed Yosemite-specific themes oriented to historical archeology. Themes relevant to the Mariposa Grove ecological restoration project include transportation, national resource management (e.g., Civilian Conservation Corps), and industrial (e.g., logging).

During the nineteenth century, the Yosemite area and its natural resources were used and exploited by individuals for private gain, and included mainly mining, herding, logging, and tourism. The progression of such development was particularly evident in the transportation and lodging infrastructure. At the end of the nineteenth century, the area became the first major parcel of federal

land to be set aside for preservation purposes as a result of the movement to preserve the natural wonders of Yosemite Valley and the Mariposa Grove of Big Trees. Congressional passage of the Yosemite Grant in 1864 protected the Grove as a state land grant until 1890, when it was designated a national park by Congress. The creation of this park and its policies on the nature of acceptable land use fostered tensions between private entrepreneurs, who used public lands for their own profit, and state and federal governments. These tensions resulted in a number of lawsuits that tested the rights of private individuals versus the federal government. Ultimately, the federal government prevailed in preserving Yosemite Valley and the surrounding lands for the public. The preservation of this area reduced the environmental impacts caused by private enterprises, such as livestock grazing, logging, cultivation, and mining, within and adjacent to the park.

The historic-era archeology of Mariposa Grove is strongly related to the tourism that developed out of the establishment of the park, as it was among the initial lands set aside for protection in 1864. Historic-era archeological remains at South Entrance also reflect tourism after 1932, when the Wawona Basin was included in the park boundaries. Prior to that date, the area was heavily used as a center for logging by the Madera Sugar Pine Company, which operated there from 1908 to 1931. Many of the historic-era archeological sites at South Entrance reflect the lumber industry from that period.

Mariposa Grove Archeology

Since the mid-1950s, eight cultural resources studies have been conducted at the Mariposa Grove. These have primarily included archeological surveys (Bennyhoff 1956; Napton and Greathouse 1976; Hull and Mundy 1985; Jackson 2002; Bane 2012), but limited site test excavation (Hull 1989) and a cultural landscape inventory (Caywood and Homstad 2004a) have also been completed. The Mariposa Grove Archeological District, which was listed in the National Register in 1980, was established as the result of some of the earliest studies (NPS 1980b). The Mariposa Grove Archeological District consists of three noncontiguous areas (Areas 1 through 3) ranging in size from 10 acres (Areas 1 and 3) to 15 acres (Area 2) that surround three discrete prehistoric archeological sites with bedrock mortars. These include sites CA-MRP-198 (Area 1), CA-MRP-199 (Area 2), and CA-MRP-372 (Area 3). Altogether, 21 archeological resources have been recorded within Mariposa Grove: 4 prehistoric archeological sites, 15 historic-era sites, and 1 multicomponent site that contain both prehistoric and historic-era constituents (table 3-9).

Nine of the 21 sites have been evaluated for National Register eligibility; the remaining 12 sites have not yet been evaluated, as summarized in table 3-9. Four of the historic-era sites (CA-MRP-2109H, P-22-002384, P-22-002385, and P-22-002386) are small, diffuse trash scatters adjacent to the Mariposa Grove Road, and likely represent single episodes of discard from the road shoulder. The NPS (Bane 2012) evaluated these sites and recommended that they be considered ineligible for listing in the National Register, as they do not meet any of the eligibility criteria. The California SHPO concurred with a determination of ineligibility for these four sites in February 2013. Hull (1989) conducted test excavations at multicomponent site CA-MRP-661/H in 1985, and recommended the site as eligible for inclusion in the National Register. Hull also conducted test excavations at prehistoric site CA-MRP-199 in 1985, and, as noted above, this site is National Register-eligible as part of the Mariposa Grove Archeological District. CA-MRP-1618H, the Mariposa Grove Road, also is considered eligible for the National Register as a contributing element of the Mariposa Grove Historic District. This historic feature extends between Mariposa Grove and its intersection with Wawona Road at South Entrance.

Table 3-9 – Mariposa Grove Archeological Resources

Site Number	Site Type	National Register of Historic Places Eligibility
CA-MRP-198	Prehistoric	Eligible*
CA-MRP-199	Prehistoric	Eligible*
CA-MRP-372	Prehistoric	Eligible*
CA-MRP-661/H	Multi-Component	Eligible
CA-MRP-662	Prehistoric	Not evaluated
CA-MRP-1611H	Historic-Era	Not evaluated
CA-MRP-1612H	Historic-Era	Not evaluated
CA-MRP-1613H	Historic-Era	Not evaluated
CA-MRP-1614H	Historic-Era	Not evaluated
CA-MRP-1615H	Historic-Era	Not evaluated
CA-MRP-1616H	Historic-Era	Not evaluated
CA-MRP-1617/H	Historic-Era	Not evaluated
CA-MRP-1618H	Historic-Era	Eligible
CA-MRP-1843H	Historic-Era	Not evaluated
CA-MRP-2109H	Historic-Era	Not Eligible
P-22-002376	Historic-Era	Not evaluated
P-22-003284	Historic-Era	Not Eligible
P-22-003285	Historic-Era	Not Eligible
P-22-003286	Historic-Era	Not Eligible
P-22-003287	Historic-Era	Not evaluated
YOSE 1998 W-02		Not evaluated

* = Site is a contributor to the Mariposa Grove Archeological District

South Entrance Archeology

The South Entrance area has been subject to seven cultural resources studies: 6 archeological surveys (Hull and Mundy 1985; Hull and Hale 1997; Jackson 2002; Peabody and Beville 2009; URS n.d.; Bane 2012), 1 limited site test excavation (Hull 1989), and a cultural landscape inventory (Caywood and Homstad 2004b). Ten archeological sites (8 historic-era, 2 multicomponent,) have been recorded in this area (table 3-10). Hull (1989) recommended CA-MRP-660/H as eligible for the National Register after conducting test excavations at the site in 1985. As previously noted in table 3-9, the Mariposa Grove Road (CA-MRP-1618H) was determined eligible for the National Register as a contributing element of the Mariposa Grove Historic District. The remaining 8 sites, including CA-MRP-1620H, the Washburn Wagon Road, is currently under evaluation for National Register eligibility.

Table 3-10 – South Entrance Archeological Resources

Site Number	Site Type	National Register of Historic Places Eligibility
CA-MRP-660/H	Multi-Component	Recommended Eligible
CA-MRP-716H	Historic-Era	Not evaluated
CA-MRP-1361H	Historic-Era	Not evaluated
CA-MRP-1618H	Historic-Era	Eligible
CA-MRP-1620H	Historic-Era	Recommended Eligible
CA-MRP-1850/H	Multi-Component	Not evaluated
CA-MRP-2105H	Historic-Era	Not evaluated
CA-MRP-2107H	Historic-Era	Not evaluated
CA-MRP-2108H	Historic-Era	Not evaluated
CA-MRP-2110H	Historic-Era	Not evaluated

Environmental Consequences

Impact/Effects Assessment Methodology. Historic properties, as defined by the implementing regulations of the NHPA, are any districts, buildings, structures, sites, or objects eligible for inclusion in the National Register because they are significant at the national, state or local level in American history, architecture, archeology, engineering, or culture. Historic properties also include resources considered by American Indians to have cultural and/or religious significance. The term “eligible for inclusion” includes both properties formally determined eligible and all other properties that meet National Register listing criteria.

Effects on archeological resources considered eligible for inclusion in the National Register were analyzed in accordance with 36 CFR 800.5(a)(1) effects criteria. Archeological sites are most often determined eligible for the National Register under 36 CFR 60.4, Criterion (d), as resources that have “yielded, or may be likely to yield information important in prehistory or history.”

Adverse effects result when it is determined that a proposed action would diminish the characteristics that make a historic property eligible for inclusion in the National Register. For archeological sites, these actions generally include physical destruction of, or damage to, all or part of the property.

National Historic Preservation Act Methods for Assessing Effect. Pursuant to Director’s Order 12 (Sections 2.14(6)(3), 6.2 F, and 6.3 F and Appendix 3); 40 CFR 1508.7, 1508.8, and 1508.27; and 36 CFR 800.8), effect intensity, duration, context, and type as they relate to historic properties, are determined using the criteria established in 36 CFR Part 800. When the effect of an action results in an alteration of the characteristics of a cultural resource that qualify it for inclusion in the National Register as a historic property, the action is considered to have an adverse effect under Section 106 of the NHPA. Per 36 CFR 800.5(a)(1), an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

The cultural resources investigations and reports for the project were undertaken in accordance with the NHPA Section 106 implementing regulations, 36 CFR 800, Protection of Historic Properties. As amended, Section 106 of the NHPA requires federal agencies with either direct or indirect jurisdiction over a proposed undertaking to take into account the effect of the undertaking on historic properties. As part of Section 106 compliance, a four-step process is typically implemented, and consists of the following: initiate consultation (36 CFR 800.3); identify historic properties (36 CFR 800.4); assess adverse effects (36 CFR 800.5); and resolve adverse effects (36 CFR 800.6). These steps involve a range of activities, such as defining the undertaking, identifying the proper consulting parties (e.g., SHPO and American Indian tribes and groups), delineating the APE, identifying and evaluating properties in the APE, applying the effects criteria, and resolving any adverse effects.

Under this four-step process, there are three possible effects determinations:

No Historic Properties Affected – A “no historic properties affected” determination indicates that no historic properties are in the APE, or that there are historic properties in the APE, but the undertaking would not alter the characteristics that qualify it for inclusion in or eligibility for the National Register.

No Adverse Effect – A “no adverse effect” determination indicates that there would be an effect on the historic property by the undertaking, but the effect does not meet the criteria of adverse effect in 36 CFR 800.5(a)(1) and would not alter any of the characteristics that make it eligible for listing in the National Register in a manner that would diminish the integrity of the historic property.

Adverse Effect – An adverse effect indicates that the undertaking would alter, directly or indirectly, any of the characteristics that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property.

Adverse effects may be resolved by developing a memorandum of agreement or programmatic agreement among the project proponent, the SHPO, and the ACHP, and in consultation with associated American Indian tribal governments and traditionally affiliated groups, and other consulting parties, such as American Indian tribes (36 CFR 800.6). The agreement would specify the mitigating actions that must be taken to resolve the adverse effects, and the implementation and documentation protocols to be followed.

As previously noted (see American Indian Traditional Cultural Resources section, above), impacts on cultural resources that are deemed ineligible for listing in the National Register are also addressed under NEPA. NEPA states that, in considering whether an action may “significantly affect the quality of the human environment,” an agency must consider, among other things, the unique characteristics of the geographic area, such as proximity to historic or cultural resources [40 CFR 1508.27(3)], and the degree to which the action may adversely affect districts, sites, linear features, landscapes, buildings, structures, or objects listed, or eligible for listing, in the National Register, or may cause loss or destruction of significant scientific, cultural, or historical resources [40 CFR 1508.27].

However, the evaluation of project impacts under NEPA is not the same as the evaluation of those effects under Section 106. The ACHP stated in the preamble for the revised Section 106 regulations (ACHP 2001: 49) that the rules contain “no significance or materiality limitations,” such as those contained in the NEPA that limit most of that statute’s key provisions only to actions that might significantly affect the environment. In contrast, the ACHP Section 106 rules seek to require agencies to examine all effects of any intensity, whether or not the effects are significant. Where there is an alteration of a historic property, any diminishment of any aspect of its historic integrity, however measured and however great or small, can support a finding of “adverse effect.” As a result, any reduction in the intensity of an impact through mitigation would not necessarily reduce an adverse effect to a “no effect.” That is, although actions determined to have an adverse effect under Section 106 and 36 CFR 800 may be mitigated, the effect remains adverse. An adverse effect finding under Section 106 could be an impact with moderate or substantial intensity under NEPA.

NEPA impacts are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the impact, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the impact, duration of the effect (short- or long-term), and other consideration of context. Beneficial effects are also considered. When no measurable effect exists, there is no impact. The intensity of an impact is the degree or magnitude of a potential impact, described as negligible, minor, moderate, or major. Context and intensity are considered together when determining whether an impact is significant under NEPA. Thus, it is possible that a significant adverse effect under Section 106 may still exist when the intensity of the impact is determined to be negligible or even if the impact is beneficial.

The following defines the impact intensities for those cultural resources within the project area that are not eligible for listing in the National Register:

- Negligible Impact Intensity – the impact would be at the lowest levels of detection, barely measurable, with no perceptible consequences either adverse or beneficial to the resources.
- Minor Impact Intensity – the impact is measurable or perceptible, but it is slight and affects a limited area of a resource or group of resources.
- Moderate Impact Intensity – the impact is measurable and perceptible.
- Major Impact Intensity – the impact is substantial, noticeable, and permanent.

Area of Potential Effects

The APE for a federal undertaking under the NHPA is defined at 36 CFR 800.16(d) as “...the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” The APE for the current project includes the Mariposa Grove and South Entrance vicinities, including the transportation corridor linkages (i.e. the Washburn Wagon Road route and the Mariposa Grove Road) between the two areas, as depicted in figure 3-18. The APE encompasses the Mariposa Grove Archeological District, as well as the Mariposa Grove and South Entrance Station historic districts. As described above, the APE incorporates historic properties, archeological resources deemed ineligible for inclusion in the National Register, and archeological resources not yet evaluated for National Register eligibility. In accordance with NPS policy, resources for which eligibility has not been determined are considered potentially eligible for inclusion in the National Register.

Alternative 1: No Action

Under Alternative 1, current infrastructure, concessioner services and maintenance, and park management would remain as is. No repair, renovation, or ecological restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvement of visitor orientation and interpretation, would be implemented.

Operation-related Impacts. Under Alternative 1, the existing conditions for archeological resources within the project area would not be altered, including the four sites in the Mariposa Grove Archeological District. Portions of site CA-MRP-1361/H, which has not yet been evaluated for National Register eligibility, are currently beneath the parking area at the South Entrance. Similarly, the existing gift shop and shuttle staging area at the lower portion of the Grove overlie parts of site CA-MRP-0661/H, which has been found to be eligible for listing in the National Register. A historic-era artifact scatter associated with this site also is in close proximity to gift shop, which may result in the unauthorized collection of artifacts by park visitors. Unauthorized collection is considered an adverse effect. Other current operational impacts that exist within the boundaries of CA-MRP-0661/H include concessioner parking, picnicking facilities next to the gift shop, burn piles, and hazard fuel thinning. Furthermore, there is little interpretation of archeological resources within the Mariposa Grove.

Impact Significance and Determination of Effect. The potential for unauthorized collection of artifacts at site CA-MRP-0661/H would continue under Alternative 1, and constitutes an adverse effect on this historic property under Section 106 of the National Register. Portions of CA-MRP-1361/H lie beneath the existing parking lot at the South Entrance. This site has not yet been evaluated for National Register eligibility, but is assumed eligible until determined otherwise.

Areas of this site beneath the parking lot currently are protected from further disturbance, and features adjacent to the parking lot lie outside of areas likely to be subject to disturbance by park visitors. Alternative 1 would have no adverse effect on CA-MRP-1361/H.

Conclusion. Under Alternative 1, the No Action Alternative, the condition, routine maintenance, and operations of the Mariposa Grove and the South Entrance would remain unchanged. The potential for adverse effects through unauthorized collection of artifacts would continue in the lower portion of the Grove at site CA-MRP-0661/H, and portions of site CA-MRP-1316/H would remain protected by the parking lot at the South Entrance. None of the other archeological resources identified in the project APE, including those sites that contribute to the Mariposa Grove Archeological District, would be impacted under Alternative 1. Routine or emergency repairs that could occur during concessioner and park operation of Mariposa Grove and South Entrance (e.g., repairs to existing septic systems and leach fields or buried utilities; excavation of fire breaks) could result in disturbance of archeological deposits. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance. There would continue to be limited interpretation of archeological resources in this area of the park.

Cumulative Impacts. The following cumulative effect discussion on archeological resources considers the past, present, and reasonably foreseeable actions in the Mariposa Grove area, in combination with potential effects of Alternative 1 (No Action). Archeological resources in the area were disturbed in the past by construction, operation, and maintenance activities through time. There have been eight archeological studies in the Mariposa Grove area and seven studies at the South Entrance since the mid-1950s. These studies identified a number of sites as eligible for the National Register, though many sites were not evaluated.

Present and future projects in the Mariposa Grove area with ground-disturbing components and the potential for archeological effects include: placement of riprap along historic road shoulders after flood events, Mariposa Grove Comfort Station Log Replacement and Repair, Mariposa Grove Interpretive Sign Installation, Mariposa Grove Trails and Asphalt Removal, Replace Mariposa Grove Remote Access Weather Station with Standard Tower, South Entrance Boundary Marker Stabilization, South Entrance Leach Field Repair, South Entrance Office Reroute Telephone Line, South Entrance Station Reestablish Exit Lane, South Entrance Safety Improvements, South Entrance Station Reestablish Exit Lane, South Entrance Traffic Safety Improvements, South Entrance Station Kiosks Replacement, Tachyon Satellite Equipment Installation. Appendix B describes these projects in more detail. During project implementation, the NPS avoided adverse effects or otherwise carried out mitigation to minimize potential effects on cultural resources. With application of mitigation, which may include consultation, survey, testing, monitoring, and data recovery prior to each project, adverse effects of these projects were resolved.

Alternative 1 (No Action) would result in no change in the current treatment and management of archeological resources. Maintenance activities would have no effect on archeological resources, as appropriate mitigation measures would be enacted. Unauthorized collection of archeological artifacts from the ground surface by visitors could continue. Overall, there would be no adverse effects.

In summary, past, present and foreseeable future actions would have a no effect on archeological resources in the Mariposa Grove area. Under Alternative 1, there would be no adverse effect on archeological resources in the Mariposa Grove area. Present and future effects, in conjunction with the effects of Alternative 1 (No Action), would result in no adverse effects on archeological resources in the Mariposa Grove area.

Alternative 2: South Entrance Hub (Preferred Alternative)

Alternative 2 would remove the commercial tram operations and reduce the amount of impervious surfaces and structures in the lower portion of the Grove, while relocating primary visitor parking to South Entrance. New visitor services at the South Entrance area would include visitor information, educational, and other sales items. The water tank and chlorination unit on the loop road in the upper portion of the Grove would be relocated to a nearby location outside of sequoia habitat. The gift shop in the lower portion of the Grove, the existing vault toilets at the Grizzly Giant, and the existing vault toilet in the upper portion of the Grove (near the old lodge site) would be removed. Numerous other repairs, renovations, and ecological restoration actions, such as water line repair or replacement, renovation of the comfort station and installation of a new septic system and leach field in the lower portion of the Grove, historic rehabilitation of Wawona Point features, and soil decompaction would be components of this alternative. Visitor orientation would be improved and interpretation of natural and cultural/archeological resources would be expanded. Modifications to enhance accessibility would be made at South Entrance parking, the restored lower Grove area and the Grizzly Giant. The intersection of Mariposa Grove Road and Wawona Road at South Entrance would be realigned and, if needed, to address congestion, a roundabout could replace the existing T-intersection.

Construction-related Impacts. Construction of a new parking area at the South Entrance would impact nearly half of site CA-0660/H, which has been recommended eligible for listing in the National Register. Modification of the existing South Entrance paved parking lot to serve as a bus turnaround would impact the southernmost extent of site CA-MRP-1361/H. This site has not been evaluated for listing in the National Register, and evaluation would be necessary, but until then, CA-MRP-1361/H is assumed eligible. The portion of the site that would be impacted has been previously disturbed and contains no intact features or recorded artifacts. Alternative 2 also proposes to convert the majority of the 1.5-mile-long historic-era Washburn Wagon Road, CA-MRP-1620H, to a pedestrian trail that would lead from the South Entrance to the Mariposa Grove. The remaining 1,100 feet of the wagon road would be removed during construction of the proposed South Entrance hub parking lot. The road was identified as a contributing resource to an amended determination of eligibility for the Mariposa Grove Historic District Determination in 2012.

Actions at the lower portion of the Grove that have the potential to adversely impact CA-MRP-0661/H include installation of a new shuttle turnaround, removal of the gift shop and modification of existing parking areas, and ecological restoration of modified areas. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. The new proposed trail would be designed to run outside of known historic sites, and data recovery would be conducted as appropriate during trail construction.

Ground-disturbing activities associated with removal and construction of facilities under Alternative 2 also would have a potential to disturb previously undocumented archeological resources and/or archaeological deposits that are not visible on the ground surface. The potential effect of these activities on such resources would depend on the significance of the resource, and the extent and magnitude of disturbance of such resource during project implementation. Alternative 2 construction would not affect sites included in the Mariposa Grove Archeological District.

Impact Significance and Determination of Effect. Construction of new parking and the realignment of Wawona Road at the South Entrance would have an adverse effect on site CA-MRP-0660/H. The NPS would ensure that installation of a leach field and removal of the gift shop and appurtenant facilities in the lower Grove area would not adversely affect CA-MRP-0661/H.

Neither site CA-MRP-1361/H nor CA-MRP-1620H has been evaluated for National Register eligibility, but until evaluation studies are complete, these resources are assumed to be eligible. The portion of CA-MRP-1361/H that would be affected by construction has been previously disturbed, and contains no intact features or recorded artifacts. Portions of the site that would be disturbed by construction of Alternative 2 components are not likely to contribute to the significance of the site, and therefore would not result in an adverse effect. Approximately 1,100 feet of the historic-era Washburn Wagon Road (CA-MRP-1620H) would be removed during parking lot construction, which would result in an adverse effect on the resource. However, rehabilitation of the remaining segment of CA-MRP-1620H (between the proposed South Entrance parking lot and the picnic area along Mariposa Grove Road) for use as a pedestrian trail would restore its circulation function. Rehabilitation actions, such as clearing deadfall and brush and regarding to arrest erosion, would have no adverse effect on this linear historic property.

Impacts to site CA-MRP-0661/H would be minor, as design would avoid ground disturbance in the vicinity of the site. The parking area and gift shop at the lower portion of the Grove are being removed to specifically move them away from CA-MRP-0661/H. Removal of the parking area and gift shop away from CA-MRP-0661/H at the lower portion of the Grove would be a beneficial impact.

Ground disturbance during habitat restoration-related activities (e.g., soil decompaction, drainage improvements, removal of undesirable plant species, new plantings or transplanting) under Alternative 2 has the potential to disturb buried archeological deposits that are undocumented. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Sites associated with the Mariposa Grove Archeological District would not be impacted by Alternative 2 restoration-related activities.

Operations-related Impacts. Continued public access to sites CA-MRP-0660/H and CA-MRP-0661/H during the operation of Alternative 2 could potentially lead to unauthorized collection of surface artifacts by park visitors. Such collection would be considered an adverse effect on National Register-eligible historic properties. However, Alternative 2 would reduce public access to CA-MRP-0661/H relative to the Alternative 1, which would be a beneficial action.

Routine or emergency repairs that could occur during operation of Alternative 2 at the Mariposa Grove and the South Entrance (e.g., repairs to septic systems and leach fields or buried utilities; excavation of fire breaks) could result in disturbance of archeological deposits, including those that are not visible on the ground surface. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Impact Significance and Determination of Effect. Unauthorized collection of artifacts potentially could occur at sites CA-MRP-0660/H and CA-MRP-0661/H as a result of ongoing park and concessioner operations and visitor use under Alternative 2. Such collection of archeological materials at resources that are eligible for the National Register would be an adverse effect. Reduced public access to CA-MRP-0661/H under Alternative 2, relative to Alternative 1, would be a beneficial action.

Routine or emergency repairs that could occur during operation of Alternative 2 at the Mariposa Grove and the South Entrance could result in disturbance of archeological deposits. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Conclusion. Two archeological sites that have previously been determined eligible for the National Register would be adversely affected by construction activities under Alternative 2.

CA-MRP-0660/H would be disturbed by development of a new parking lot at the South Entrance, and the realignment of Wawona Road. Alternative 2 construction actions would have a short-term, minor adverse impact on archeological site CA-MRP-0661/H. Final design of facilities in the vicinity of this site would avoid or minimize potential impacts on the site. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features.

Sites CA-MRP-1361/H and CA-MRP-1620H require further evaluation, but are considered eligible for listing in the National Register for the purposes of this assessment. Because portions of CA-MRP-1361/H have been previously disturbed and no intact features or artifacts remain in the proposed construction area, a finding of no adverse effect may be appropriate for this resource under Alternative 2, pending further evaluation. However, approximately 1,100 feet of the historic-era Washburn Wagon Road would be removed by construction of the parking area at South Entrance, which would result in an adverse effect on site CA-MRP-1620H. The consolidation and expansion of visitor education at a South Entrance hub would enhance the interpretation of archeological resources at Mariposa Grove and at South Entrance.

Temporary, minor adverse impacts on traditionally significant site CA-MRP-0661/H would occur from restoration actions at the lower portion of the Grove, and there would be increased potential for operations-related adverse effects on sites CA-MRP-0660/H and CA-MRP-0661/H in the form of unauthorized collection of surface artifacts.

Actions having no adverse effects under Alternative 2 include the clearing of deadfall and brush from approximately 1.3 miles of the Washburn Wagon Road (CA-MRP-1620H), reducing public access to CA-MRP-0661/H, and expanding public information about archeological resources.

Cumulative Impacts. Present and reasonably foreseeable projects affecting archeological resources would be the same as those under Alternative 1 (No Action)—no adverse effect on archeological resources in the Mariposa Grove. Under Alternative 2, there would be an adverse effect on site CA-MRP-0660/H at the South Entrance, adverse effect on site CA-MRP-1620H, to the Washburn Wagon Road, and may have an adverse effect on site CA-MRP-0661/H in the lower Grove area. The effects of Alternative 2, in conjunction with past, present, and reasonably foreseeable projects, would have an adverse effect on archeological resources in the Mariposa Grove area. Adverse effects would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Alternative 3: Grizzly Giant Hub

Alternative 3 would remove the commercial tram operation and build a new bypass road, including two new bridges and a new, larger parking lot near the Grizzly Giant outside of giant sequoia habitat. This alternative would make the Grizzly Giant the primary departure point for visitors to the Grove. The existing road from Grizzly Giant to Wawona Point would be narrowed and converted to a hardened trail. A new grove bypass road would be constructed between lower portion of the Grove and Grizzly Giant and the current road would be removed and vegetation restored. The loop road in the upper portion of the Grove would be decommissioned and converted into a pedestrian trail. The parking lot in the lower portion of the Grove would largely be removed and replaced by a significantly smaller parking lot for ABAAS parking. Additional facilities to be removed from the lower portion of the Grove include the gift shop, visitor information kiosks, the commercial tram

staging area, and the existing comfort station. Other changes at the lower portion of the Grove would include a new trailhead and loop trail that would serve ABAAS visitors, and installation of new comfort station. Visitor orientation would be improved and interpretation of natural and cultural/ archeological resources would be expanded. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, and soil decompaction, would be components of this alternative. The current South Entrance parking lot would remain as is.

Construction-related Impacts. Under Alternative 3, the new Grove bypass road would pass through the center of site CA-0661/H, which is a National Register-eligible property. Development of the ABAAS-compliant accessible parking lot and removal of the gift shop, access road, and parking area in the lower portion of the Grove also could disturb this site. These activities could have an adverse effect on site CA-0661/H.

The establishment of new parking lot and bypass road at the Grizzly Giant has the potential to impact site CA-MRP-2109H, a small, diffuse, historic trash scatter. The site has been determined to be ineligible for listing in the National Register, and construction of the new parking lot and new Grove bypass road would have no effect on a known historic property under Section 106 of the NHPA. Impacts on this site under NEPA, however, would be long-term and adverse, but given the site's lack of significance, the impact would be considered negligible. Modifications to Mariposa Grove Road (CA-MRP-1618H), which is a contributing element of the Mariposa Grove Historic District, also would have an adverse effect on an alignment of the road that was in place by 1879. These effects are more thoroughly discussed in the Historic Structures section of this document.

Ground-disturbing activities associated with removal and construction of facilities under Alternative 3 would have a potential to disturb previously undocumented archeological resources. The potential effect of these activities on such resources would depend on the significance of the resource, and the extent and magnitude of disturbance of such resource during project implementation. The Mariposa Grove Archeological District would not be affected by construction-related activities under Alternative 3.

Impact Significance and Determination of Effect. Alternative 3 construction activities would have an adverse effect on site CA-MRP-0661/H, because construction of the New Grove Bypass Road and ABAAS-compliant parking and removal of facilities in the lower portion of the Grove would directly impact this National Register-eligible site. Site CA-MRP-1618H or Mariposa Grove Road also would be adversely affected because proposed modifications would alter characteristics that contribute to its National Register eligibility. Impacts on CA-MRP-2109H would be site-specific, long-term, negligible, and adverse under NEPA; this site has been determined to be ineligible for the National Register.

Ground-disturbing restoration activities related to the restoration of existing bus parking and the gift shop area would impact near- and sub-surface archeological materials at site CA-MRP-0661/H. Furthermore ground disturbance during habitat restoration-related activities (e.g., soil decompaction, drainage rehabilitation, removal of undesirable plant species, new plantings or transplanting) under Alternative 3 have the potential to disturb archeological deposits that have not been documented. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Sites associated with the Mariposa Grove Archeological District would not be impacted by Alternative 3 restoration-related activities.

Operations-related Impacts. Operations-related impacts under Alternative 3 would be the direct result of construction activities at site CA-MRP-0661/H, which would likely bring previously buried artifacts to the surface where they could be subject to unauthorized collection by park visitors during park operations. Such collection is considered an adverse effect. Routine or emergency repairs that could occur during operation of Alternative 3 at Mariposa Grove and South Entrance (e.g., repairs to leach fields or buried utilities; excavation of fire breaks) could result in disturbance of undocumented archeological deposits. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Impact Significance and Determination of Effect. The increased potential for unauthorized collection of artifacts at National Register-eligible site CA-MRP-0661/H as a result of visitor use under Alternative 3. Such collection of archeological materials at resources that are eligible for the National Register would be an adverse effect.

Routine or emergency repairs that could occur during operations under Alternative 3 at Mariposa Grove and South Entrance could result in disturbance of archeological deposits. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Conclusion. Alternative 3 would have an adverse effect on archeological site CA-MRP-0661/H as the result of construction activities proposed for the lower Grove area, including building the new Grizzly Giant bypass road and the removal of the gift shop and other facilities. Development of parking near the Grizzly Giant would not impact National Register-eligible archeological resources. The consolidation and expansion of visitor education at Grizzly Giant would enhance the interpretation of archeological resources at the Mariposa Grove, which would be a beneficial impact under NEPA.

Restoration activities could have an adverse effect on CA-MRP-0661/H under Alternative 3, and a potential increased opportunity for unauthorized artifact collection during post-construction operations would also be an adverse effect on site CA-MRP-0661/H. There would be site-specific, long- and short-term, major adverse impacts on archeological site CA-MRP-2109H under NEPA; this site was determined to be ineligible for the National Register.

Cumulative Impacts. Present and reasonably foreseeable projects affecting archeological resources would be the same as those under Alternative 1 (No Action)—no adverse effect on archeological resources in the Mariposa Grove. Under Alternative 3, there would be no adverse effect on site CA-MRP-0661/H in the lower Grove area. There would be an adverse effect on site CA-MRP-1618H (the Mariposa Grove Road) because proposed modifications would alter characteristics that contribute to its National Register eligibility. The effects of Alternative 3, in conjunction with past, present and reasonably foreseeable projects, would have an adverse effects on archeological resources in the Mariposa Grove area. Adverse effects would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Alternative 4: South Entrance Hub with Modified Commercial Tram Service

Alternative 4 would maintain commercial tram service on a limited route and reduced hours of operation, and would relocate tram staging and the majority of parking from the lower Grove area to the South Entrance. The water tank and chlorination unit in the loop road in the upper portion of the Grove would be moved to a location near the museum building in the upper portion of the Grove, and the gift shop in the lower portion of the Grove and existing comfort stations at the

Grizzly Giant and in the upper portion of the Grove would be removed. New visitor services at the South Entrance area would include visitor information, educational, and other sales items. Numerous other rehabilitation and restoration actions, such as water line repair or replacement, replacement of the comfort station and installation of a new septic tank and leach field in the lower portion of the Grove, historic rehabilitation of features at Wawona Point, and soil decompaction would be components of this alternative. The intersection of Mariposa Grove and Wawona roads at the South Entrance would be realigned, and a roundabout could replace the existing T-intersection if traffic conditions warrant this action.

Construction-related Impacts. Construction of a new parking area at the South Entrance would affect nearly half of site CA-0660/H, which has been recommended eligible for listing in the National Register. Modification of the existing South Entrance paved parking lot to serve as a bus turnaround would impact the southernmost extent of site CA-MRP-1361/H. This site has not been evaluated for listing in the National Register, and evaluation would be necessary, but until then, CA-MRP-1361/H is assumed eligible. The portion of the site that would be impacted has been previously disturbed, and contains no intact features or recorded artifacts.

Alternative 4 also would remove approximately 1,100 feet of the historic Washburn Wagon Road (CA-MRP-1620H) through construction of the parking lot at South Entrance, and would rehabilitate the remaining 1.4 miles of the wagon road for use as a pedestrian trail between South Entrance and the picnic area on the Mariposa Grove Road. The road has not yet been evaluated for National Register eligibility, but pending evaluation, is assumed eligible. Rehabilitation of this road would affect the resource, but the effect would not be adverse under Section 106, but removal of 1,100 feet of the road for parking lot construction would have an adverse effect on the integrity of the road. Lastly, the consolidation and expansion of visitor education at the South Entrance would enhance the interpretation of archeological resources at Mariposa Grove and South Entrance.

Actions at the lower portion of the Grove that have the potential to adversely impact CA-MRP-0661/H include installation of a new shuttle turnaround, removal of existing roads and parking areas, and ecological restoration of modified areas. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. The new proposed trail would be designed to run outside of known historic sites, and data recovery would be conducted as appropriate during trail construction. The parking area and gift shop at the lower portion of the Grove are being removed to specifically move them away from CA-MRP-0661/H.

Ground-disturbing activities associated with removal and construction of facilities under Alternative 4 also could have a potential to disturb previously undocumented archeological resources. The potential effect of these activities on such resources would depend on the significance of the resource, and the extent and magnitude of disturbance of such resource during project implementation. Alternative 4 construction would not affect sites within the Mariposa Grove Archeological District.

Impact Significance and Determination of Effect. Construction of new parking and the realignment of Wawona Road at the South Entrance would have an adverse effect on site CA-MRP-0660/H. Similarly installation of a leach field and removal of the gift shop and appurtenant facilities at the lower Grove area would have an adverse effect on CA-MRP-0661/H. Adverse effects on historic properties as a result of implementation of this project alternative would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

Neither site CA-MRP-1361/H nor CA-MRP-1620H has been evaluated for National Register eligibility, but until evaluation studies are complete, these resources are assumed to be eligible. That portion of CA-MRP-1361/H that would be affected by construction has been previously disturbed, and contains no intact features or recorded artifacts. Portions of the site that would be disturbed by construction of Alternative 4 components are not likely to contribute to the significance of the site, and therefore the alternative would not result in an adverse effect. Approximately 1,100 feet of the historic-era Washburn Wagon Road, CA-MRP-1620H, would be removed during parking lot construction, which would result in an adverse effect on the site. However, clearance of deadfall and brush from CA-MRP-1620H between South Entrance and the picnic area along Mariposa Grove Road for use as a pedestrian trail would restore that segment of the site as a transportation corridor in the park, which would have no adverse effect on the site.

Ground-disturbing restoration activities related to the restoration of existing bus parking and the gift shop area could have an adverse effect on near- and sub-surface archeological materials at site CA-MRP-0661/H, which could result in an adverse effect. Ground disturbance during habitat restoration-related activities (e.g., soil decompaction, recontouring, drainage rehabilitation, removal of undesirable plant species, new plantings or transplanting) under Alternative 4 has the potential to disturb archeological deposits that are undocumented. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Sites associated with the Mariposa Grove Archeological District would not be impacted by Alternative 4 restoration-related activities.

Operations-related Impacts. Continued public access to sites CA-MRP-0660/H and CA-MRP-0661/H during the operation of Mariposa Grove and South Entrance under Alternative 4 would potentially lead to unauthorized collection of surface artifacts by park visitors. Such collection would be considered an adverse effect on National Register-eligible historic properties. However, Alternative 4 could reduce public access to CA-MRP-0661/H relative to Alternative 1, which would be a beneficial effect.

Routine or emergency repairs that could occur during operation of Alternative 4 at the Mariposa Grove and the South Entrance (e.g., repairs to septic systems and leach fields or buried utilities; excavation of fire breaks) could result in disturbance of archeological deposits, including those that are not visible on the ground surface. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Impact Significance and Determination of Effect. Unauthorized collection of artifacts potentially could occur at sites CA-MRP-0660/H and CA-MRP-0661/H as a result of ongoing park and concessioner operations and visitor use under of Alternative 4. Such collection of archeological materials at resources that are eligible for the National Register would be an adverse effect under Section 106 of the NPA. Reduced public access to CA-MRP-0661/H under Alternative 4, relative to Alternative 1, would have a beneficial impact under NEPA.

Routine or emergency repairs that could occur during operation of Alternative 4 at the Mariposa Grove and the South Entrance could result in disturbance of archeological deposits. The level of effect on such deposits would depend on the significance of the resource, and the extent and magnitude of the disturbance.

Conclusion. Two archeological sites that have previously been determined eligible for the National Register would be adversely affected by construction activities under Alternative 4. CA-MRP-0660/H would be disturbed by development of a new parking lot at the South Entrance

and the realignment of Wawona Road. Alternative 4 construction actions would have a short-term, minor adverse impact on archeological site CA-MRP-0661/H. Final design of facilities in the vicinity of this site would avoid or minimize potential impacts on the site. Any parking reconfiguration in this area would seek to avoid excavation and rely on use of fill material to avoid impacting surface features. Sites CA-MRP-1361/H and CA-MRP-1620H would require evaluation, but are considered eligible for the National Register for the purposes of this assessment. Because portions of CA-MRP-1361/H have been previously disturbed and no intact features or artifacts remain in the proposed construction area, a finding of no adverse effect may be appropriate for this resource under Alternative 4, pending further evaluation. However, approximately 1,100 feet of the historic-era wagon road would be removed by construction of a new trail along this route, which would result in an adverse effect on site CA-MRP-1620H. Improved visitor education would enhance the interpretation of archeological resources at the Mariposa Grove, which would have a long-term moderate beneficial impact under NEPA.

Temporary, minor adverse impacts on traditionally significant site CA-MRP-0661/H would occur from restoration actions at the lower portion of the Grove, and there could be increased potential for operations-related adverse effects on sites CA-MRP-0660/H and CA-MRP-0661/H in the form of unauthorized collection of surface artifacts. These actions would have long-term, minor to moderate adverse impacts under NEPA.

Beneficial impacts under NEPA for Alternative 4 would include the clearing of deadfall and brush from CA-MRP-1620H, reducing public access to CA-MRP-0661/H, and expanded public information about archeological resources.

Cumulative Impacts. Present and reasonably foreseeable projects affecting archeological resources would be the same as those under Alternative 1 (No Action)—no adverse effect on archeological resources in the Mariposa Grove. Under Alternative 4, there would be an adverse effect on site CA-MRP-0660/H at the South Entrance and no adverse effect on site CA-MRP-0661/H in the lower Grove area. The effects of Alternative 4, in conjunction with past, present, and reasonably foreseeable projects, would have an adverse effect on archeological resources in the Mariposa Grove area. Adverse effects would be resolved through consultation with the California SHPO in accordance with the NHPA implementing regulations at 36 CFR Part 800, and implemented through a project-specific MOA to be developed in consultation with the SHPO, ACHP, and associated American Indian tribes and groups.

SOCIOCULTURAL RESOURCES

VISITOR EXPERIENCE AND RECREATION

Affected Environment

Yosemite National Park, as guided by its enabling legislation and the NPS Organic Act of 1916, has two interwoven purposes: (1) the preservation of the resources that contribute to Yosemite National Park's uniqueness and attractiveness—its exquisite scenic beauty; outstanding wilderness values; a nearly full diversity of Sierra Nevada environments, including the special-giant sequoia groves; the awe-inspiring domes, valleys, polished granites, and other evidences of the geologic processes that formed the Sierra Nevada; cultural resources, especially those relating to the beginnings of a national conservation ethic; and evidence of the American Indians who lived on the land; and (2) to make the varied resources of Yosemite National Park available to people for their individual enjoyment, education, and recreation, now and in the future (NPS 1980a).

Recent visitor surveys taken during the peak summer season indicate that viewing scenery and taking scenic drives are the two most popular activities within Yosemite National Park with 93 percent and 64 percent of respondents participating in those activities, respectively (NPS 2008). For many visitors, driving through the park is the primary means for experiencing the spectacular views. Driving to and within Yosemite National Park is usually a pleasurable experience, contributing to visitors' enjoyment of the park. The ability to make informal stops along park roads to take advantage of the unique and varied scenery contributes to each visitor's opportunity to experience the park on his or her own terms. Some visitors, depending on season and arrival time, have opportunities to stop en route at small visitor contact stations such as the Wawona Information Station. However, during the peak visitation season, travelers sometimes experience traffic congestion within the park. Congestion issues are exacerbated near the South Entrance due to traffic conditions at the intersection at Wawona and Mariposa Grove Roads and the park entrance station at the South Entrance.

Visitor experiences in Yosemite National Park are highly diverse. Some come simply to see Yosemite National Park's icons—its waterfalls and geologic features. Others visit to experience a place they have found unique, for personal challenges, timelessness, a place and pace different from their day-to-day experiences, or a personal connection with the grandeur or intricacies of Yosemite National Park. The continuum of visitor experiences extends from highly social to isolated, from independent to directed, from spontaneous to controlled, from easy to challenging, and from natural to more urban (NPS 2000b).

Park Recreation and Visitor Services

Yosemite National Park provides a range of recreation opportunities, including sightseeing and tours, picnicking, walking, hiking, bicycling, stock use, climbing, camping, water activities such as rafting, swimming, fishing, and winter activities such as cross-country and downhill skiing and snowshoeing. Camping throughout Yosemite National Park is regulated differently depending on whether the activity occurs in the developed or wilderness areas.

According to a study of visitors, 54 percent of visitor groups participated in day hiking, and 43 percent noted wildlife viewing or bird watching as an element of their trip. A greater proportion of park visitors hike during off-peak seasons. Sitting or standing quietly, absorbed in thought or in awe of one of Yosemite National Park's majestic views, was found to be basic to the park experience. Artistic pursuits were also important to the enjoyment of the park (NPS 2010c).

Private vehicles are the predominant means of access to and through the park. Over 84 percent of visitors arrive by private car, with the remaining arriving on a commercial tour bus, on buses operated by the Yosemite Area Regional Transportation System, by foot, or by bicycle (NPS 2011h). While within the park, most visitors (62 percent) use the existing park shuttle service at least part of the time.

The park or its concessioners provide several visitor services, including but not limited to overnight lodging, camping, interpretive services and events, retail sales, food service, post office, and shuttle service. The Wawona area has lodging and food service, shuttle service, campground, picnic area, gas station, and ranger station. The Mariposa Grove area has parking, shuttle and commercial tram services, a retail gift shop, museum, and a picnic area, as well as restrooms in the upper and lower groves.

Park Orientation and Interpretation

Visitors to Yosemite National Park have a number of information resources available to plan their visits (figure 3-26). Yosemite National Park's website provides information about trip planning, current conditions, other park resources and pertinent news. The park's public information office mails pre-visit materials to those requesting them by phone or mail. Yosemite Conservancy and NatureBridge also have interactive websites, offering more in-depth orientation and the sale of books and maps. The park also provides assistance (updated information, publications, and seasonal staffing) to local, multiagency visitor centers where visitors can stop en route. Once at park entrance stations, visitors receive park publications with trip and activity planning information.

During the summer and early fall, information stations in Wawona and Big Oak Flat are staffed to provide additional assistance. In summer, the Tuolumne Meadows Visitor Center introduces the area to visitors traveling to this region of the park. Each of these facilities provides a selection of helpful park guidebooks, maps, and other resources sold by Yosemite Conservancy, a nonprofit partner of Yosemite National Park.

Park interpreters serve a primary resource preservation role by conveying information and educational programs to visitors and park/concessioner employees about the importance and sensitivity of park ecosystems and the relationships among various park resources. This includes educational programs provided by park rangers and park partners such as NatureBridge. The interpretive staff provides information to visitors about wilderness resources, wildlife, policies, regulations, conditions, and trails at information centers, in programs, on roving contact assignments, and open-air tram tours in Yosemite Valley and at the Mariposa Grove. The primary information source for recreational opportunities in the park's wilderness is the wilderness centers in Yosemite Valley, Tuolumne, Big Oak Flat, and Wawona, which are staffed by wilderness rangers.

A wide range of interpretive programs are available. Throughout Yosemite National Park, NPS interpreters provide ranger-led walks, talks, and evening programs. Interpreters help visitors connect to the park and our American heritage. Interpretation also serves as a catalyst for inspiring visitors to gain a greater understanding of themselves and the world through their park experience. In summer, rangers also lead multiday High Sierra Camp loop trips in the Yosemite Wilderness area. Wilderness programs can focus on bears, wildflowers, the natural history of the wilderness, the hydrologic attributes of the Merced and Tuolumne watersheds, minimum-impact camping techniques, wilderness safety, park policies, and other related topics. Park partners, including Yosemite Conservancy and park concessioners, offer guided wilderness trips and a wide range of interpretive opportunities throughout the park. The Sierra Club and The Ansel Adams Gallery also provide interpretive opportunities within Yosemite Valley.

Park locations for these orientation and interpretation opportunities include visitor centers, the Yosemite Museum, the Nature Center at Happy Isles in Yosemite Valley, Parsons Lodge and Soda Springs in Tuolumne Meadows, the Pioneer Yosemite History Center in Wawona, and the Mariposa Grove Museum in the Mariposa Grove.



Figure 3-26 – Orientation Sign at Lower Grove

Mariposa Grove Setting

Visitor facilities in the Mariposa Grove operate during snow-free months of the year, typically opening in April or May and closing in October or November. Park visitor facilities include comfort stations in the lower and upper Grove, the Mariposa Grove Museum, paved roads and unpaved trails, paved visitor parking in the lower Grove, paved shuttle bus parking, and commercial tram staging area. Concessioner-operated and maintained facilities at the Mariposa Grove include the gift/snack shop and the commercial tram and its ticket booth (figure 3-27). Other Grove amenities include sitting areas, wayside exhibits, signs, trailheads, drinking fountain, and trash containers.



Figure 3-27 – Commercial Tram

The Mariposa Grove can offer a sense of profound awe and beauty to the visitor. The unique natural setting can inspire reverence and respect. It can induce contemplation and pleasure. The Mariposa Grove is part of the “front country” area of the park and provides easy access to a variety of activities including sightseeing, nature study, horseback riding, and hiking. The lower Grove area is near the parking lot, shuttle drop-off, commercial tram staging area, and gift/snack shop and is more widely used. The upper Grove area includes the Mariposa Grove Museum and is accessible by commercial tram as well as by hiking trail (an 850-foot elevation gain from the lower Grove parking lot to the museum). Wawona Point is a historic scenic overlook near the upper Grove, and affords dramatic views of varied topography. There are trail connections from the Mariposa Grove area into designated wilderness and to the Studhorse trailhead between Wawona and the South Entrance.

Visitation is highest at the Mariposa Grove from Memorial Day through Labor Day. During the winter, the Mariposa Grove may be used for snow play, skiing, and snowshoeing. During the winter when heavy snow falls, the Mariposa Grove road is closed and visitors park near the South Entrance and proceed to the Grove on foot, skis, or snowshoes. The commercial tram does not operate in the winter.

The tram is operated by a commercial vendor from May through October. The commercial tram service connects the lower Grove parking lot with the upper Grove, with a 10-minute stop at the Grizzly Giant on the return trip. Many riders do not remain on the tram for the entire trip. In one study two-thirds of the tram users ride into the upper Grove, but either hike in the upper Grove, or to Wawona Point or hike from the Grizzly Giant back to the parking lot. Each tram vehicle can accommodate up to 40 passengers. Data suggest that between 8 and 12 percent of visitors to the Grove take the tram during the peak season (Leslie et al. 2012). Multiple commercial trams operate concurrently between 9:30 a.m. and 5:00 p.m. Over the approximate five-month season, it is estimated that the commercial trams accommodate approximately 50,000 passengers. Visitors with limited mobility can pay to ride the wheelchair accessible tram, or they may follow the tram up to the museum and then down to the Grizzly Giant in their private vehicles at no cost.

Visitor Use in the Mariposa Grove

Per a visitor survey conducted in 2011, the average stay for visitors in the Mariposa Grove was about 2 hours, and 84 percent of all visitors spent at least part of that time visiting the Grizzly Giant (74 percent hike and 10 percent arrive by tram), one of the largest trees in the Grove (Leslie et al. 2012). The highest visitation in the lower Grove occurred on the Grizzly Giant Trail from the lower Grove parking lot, and averaged approximately 2,510 people per weekend day (2,300 per weekday) in July. Average daily visitor use on the Outer Loop Trail heading toward the Grizzly Giant was

approximately 140 visitors per day (all days), as measured in July 2011. Figures 3-28 and 3-29 illustrate the data gathered for daily trail use over a three-month period in 2011. Use of the Grizzly Giant and Outer Loop trails heading to the Grizzly Giant Tree sharply increased around 9:00 a.m. and remained high until about 7:00 p.m. On the Grizzly Giant Trail, usage peaked on average at around 10:00 a.m. (approximately 240 visitors per hour) and 3:00 p.m. (220 visitors per hour).

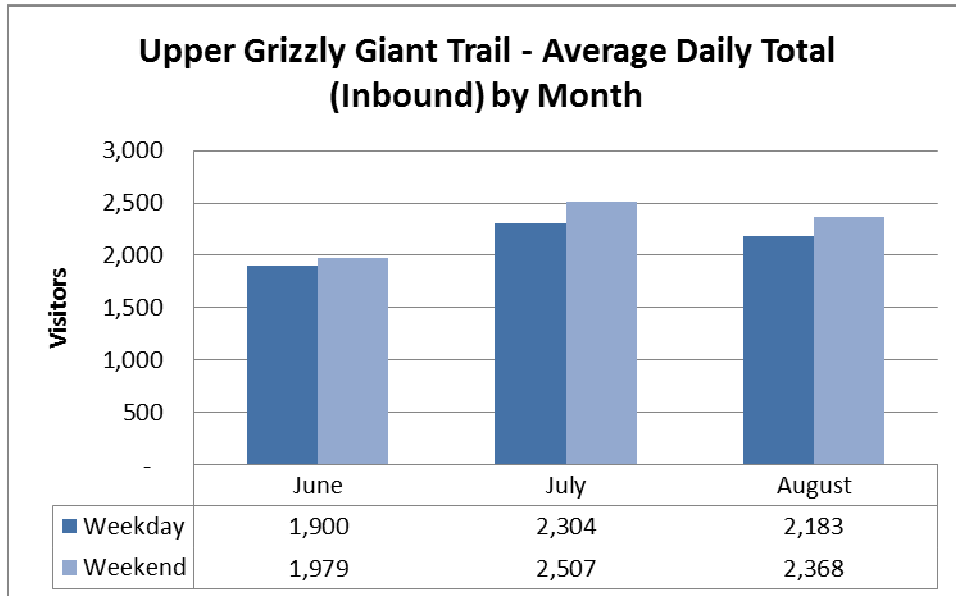


Figure 3-28 – Average Daily Total of Inbound Visitors at the Upper Grizzly Giant Counter

Source: Leslie et al. 2012

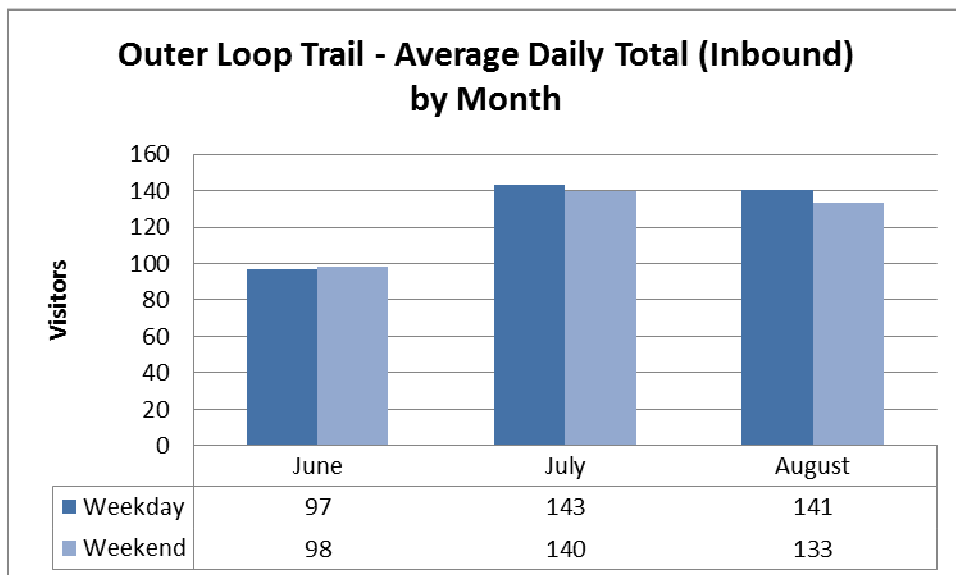


Figure 3-29 – Average Daily Total of Inbound Visitors at the Outer Loop Trail Counter

Source: Leslie et al. 2012

Note: The Outer Loop Trail counter located near the parking lot shows that very few people hike to the Grizzly Giant via the Outer Loop Trail.

About 37 percent of visitors to the Grove spend at least some time in the upper Grove. Most Mariposa Grove visitors reach the upper Grove by hiking (27 percent), while about 10 percent arrive on the commercial tram service. There is more than one hiking route to the upper Grove. A counter placed on a primary path to the upper Grove via the Grizzly Giant and California Tunnel trees found approximately 740 people hiked that route on weekend days (650 people per weekday) in August. Peak volume heading toward the upper Grove occurs between 11:00 a.m. and 2:00 p.m. (approximately 150 visitors per hour) for all days (Leslie et al. 2012). During the survey period, visitors typically spent about 7 minutes at the Grizzly Giant and 5 minutes at the California Tunnel Tree.

Visitor Experience

The upper Grove is quieter and more contemplative compared to the atmosphere of the lower Grove with its parking lot, commercial services, and larger numbers of visitors (NPS 2011i). A survey was conducted in 2010 and 2011 to assess crowding standards to understand visitors' perceptions of and thresholds for crowding at the Grizzly Giant in the lower Grove. The results are as follows:

- Preferred number of people at one time with in a 1,400 square foot area: 7 (density of 197 square feet per person)
- Maximum acceptable number of people at one time: 18 (density of 76 square feet per person)
- Maximum number of people the NPS should allow: 20 (density of 69 square feet per person)
- Maximum number of people that visitors would tolerate, before going somewhere else: 26 (density of 53 square feet per person).

To provide a sense of the densities that respondents indicated they would accept, figures 3-30 and 3-31 provide photographs used in the research that illustrated hypothetical use levels.

During 2010, the maximum number of people that survey respondents thought the NPS should allow (20 people per 1,400-square-foot area) was exceeded at the Grizzly Giant 16 percent of time on the busiest day (approximately 2,200 people); 12 percent of the time on the 7th busiest day (approximately 2,010 people); and 2 percent of time on the 50th busiest day (approximately 1,440 people) (Leslie et al. 2012). Public scoping comments related to visitor experience included suggestions to limit the number of visitors to the Grove as some felt the site was too crowded.



Figure 3-30 – Grizzly Giant Visitor Use Hypothetical Use Level – 18 people, approximately 77 square feet per person

Source: Leslie et al. 2012



Figure 3-31 – Grizzly Giant Visitor Use Hypothetical Use Level – 24 people, approximately 58 square feet per person

Source: Leslie et al. 2012

Visitors to the Grove can be grouped according to various considerations such as interests and abilities. Table 3-11 presents visitor typologies based on limitations (mobility and time) and transportation mode, timeframe, relative number of visitors, and representative experiences.

Table 3-11 – Visitor Typologies

Limitations (Mobility & Time)	Time-frame	Representative Experiences
Limited mobility (including visitors with small children and wheeled strollers) Road (and other fully accessible routes)	Varies	Trailhead Road/lower Grove
Paying commercial tram riders and persons with accessible parking placard in private vehicles following behind Road	1.5 hours	Mariposa Grove Road including Big Trees tour
Moderate limited mobility (such as elders and people with children) AND visitors with strict time limitations Road and some trails (may require some level of accessibility)	1-1.5 hours	Trailhead lower Grove Grizzly Giant and California Trees
Relatively agile with a moderate amount of time Road and some trails including a slightly wide trail loop	1.5-3.5 hours	Grizzly Giant and California Tunnel trees
Agile with a substantial amount of time Road and all trails including winter use	3.5 + hours	upper Grove Mariposa Museum Wawona Point Outer Loop Trail

Trailhead

Interpretive and orientation kiosks are located at the main trailhead in the lower Grove parking lot. Beyond the parking lot, information often is difficult to find and is not accessible to all visitors. Along with problems getting to the parking lot due to traffic congestion and limited spaces, visitors who arrive at the trailhead often feel stressed, disoriented, and time-constrained (Yosemite Conservancy 2012). Public scoping comments related to the trailhead area included suggestions to add picnic tables and to add a visitor center either at the trailhead or at Fish Camp (just outside the park boundary to the south). Other scoping comments noted a preference for a natural, wilderness-oriented experience in the Grove that would be characterized by no- or less-intrusive infrastructure or transportation activities.

Accessibility, Trails, and Signs

Universally accessible routes through the Grove are limited to the paved roadways, which are used by pedestrians, commercial tram riders, maintenance vehicles, and visitors in private vehicles displaying an accessible parking placard who follow behind the commercial trams. Besides being important for accessibility, the road is also used by hikers who become lost or disoriented on the trails that intersect the roadway, and visitors with time constraints who take the commercial tram to their destination, and then hike back down the road (Yosemite Conservancy 2012). Only certain portions of Mariposa Grove Road meet accessibility standards (less than 5 percent grade without

resting intervals) for those who wish to get out of their cars. Public scoping comments related to accessibility include suggestions to maintain or improve accessibility for visitors with mobility limitations, including use of the commercial tram.

Visitors also use the 10-mile trail system to experience the Grove (figure 3-32 and figure 3-33). From the trailhead the Grizzly Giant is a steady climb of 0.8 mile, the upper Grove is 1.7 miles, and the Grove Museum is 1.8 miles. Visitors encounter poorly signed trail junctions and road crossings, and are often left confused, disoriented, and feeling lost; in fact, they may even miss their planned destinations (figure 3-34) (Yosemite Conservancy 2012).

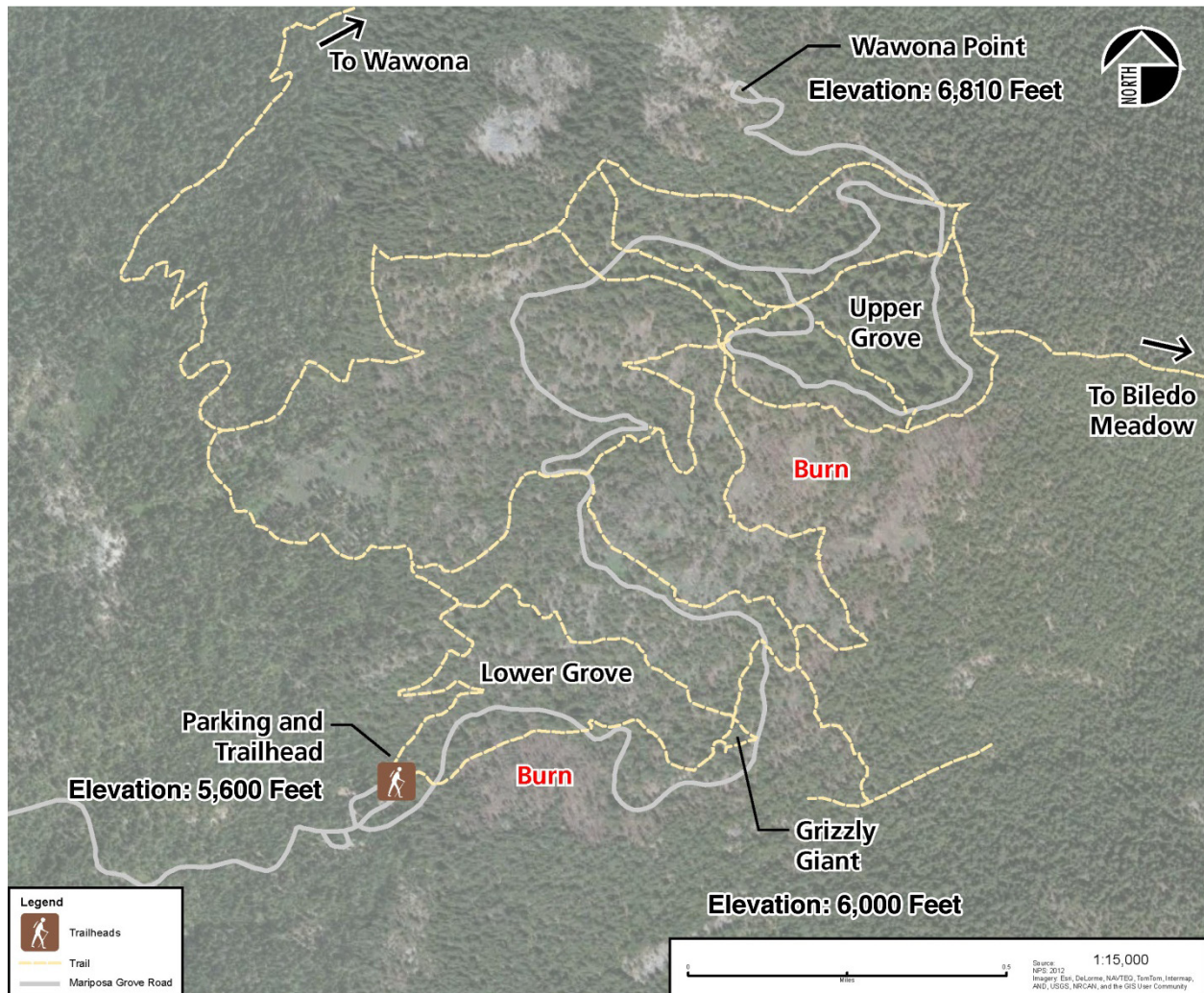


Figure 3-32 – Trails of the Mariposa Grove



Figure 3-33 – Stonework along Mariposa Grove Trail



Figure 3-34 – Trail Sign

Public scoping comments related to trails state that signs are inadequate and/or confusing.

Trail users who cross the road and pedestrians on the road may encounter commercial trams. Other hikers may hear the tram engine noise from many areas within the Grove. The noise from the commercial tram engine can obscure the quiet, natural sounds of the Grove, such as birds calling or wind in the tree branches. Commercial trams may cause pedestrians to stop and step off the road. The commercial tram noise, movement, and emissions from the diesel engines distract the thoughts and attention of many pedestrian visitors. Although the trams provide access for visitors with limited mobility, because they are a fee-based service, the commercial trams do not meet requirements for universal accessibility.

Mariposa Museum and Wawona Point

Destinations in and near the upper Grove include the Grove Museum and Wawona Point. The museum includes exhibits on ecology and history of the giant sequoias, and books and postcards for sale. The Wawona Point overlook is the Grove destination farthest from the trailhead, and is at the end of the road. Wawona Point has broad views of the surrounding mountains, Wawona Dome, and the meadow at Wawona. The vista is in sharp contrast to the closed-in forest environment with its massive trees and limited views experienced en route to Wawona Point. The vista is the location of park-wide communications equipment visible to visitors at the overlook, including propane tanks, a communication tower, and an equipment shed. The equipment at Wawona Point serves multiple agencies and their vehicles including the NPS, the concessioner in Mariposa Grove, and cell companies. Periodic, year-round maintenance access is needed for both Wawona Point and the Mariposa Grove Museum.

Vehicular Access and Circulation

Transportation-related factors have important effects on visitor use and experience at the Mariposa Grove, and include vehicular access to the Grove, parking capacity, and shuttle service to the Grove. It is estimated that about 58.5 percent of visitors to the Grove park their private vehicles at the Mariposa Grove parking lot (113 car capacity) (Leslie et al. 2012). The remainder of the visitors typically arrive on a shuttle from either the South Entrance parking area or Wawona Store (figure 3-35). A 2012 *Visitor Use and Transportation Assessment* concluded that parking is saturated at the lower Grove, and Wawona Store during the peak summer visitation season – meaning parking is at capacity all days of the week (Leslie et al. 2012).

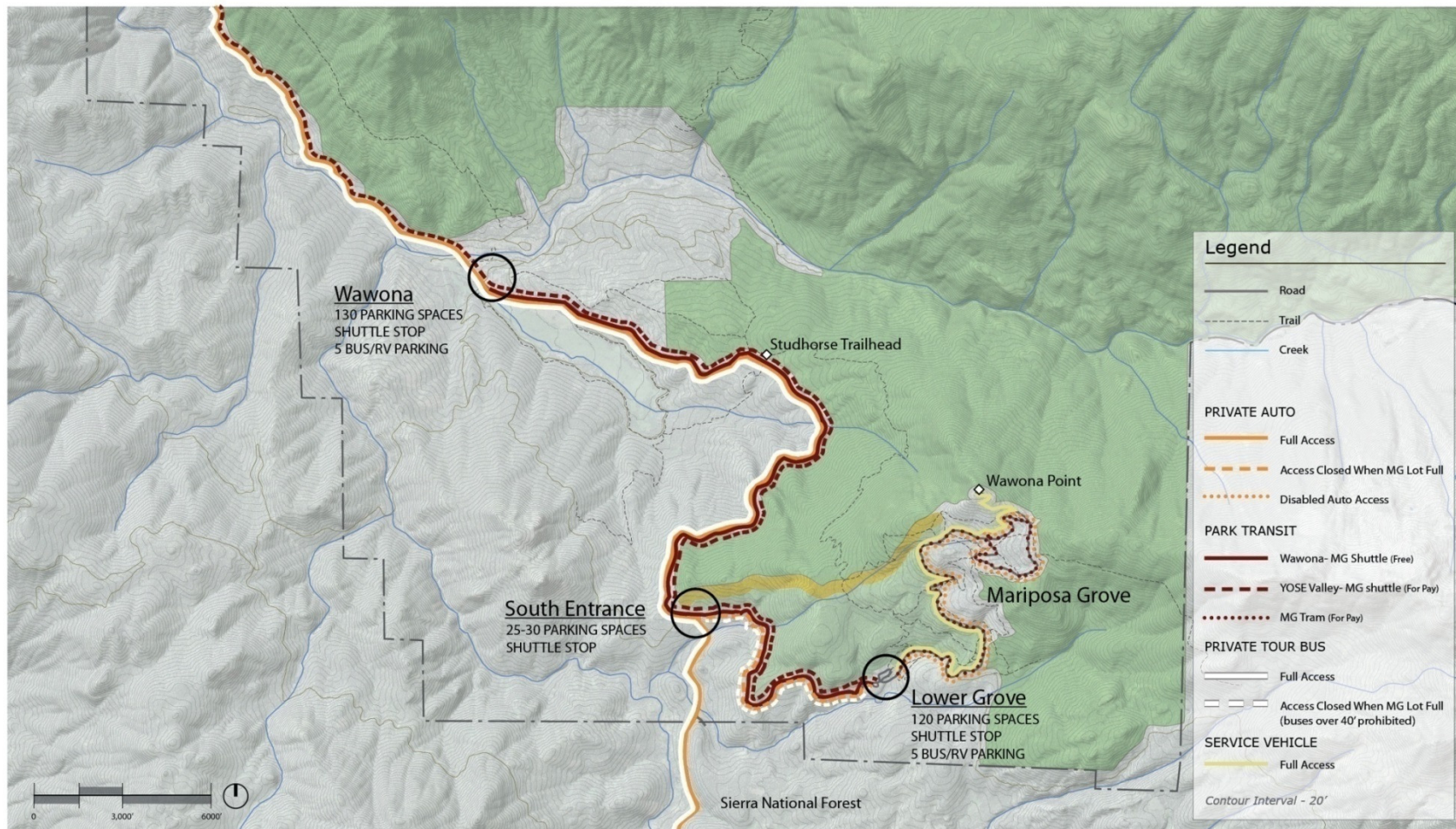


Figure 3-35 – Traffic Circulation between Wawona and the Mariposa Grove

Parking reaches capacity at the Mariposa Grove often, and generally early in the day. On a typical day during the peak summer season, the lot fills and the gate to Mariposa Grove Road is first closed between 9:00 and 10:00 a.m. During a summer-long sampling period, the gates were closed 52 percent of the day on average. The gate opened and closed an average of 5.5 times a day (Leslie et al. 2012). When the gates close on the road to the lower Grove, visitors park elsewhere and take a shuttle to the Grove. Additional parking spaces are available at Wawona and the South Entrance. Input collected via scoping suggests that some members of the public consider the shuttle wait times to be excessive and that this negatively affects the visitor experience. During the high use season, the average wait is 12 minutes to board the shuttle at both Wawona and the Mariposa Grove. According to a 2011 study conducted by the NPS, 75 percent of all shuttle bus waits are 20 minutes or less.

When the Mariposa Grove Road is closed because the Grove parking lot has reached its capacity, traffic circulation is challenged near the South Entrance, as visitors must proceed to Wawona to park their cars, wait for a shuttle bus, and backtrack to the Grove.

South Entrance Setting

The South Entrance to Yosemite National Park is used by visitors for orientation, fee payment, and as a rest stop. Park visitor infrastructure at the South Entrance include the fee kiosks, parking lot, the paved Mariposa Grove Road, comfort station, and shuttle stop. Periodic heavy traffic volume during the summer months leads to a variety of issues. During peak seasons and holidays, visitors commonly endure long wait times to reach the fee-booth kiosks as traffic backs up to the south along Wawona Road toward Fish Camp. Upon reaching the fee booth and entering the park, visitors are often routed away from the Mariposa Grove Road toward Wawona, leading to frustration if the Grove is on a visitor's itinerary. If the lower Grove parking lot is full, park concessioner staff must stand at the junction of the closed Mariposa Grove Road and Wawona Road and use hand signals and verbal communication to reroute traffic westward, leading to poor traffic circulation and confusion, and creating safety hazards for concessioner staff. The existing Wawona Road – Mariposa Grove Road T-intersection and three-way stop further exacerbates traffic congestion. During the off-season, the visitor experience at the South Entrance is typically more favorable, as park visitors can readily reach the fee booth and then drive up to the Mariposa Grove (when the road is snow-free), or toward Wawona with minimal wait times and traffic.

Environmental Consequences

Impact Assessment Methodology

This analysis addresses transportation and mobility considerations as part of the visitor experience in accordance with the objectives and guidance in Yosemite's General Management Plan (NPS 1980a). Assumptions used in evaluating visitor experience and recreation impacts for the alternatives include the following:

- Existing infrastructure has been constructed in response to visitor demands and needs. This includes roads, trails, turnouts, and viewpoints. Private vehicles are the preferred mode of travel for most visitors.
- Anticipated changes in visitor participation would represent an impact, including changes in ABAAS-accessible areas.
- Anticipated changes in visitor experience quality would represent an impact. Way finding, sound, visitor crowding, and aesthetic changes are among the potential factors influencing trip quality.

- Anticipated changes in service level (such as reductions in parking, changes in frequency of shuttle service, or changes in safety conditions) would represent an impact.

Beneficial impacts would occur as a result of enhanced visitor participation, quality of visitor experience, and service level. Adverse impacts would occur as a result of reduced visitor participation, quality of visitor experience, and service level.

Impact Intensity Level Definitions

The impact thresholds are as follows.

Negligible – Impacts would result in no change or little noticeable change to visitor experience.

Minor – Impacts would result in changes in desired experiences but without appreciably limiting or enhancing critical characteristics (critical characteristics are those elements of a recreational activity that are most important to those who pursue it; for example, it may be important to backpackers to be able to drive to a trailhead).

Moderate – Impacts would change the desired experience appreciably (i.e. changes to one or more critical characteristics, or appreciable reduction/increase in the number of participants).

Major – Impacts would eliminate or greatly enhance multiple critical characteristics or greatly reduce/increase participation.

Alternative 1: No Action

Under Alternative 1, current infrastructure, concessioner services, maintenance, and park management would remain as is. No rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, or improvements to visitor orientation and interpretation, would be implemented.

Operation-related Impacts. Visitor experiences in the Mariposa Grove would remain the same. Parking would continue to reach capacity in the lower Mariposa Grove parking lot, and about 40 percent of summer visitors would take the shuttle from Wawona or the South Entrance. About 60 percent of visitors would be able to park directly in the lower Grove parking lot. Some visitors would travel to the Mariposa Grove, find the parking lot full, and backtrack 5 to 7 miles to Wawona to catch the shuttle (which would return on the same 7-mile route). Visitors could end up parking ¼-mile or more from the Wawona shuttle stop. Visitors with limited mobility could continue to follow the tram to the Grizzly Giant and museum in the upper Grove area in their private vehicles (with a placard). Estimates of current daily visitation and projections of use levels under each alternative are shown in table 3-12 for a busy summer day.

During the off-season, when the lower Grove parking lot and Mariposa Grove Road are free of snow, 115 parking spaces would be available for visitors to drive directly to the lower Grove, including two accessible spaces. Twenty year-round parking spaces would continue to be provided at the South Entrance.

Pedestrians and hikers in the Grove would continue to be distracted by the commercial tram noise, motion, and emissions in the vicinity of roads. Trail users would encounter poorly signed trail junctions and road crossings. The interpretive materials located in the museum in the upper Grove area would not be available to visitors who only have the time or ability to view the lower Grove area.

Impact Significance. Local, long-term, moderate, adverse impacts.

Conclusion. Impacts on visitor use and experience would continue for peak season travelers to the Mariposa Grove. During peak season, vehicular circulation would continue to be adversely affected by inadequate parking near the Grove, and about 40 percent of visitors would need to take a shuttle about 7 miles from Wawona to experience the Grove. Visitors would continue to be distracted by the commercial tram noise and emissions. During the off-season when the lower Grove parking lot and Mariposa Grove Road are free of snow, 115 parking spaces would be available for visitors to drive directly to the lower Grove, including two accessible spaces.

**Table 3-12 – Estimated Daily Visitors by Mode of Arrival on a Busy Summer Day
(85th Percentile, Design Day)**

Mode of Arrival	Alt 1 – No Action	Alt 2 – South Entrance Hub	Alt 3 – Grizzly Giant Hub	Alt 4 – South Entrance with Modified Tram
Parked at Mariposa Grove	2,109	0	3,498	0
Shuttle from Wawona Store	1,401	145	0	145
Shuttle from South Entrance	326	3,815	0	3,815
Tour bus to Mariposa Grove	100	0	450	0
TOTAL VISITORS	3,936	3,960	3,948	3,960

SOURCE: Data analysis by Nelson Nygaard, 2012 and Yosemite National Park staff, 2013.

Cumulative Impacts. The cumulative impacts on visitor experience and recreation discussed in this section consider the past, present, and reasonably foreseeable future actions in the Mariposa Grove area (including Wawona) in combination with potential effects of Alternative 1 (No Action). This analysis considers recreation opportunities, access to recreational sites, visitor facilities and services, visitor safety, and transportation-related factors. In the past, visitor facilities and services have changed considerably in the Mariposa Grove area. For example, the NPS removed the historic campground in the lower Grove area and replaced it with a parking lot that accommodated more visitors, constructed a gift shop, and added commercial tram operations.

Present and future plans and projects related to visitor experience include the Comprehensive Interpretive Plan, Mariposa Grove Interpretive Sign Installation, Mariposa Grove Museum Lighting Installation, South Entrance Leach Field Repair, South Entrance Station Reestablish Exit Lane, and the South Entrance Traffic Safety Improvements. The South Entrance Station Kiosks Replacement project will reduce congestion at the South Entrance and confusion at the intersection of the Mariposa Grove and Wawona Roads. The *Scenic Vista Management Plan* will restore two views in the Mariposa Grove, one at the museum and one at the Grizzly Giant. Transportation-related actions proposed in the Parkwide Traffic Management and Information System, the Transit Passenger Information System, and Wawona Road Rehabilitation would facilitate travel throughout the park by alerting visitors to real-time travel conditions.

The *Draft Merced Wild and Scenic River Comprehensive Management Plan (Merced River Plan)* proposes to formalize parking at the Wawona store and relocate bus and other parking off the Wawona Road. Under the preferred alternative in the *Merced River Plan*, a traffic diversion at the El Capitan Cross-over would divert traffic away from east Yosemite Valley to other places in the park when Yosemite Valley reaches visitor capacity. Based on 2011 park visitation levels, the diversion would take place about four days a year for an average of about 3 hours per diversion (about 12 hours total). The peak days when visitors are diverted from Yosemite Valley under the *Merced River Plan* are likely to be high use days for the Mariposa Grove as well, and visitors could

encounter congestion and crowding at the Mariposa Grove and in Wawona. The Parkwide Traffic Management and Information System and the Transit Passenger Information System would help to alert the visiting public to areas of congestion, allowing visitors to avoid congested areas on peak visitation days.

Regional transit would expand under the *Merced River Plan*; there would be up to 12 additional round-trip regional transit runs on the Highway 41 corridor. Public transit would connect communities south of Yosemite (such as Fresno and Oakhurst) with the Mariposa Grove, Yosemite Valley, and other park destinations. Shuttle service between Wawona and Yosemite Valley would be discontinued in favor of this new service. Overall, past, present, and future projects would have a long-term minor beneficial impact on the visitor.

Under Alternative 1 (No Action), congestion and confusion would be reduced at the South Entrance with the South Entrance Station Kiosks Replacement project, but some visitors would continue to travel to the Mariposa Grove, find the parking lot full, and backtrack to Wawona to catch the shuttle (which would return on the same 7-mile route). The commercial tram, generator, and parking-related sounds from the lower Grove would continue to impact soundscapes. Visitors traveling to Wawona as a destination could also be impacted as they compete for parking with those taking the shuttle to the Mariposa Grove. Impacts under Alternative 1 on visitor experience and recreation would be long-term, moderate, and adverse on peak visitation days.

In summary, past present and future plans and projects would have a local, long-term, minor, beneficial impact on the visitor experience in the Mariposa Grove area. Under Alternative 1 (No Action), there would be a long-term moderate adverse impact on the visitor experience and recreation due to inadequate parking and circulation near the Grove and commercial tram noise, and emissions within the Grove. Past, present and future impacts, in conjunction with the impacts of Alternative 1, would result in long-term, minor, adverse effect on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

Alternative 2: South Entrance Hub (Preferred Alternative)

Alternative 2 would remove the commercial tram operation and the lower Grove parking area and restore those areas to giant sequoia and wetland habitat. Peak season visitor parking would be consolidated at the South Entrance, which would be the departure point for visitor access to the Grove. Numerous other rehabilitation and restoration actions would take place, such as improvement of hydrologic flow and universal access, soil decompaction, and improvements to visitor orientation and interpretation.

Construction-related Impacts. Construction at the South Entrance and in the Mariposa Grove could cause short-term inconvenience for vehicles and pedestrians, and possible temporary closures of facilities such as trails. Repaving the Mariposa Grove Road to the lower Grove area would cause 15 to 30 minute traffic delays for one summer, as sections of the road are reduced to one-lane traffic. There would be noise, dust, and motion associated with the construction of the South Entrance parking area.

Impact Significance. Local, short-term, moderate, adverse impacts.

Restoration-related Impacts. Ecological restoration actions in the Mariposa Grove could cause short-term inconvenience to vehicular and pedestrian traffic, possible temporary closures of facilities including trails, and noise and dust associated with restoration activities. In the long-term, the lower Grove area would change from a busy parking area to a natural giant sequoia grove that sustains and highlights the large mature giant sequoia trees that currently grow in the parking lot, as

well as the native understory and young sequoia trees that would be planted. Visitors would encounter an intact giant sequoias ecosystem as they first enter the Mariposa Grove, rather than a parking lot and gift shop. The lower Grove is relatively flat compared with the rest of the Grove, and travel through this part of the Grove would be relatively easy along the footpaths or the new accessible trail. Ecological restoration would provide an opportunity for visitors with mobility impairments to experience the Grove outside of their cars on accessible trails.

Impact Significance. Local, short-term, minor, adverse impacts and long-term, moderate, beneficial impacts.

Operation-related Impacts. Under Alternative 2, the South Entrance would be the primary departure point for visitors to the Grove. The NPS would provide a shuttle from the South Entrance along the 2-mile road to the lower Grove area. Limited shuttles from Wawona would continue (table 3-12). All visitors during peak visitation periods would park in the new South Entrance parking hub and take the shuttle into the lower Mariposa Grove area, where they would disembark next to the restored giant sequoia grove (which currently is a parking lot). This may be perceived as an inconvenience to some of the 60 percent of visitors who currently drive their personal vehicles directly to the lower Grove parking lot. However, others may appreciate the shuttle ride as an opportunity to “shift gears” to the unique environment they are about to visit. The 40 percent of visitors who currently ride the shuttle from Wawona Store would enjoy a shorter shuttle ride (about 5 miles shorter each way). Some visitors would take advantage of the new hiking trail between the South Entrance and the lower Grove.

During the off-season, when the Mariposa Grove Road is open and no shuttles are operating, visitors will be able to access the Grove by either parking in the lower Grove parking area (which is used for shuttles in the summer) or expanded parking area near the existing picnic area (located about one mile from the Grove). A combined total of about 80 off-season spaces will be available in these two areas, a reduction in about 35 personal vehicle spaces from the current off-season parking in the lower Mariposa Grove. Traffic management may be required during these off-season periods.

Peak season visitors would arrive at the lower Grove in a shuttle that would provide direct access to the trailhead with its improved interpretation and orientation. Consolidation and reconfiguration of trails and improved trail signs would improve way finding. Signs at the short section of road below the Grizzly Giant would encourage visitors to use the pedestrian trail instead of the road and assist in separating pedestrians from vehicles with accessible parking placards going to the Grizzly Giant. Overall, visitor safety would be improved as a result of reduced vehicular traffic within the Grove.

Removal of the commercial tram service may have a negative impact on the 10 percent of visitors to the Mariposa Grove who utilized the service. It would also result in the loss of the audio tour that accompanies the tram. Those who hike to the upper Grove area would benefit from more opportunities for solitude because of reduced visitation and enjoy a more natural experience without the intrusion of the mechanized tram. Reduced visitation to the upper Grove is also likely to reduce visitor impacts on the ecosystem. Visitors to the lower Grove would experience similar improvements related to the removal of noise and emissions, particularly in the vicinity of the iconic Grizzly Giant (see *Soundscapes* section).

The need for the shuttle system from Wawona would be greatly reduced. This would help alleviate congestion in Wawona.

There would be about 285 private vehicle parking spaces at the South Entrance. As this alternative accommodates current visitation levels, some visitors could be turned away on peak visitation days given the demand to visit the Grove and the physical constraints on parking capacity.

Under Alternative 2, the consolidation of arrival and parking facilities at the South Entrance would enable all visitors to have a more natural experience within the Grove. Facilities at the South Entrance and in the lower portion of the Grove would be brought into compliance with ABAAS to improve accessibility and the visitor experience for all visitors, regardless of their level of mobility. This would include the addition of ABAAS-compliant trails, comfort stations and vault toilets, and additional parking spaces at the South Entrance, lower Grove area, and Grizzly Giant. The existing road and a portion of the parking lot in the lower Grove area would be replaced with an accessible loop trail, which would allow visitors of all abilities to disperse throughout most of the newly restored, lower portion of the Grove. Another accessible trail would take visitors past the Grizzly Giant and California Tunnel Tree to an overlook which would allow visitors to view a portion of the Grove in a more isolated context. Associated benches, small spurs to viewpoints and interpretive signs, and slightly wider places in the trail, would offer all visitors places to stop to rest or enjoy the Grove just outside of the main path of travel. All visitors would be able to experience the giant sequoias, wetlands and wildlife of the Grove in a much less mechanized and more natural setting, without the motion, sounds and smells from the existing parking lot adjacent to the lower portion of the Grove, or from trams driving throughout the Grove. The quieter, more natural visitor experience would be especially noticeable to visitors with limited time, mobility or with young children who do not travel far from the shuttle stop or accessible parking spaces. Visitors with accessible parking placards would be able to drive to and through the Grove in their own vehicles up to the Grizzly Giant trailhead. Road access beyond the Grizzly Giant would be limited to service vehicles only as the road would be narrowed to restore these areas.

Impact Significance. Local, long-term minor, adverse impacts and major long-term beneficial impacts.

Conclusion. Under Alternative 2, visitors during peak visitation periods would park in the new South Entrance parking hub and take the shuttle into the lower Mariposa Grove area, where they would disembark into a restored giant sequoia grove (which currently is a parking lot). This would have an adverse impact on travel and access for peak season visitors who currently drive their personal vehicles directly to the lower Grove parking lot (60 percent), and a beneficial impact on visitors who take the shuttle from Wawona (40 percent). Parking when the shuttle is not in operation would be reduced in the lower Grove area, but a new parking area will be constructed near the picnic area that will result in about 80 total spaces between the lower Grove area and the picnic area (when the shuttle is not in operation). All visitors would encounter an intact giant sequoia ecosystem as they first enter the Mariposa Grove, rather than a parking lot and gift shop, which would be a beneficial impact. Visitors will also enjoy the beneficial impacts of a more natural soundscape. Construction of the new accessible trail will provide an opportunity for visitors with mobility impairments to experience the Mariposa Grove outside of their cars. Overall, there would be minor short-term construction-related impacts on the visitor experience, and long-term beneficial impacts on the visitor experience from ecological restoration of the sequoia grove, improvement in soundscapes, consolidated parking, and reduction in shuttle travel time to the Grove.

Cumulative Impacts. Past, present, and reasonably foreseeable projects affecting the visitor experience and recreation would be the same as those under Alternative 1 (No Action)—a long-term minor beneficial effect on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

Transportation projects and other present and future actions would work in conjunction with actions proposed in Alternative 2. The new parking area at the South Entrance proposed under Alternative 2 would substantially decrease the demand for parking in Wawona and reduce driving on the Wawona Road for Grove visitors who backtrack to the Wawona shuttle if they found the existing lot at the Grove full. The new parking area at the South Entrance would provide shuttle parking that is 5-miles closer to the Mariposa Grove than the shuttle parking in Wawona. A shuttle to the Mariposa Grove would be available for visitors arriving to the South Entrance on public transit. Peak visitation days, when visitors could be diverted to manage user capacity from east Yosemite Valley under the *Merced River Plan*, are likely to be high use days for the Mariposa Grove as well. Based on 2011 park visitation levels, the diversion would take place about four days a year for an average of about 3 hours per diversion (about 12 hours total). Visitors could encounter times when they would be diverted from Yosemite Valley and encounter congestion at the Mariposa Grove and in Wawona. The Parkwide Traffic Management and Information System and the Transit Passenger Information System would help to alert the visiting public to real-time areas of congestion, allowing visitors to avoid congested areas on peak days. Overall, Alternative 2 would have a long-term beneficial impact on visitor experience and recreation from consolidated parking, reduction in shuttle travel time to the Grove, and improvement in soundscapes from removal of the tram, generator, and sound related to the Lower grove parking area.

In summary, past, present and future plans and projects would have local, long-term, minor, beneficial impacts in the Mariposa Grove area. Under Alternative 2, there would be a long-term beneficial impact on visitor experience and recreation from consolidated parking, reduction in shuttle travel time to the Grove, and improvement in soundscapes. Past, present and future impacts, in conjunction with the impacts of Alternative 2, would result in long-term beneficial impacts on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

Alternative 3: Grizzly Giant Hub

Alternative 3 would remove the commercial tram operation and build a new bypass road, including two new bridges, and a new parking lot near the Grizzly Giant. This alternative would make the Grizzly Giant the primary departure point for visitors to the Grove. The current South Entrance parking lot would remain as is and the lower Grove parking lot would be largely removed; a small lot of ABAAS-only spaces would be developed, increasing the number of ABAAS-compliant accessible parking spaces from 2 to 10 in the lower Grove area. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvements to visitor orientation and interpretation, are components of this alternative.

Construction-related Impacts. The nature of the impacts would be similar to Alternative 2 but the focus of most of the disturbance would be at the Grove itself, instead of at the South Entrance. If the changes were made all at once, it would be a short-lived but major disruption to movement in the Grove, and the experience of the Grove. If the construction and rehabilitation was undertaken in stages, then the overall impact could be long-term, with a sequence of short-term disruptions in varying sections of the Grove.

Impact Significance. Local, short- to long-term, moderate, adverse impacts.

Restoration-related Impacts. Similar to Alternative 2.

Impact Significance. Local, short-term, moderate, adverse impacts.

Operation-related Impacts. Grove visitors would stage at the new parking area near the Grizzly Giant, and would not be delayed by taking a shuttle from the South Entrance or Wawona, as would occur with Alternatives 1, 2 and 4 (table 3-12).

There would be no change in parking capacity at the South Entrance under this alternative. The addition of 233 parking spaces (including spaces for cars, tour buses, recreational vehicles, and ABAAS spaces) and the visitor contact facilities at the Grizzly Giant location would respond to the large proportion of users who want to visit that location. However, some visitors who would be anticipating a more natural, contemplative, and inspirational setting for their experience may have a negative perception of the increased level of development at the site. Even though they would not see the structures, people, and motorized vehicles (including tour buses) as they travel on the trail, they may still be able to hear and smell them to a certain distance. The reduction of activity that would occur at the lower Grove area and improvements such as wetland restoration would promote restoration at the lower Grove and change the nature of the visitor experience there. The existing Wawona Road – Mariposa Grove Road T-intersection and three-way stop would remain under this alternative.

As this alternative accommodates current visitation levels, some visitors could be turned away on peak visitation days given the demand to visit the Grove and the physical constraints on parking capacity. The lack of shuttle service under this alternative may result in unsafe conditions and resource impacts if cars are parked along the roadway or in other undesirable locations. Signage or other traffic management strategies could mitigate unsafe or resource impactful parking practices. It is expected that all visitors would arrive by car or tour bus under this alternative, which may lead to vehicular congestion. Visitors may appreciate the direct access to the Grove afforded by locating a large parking lot at Grizzly Giant, although the expansion of developed infrastructure would change the visitor experience and perception of the entry to the Grizzly Giant. In addition, the direct access to Grizzly Giant could promote crowding as more visitors can arrive at the site concurrently, and nearly all visitors would visit the Grizzly Giant, instead of the 84 percent who currently visit that area of the Grove. Parking access at the Grizzly Giant would significantly increase visitation to the upper Grove because it would shorten hiking distance to that area. This would have the benefit of providing easier hiking access to the upper Grove to more visitors, but the increased access could result in diminished experiences due to more visitors using the area. Higher visitor use in the upper Grove could also result in increased impacts on the environment and increased pressure on existing facilities.

Under Alternative 3, the accessibility of all facilities at the new transportation hub at the Grizzly Giant would be in compliance with ABAAS. Seven ABAAS-compliant parking spaces would be available at Grizzly Giant and ten available in the lower portion of the Grove. A 0.3-mile accessible loop trail would be constructed in the lower portion of the Grove, and a 0.25-mile accessible trail would be constructed to the Grizzly Giant and California Tunnel Tree. Placarded access to the upper Grove would be discontinued.

Impact Significance. Local, permanent, minor, adverse impacts; and local, permanent, major, beneficial impacts.

Conclusion. While both Alternatives 2 and 3 are designed to consolidate parking for Grove visitors, Alternative 3 would locate this infrastructure closer to the heart of the Grove. In comparison to Alternative 2, Alternative 3 provides a more auto/personal vehicle-centered option for accommodating visitors because it is focused on expanding parking closer to the Grove and eliminating shuttle service. Alternative 3 would reinforce personal vehicle access as the primary mode of access to the Grove, which some visitors may appreciate, whereas Alternative 2 relies on

expanded shuttle service to deliver visitors to the Grove. While some visitors may be more comfortable navigating the park from their cars, this alternative would serve to introduce the noise, emissions, and other effects of car use directly adjacent to the most popular visitor destination. Increased crowding at Grizzly Giant could result from direct access for vehicles and commercial tour buses to the site. Location of parking at the Grizzly Giant would likely impact other areas of the Grove as well. Less vehicular travel and visitor use in the lower Grove area could result in higher quality experiences and lower impacts to resources than exists under Alternatives 1, 2, or 4; however, the anticipated increased visitor use of the upper Grove could result in a decline in visitor experience quality and increased resource impacts.

Grove visitors expecting a more natural start to their experience may experience moderate impacts on the visitor experience due to the change in experience at the Grizzly Giant due to the expansion of developed infrastructure and overall less perceived naturalness in that location. However, visitors to the lower Grove area would benefit from reduced infrastructure and a greater perceived natural experience in that area.

Cumulative Impacts. Past, present, and reasonably foreseeable projects affecting the visitor experience and recreation would be the same as those under Alternative 1 (No Action)—a long-term minor beneficial effect on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

Transportation projects and other present and future actions would work in conjunction with actions proposed in Alternative 3. The new parking area at the Grizzly Giant hub would substantially decrease the demand for parking in Wawona by Grove-bound visitors and reduce driving on the Wawona Road for Grove visitors who backtrack to the Wawona shuttle if they found the existing lot at the Grove full. There would be no shuttle service available from Wawona or the South Entrance, even for visitors arriving to the South Entrance on public transit.

Peak visitation days, when visitors could be diverted from Yosemite Valley under the *Merced River Plan* to manage user capacity, are likely to be high use days for the Mariposa Grove as well. Visitors could encounter times where they would be diverted from east Yosemite Valley and encounter congestion at the Mariposa Grove and in Wawona. The Parkwide Traffic Management and Information System and the Transit Passenger Information System would help to alert the visiting public to real-time areas of congestion, allowing visitors to avoid congested areas on peak days. Overall, Alternative 3 would have a long-term beneficial impact on visitor experience and recreation from consolidated parking at the Grove.

In summary, past, present and future plans and projects would have local, long-term, minor, beneficial impacts in the Mariposa Grove area. Under Alternative 3 there would be a long-term beneficial impact on visitor experience and recreation from consolidated parking and direct access to the Grove. Past, present and future impacts, in conjunction with the impacts of Alternative 3, would result in long-term beneficial impacts on the visitor experience and recreation in the Mariposa Grove area.

Alternative 4: South Entrance Hub with Modified Commercial Tram Access

Alternative 4 would maintain the commercial tram but with a limited route and hours of operation while also relocating the majority of the parking to the South Entrance, making the South Entrance the primary departure point for visitors to the Grove. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvements to visitor orientation and interpretation, are components of this alternative.

Construction-related Impacts. Similar to Alternative 2, except that the road between the lower and upper Grove areas would not be narrowed and converted to a hardened trail.

Impact Significance. Local, short-term, moderate, adverse impacts.

Restoration-related Impacts. Similar to Alternative 2.

Impact Significance. Local, short-term, moderate, adverse impacts.

Operation-related Impacts. Changes to parking and number of visitors served would be similar in Alternatives 2 and 4 (table 3-12). The only change in travel conditions between Alternative 2 and 4 would be the inclusion of the commercial tram, which would provide an additional mode to access the upper Grove area for some. The commercial tram would run between the South Entrance and the upper Grove, providing a non-hiking option for access to the Grizzly Giant and upper Grove area. The upper Grove tram terminus would also provide a staging area for visitors who want to go to Wawona Point but would not or could not walk to the overlook from the lower Grove area.

Under this alternative, almost all visitors to the Grove would arrive via shuttle from the South Entrance. Limited shuttle service would still be available from Wawona to South Entrance for those staying overnight in the Wawona area. Visitor use levels and associated impacts in the upper Grove area would be similar to Alternative 1. A modified Wawona Road – Mariposa Grove Road T-intersection would slightly improve traffic flow and safety.

The commercial tram noise, motion, and emissions would distract pedestrians on or crossing the road and at the trailhead, as well as on trails in the vicinity of the road, similar to conditions under Alternative 1. The slower-moving tram may also adversely impact shuttle operations between the South Entrance and the lower Grove.

For those with mobility constraints, vehicles with placards would be allowed to follow the tram to the Grizzly Giant and upper Grove area and have similar access as under Alternative 1. Accessibility would be improved by constructing an accessible loop trail in the lower portion of the Grove and an accessible overlook near the Grizzly Giant and California Tunnel Tree.

Impact Significance. Local, permanent, minor, adverse impacts; and local, permanent, moderate, beneficial impacts.

Conclusion. Impacts on visitor use and experience would be similar to Alternative 2, except conditions would be somewhat more adverse to pedestrians desiring a more natural, contemplative and inspirational setting, and somewhat more beneficial to visitors who wish to experience the Grove on the commercial tram.

Cumulative Impacts. Past, present, and reasonably foreseeable projects affecting the visitor experience and recreation would be the same as those under Alternative 1 (No Action)—a long-term minor beneficial effect on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

Transportation projects and other present and future actions would work in conjunction with actions proposed in Alternative 4. The new parking area at the South Entrance proposed under Alternative 4 would substantially decrease the demand for parking in Wawona and reduce driving on the Wawona Road for Grove visitors who backtrack to the Wawona shuttle if they found the existing lot at the Grove full. The new parking area at the South Entrance would provide shuttle parking that

is five miles closer to the Mariposa Grove than the shuttle parking in Wawona. A shuttle would be available for visitors arriving to the South Entrance on public transit. Peak visitation days, when visitors could be diverted from Yosemite Valley to manage user capacity under the *Merced River Plan*, are likely to be high use days for the Mariposa Grove as well. Visitors could encounter times where they would be diverted from Yosemite Valley and encounter congestion at the Mariposa Grove and in Wawona. The Parkwide Traffic Management and Information System and the Transit Passenger Information System would help to alert the visiting public to areas of congestion, allowing visitors to avoid congested areas on peak days. Overall, Alternative 4 would have a long-term beneficial impact on visitor experience and recreation from consolidated parking, reduction in shuttle travel time to the Grove, and improvement in soundscapes from removal of the generator and sound related to the Lower grove parking area, though sounds related to the commercial tram would remain.

In summary, past, present, and future plans and projects would have local, long-term, minor, beneficial impacts in the Mariposa Grove area. Under Alternative 4, there would be a long-term beneficial impact on visitor experience and recreation from consolidated parking, and reduction in shuttle travel time to the Grove. Past, present and future impacts, in conjunction with the impacts of Alternative 4, would result in long-term beneficial impacts on the visitor experience and recreation in the Mariposa Grove area, including Wawona.

PARK OPERATIONS

Affected Environment

Sound park operations help maintain a safe, functional, and orderly environment that provides compatible opportunities for resource preservation and enjoyment by visitors and employees to Yosemite National Park. The park supports an integrated system of compatible land uses providing opportunities for recreation, community development, preservation, and economic use of resources. NPS Resource Management and Science staff are responsible for protecting the natural and sociocultural resources of the park. The NPS Division of Facilities Management performs preventive and corrective maintenance on utility infrastructure throughout the park, which includes water supply systems, wastewater disposal infrastructure, power systems, telecommunications systems, and roads and parking lots. The NPS Divisions of Visitor Protection, Interpretation and Education, and Facility Management maintain a physical or operational presence at the Mariposa Grove and the South Entrance. NPS law enforcement rangers perform essential functions and responsibilities, including law enforcement and resource protection, search and rescue, emergency medical response, wilderness management, and oversight of concession services at the Grove.

Mariposa Grove Setting

Mariposa Grove visitor facilities are operated seasonally during snow-free months of the year, typically opening in April or May and closing in October or November. Park facilities and infrastructure within the Mariposa Grove include comfort stations in the lower and upper Grove areas, a small office and storage area, the Mariposa Grove Museum, two water tanks, paved roads and unpaved trails, paved shuttle bus parking, and commercial tram staging area.

Concessioner-operated and maintained facilities at the Mariposa Grove include the gift/snack shop and its diesel-powered generator, and commercial tram ticket booth. Other Grove amenities include sitting areas, wayside exhibits, signs, trailheads, drinking fountain, and trash containers. The park owns the shuttle buses and commercial trams that serve the Mariposa Grove (figure 3-36); Delaware North Companies operates and maintains the shuttle buses and commercial trams. The NPS Division of Facilities Management maintains the roads, parking lot, and all non-concessioner-

operated buildings throughout the Grove. The park also maintains the communications systems and associated solar and propane generator power systems, scenic overlook, and comfort station at Wawona Point.

A domestic water supply system constructed in the 1930s supplies water to the upper Grove area, lower Grove area, and the South Entrance and is a designated alternate water source to the community of Wawona. A water line from the upper Grove settling tank to a hydrant near Mariposa Tree and Rattlesnake Creek is approximately 2700 feet in length and is leaking in several areas, resulting in a loss of water of 27.5 gallons per minute. The 450-foot water line segment from the hydrant at Mariposa Tree leaks at joints and pin holes at various locations throughout Rattlesnake Creek. Static tests show leakage rates at 1.5 gallons per minute through the creek bed. Over the years many repairs have been made on the water lines throughout the system but leaks remain. In addition to maintenance activities on the lines of the water supply system, the water tanks were replaced at the South Entrance and the lower Grove area in 2007-2008.



Figure 3-36 – Park Shuttle Bus

Delaware North Companies Parks and Resorts at Yosemite, Inc. is currently Yosemite National Park's primary concessions contractor, providing lodging, retail, food and beverage, commercial recreation, and transportation services to visitors at Yosemite National Park. Delaware North Companies is the only concessioner operating in the Mariposa Grove. Delaware North Companies is responsible for operating and maintaining the park shuttle buses, commercial trams (4 at Mariposa Grove and 3 in Yosemite Valley), and the Grove gift shop from May through October. Concessioner staff also assist with traffic management when the lower Grove parking lot is full.

South Entrance Setting

Park facilities at the South Entrance include a single-story ranger building, garage, entrance office, kiosk, parking lot, the paved Mariposa Grove Road, comfort station, and shuttle stop. Infrastructure systems at the South Entrance include a water supply and distribution system, and a leach field septic system. Power to the comfort station and ranger residence is provided by Pacific Gas and Electric Company via above- and below-ground electrical lines. The ranger building also has a satellite dish, propane-powered generator, propane tanks, hazardous materials storage, and electrical transformer. The South Entrance operates year-round, and is staffed by NPS rangers; no concession services other than the shuttle stop are provided at the South Entrance.

Transportation and Public Safety

The current configuration of the Wawona Road/Mariposa Grove Road T-intersection at the South Entrance has resulted in inefficient traffic flow as well as safety concerns for motorists and pedestrians using or passing through the area. Inadequate road design, width, striping, and signs were noted by the public during the scoping period. These concerns are documented in the 2011 Parkwide Safety Study/Review Report which indicates that this intersection now has the highest overall accident index in the park (given completion of work at the Chinquapin intersection). Due to the limited parking at the Grove, its popularity, and overall high visitation of the park, the Mariposa Grove Road is periodically closed by concessioner employees who must reroute motorists, using hand signals, to Wawona. The congestion and resultant confusion is not optimal for public safety or the visitor experience. A turn-off lane was constructed heading southward through the South Entrance toward Fish Camp to alleviate traffic congestion. Separate NPS modifications to the kiosk area at the South Entrance are expected to improve circulation at the intersection by allowing

visitors the space to select a right or left turn lane. The design for the Restoration of the Mariposa Grove of Giant Sequoias includes additional long-term plans for improving transportation, traffic flow, and pedestrian and motorist safety in this area, if needed.

Environmental Consequences

Impact Assessment Methodology

Impacts on park operations were considered to determine how each alternative would affect park management strategies, methods, and costs.

Impact Intensity Level Definitions

Negligible – Impacts on park operations would be largely unnoticed by staff and the visiting public. Existing programs and activities would remain essentially unchanged. There would not be a measurable difference in costs from existing levels.

Minor – Park operations would be affected, but the impacts would be limited and not generally noticed by visitors. Increases or decreases in operating costs and staffing workload would require some realignment of funds, but would not require substantial changes to the overall operating budget. Measurable additions or reductions in cost would be less than 10 percent of existing levels.

Moderate – Park operations would be measurably affected, and the impacts would be noticeable to some visitors. Increases or decreases in operating costs and/or workload would require realignment of funds and would alter the scope and/or quality of some programs. Additions or reductions in cost would be between 10 percent and 20 percent of existing levels.

Major – Impacts on park operations would be widespread and readily apparent to most visitors. Increases or decreases in operating costs and/or workload would require substantial changes in funding allocation and alter the scope and quality of multiple programs or basic operational activities. Additions or reductions in cost would exceed 20 percent of existing levels.

Type of Impact. Impacts were evaluated as either beneficial or adverse to park operations. Adverse impacts represent an increase in operating costs or management activities, and beneficial impacts represent a decrease in operating costs or management activities.

Alternative 1: No Action

Operation-related Impacts. Under the No Action Alternative, the Mariposa Grove would remain in its existing condition and park operations and management would not change. The dispersal of facilities and equipment and the aging infrastructure within the Grove would continue to require ongoing maintenance and repairs and increased facilities management time, staff, and resources.

The existing septic system at the South Entrance and restroom facilities throughout the Grove would continue to be inadequate and the wastewater system would continue to generate odor complaints and service calls. The leaking water supply line from the upper Grove area to the hydrant near Mariposa Tree and Rattlesnake Creek would not be replaced, resulting in more maintenance costs for repairs. The deteriorating alternative Wawona water supply system would not be repaired and the water tank would remain adjacent to the upper Grove loop. Water system operators would continue to be challenged with repairing and rehabilitating an already degraded and deteriorated water system.

Under the No Action Alternative, buildings, structures, and roads would not be upgraded or replaced, which could result in ongoing repair and maintenance work. The park would continue to operate the shuttles between Wawona, the South Entrance, and lower Grove area from May through October. The park would continue to collect franchise fees generated by the concessioner-operated tram and gift shop.

Impact Significance. Local, long-term, moderate, adverse impact.

Conclusion. The aging buildings and infrastructure at the Grove would continue to place demands on facilities management staff for repair and maintenance work, resulting in overall increases to the operating budget. Under the No Action Alternative, the Grove would have an adverse impact on park operations and facilities.

Cumulative Impacts. This cumulative impact analysis on park operations considers the past, present, and reasonably foreseeable future actions in the Mariposa Grove area, in combination with potential effects of Alternative 1. Past park operations have a negligible impact on the operational conditions of today. Development of the Parkwide Traffic Management and Information System, the Transit Passenger Information System, and completion of the Wawona Road Rehabilitation may reduce traffic-related operational burdens by contributing to transportation management solutions within the park. Completion of the Parkwide Communication Data Network could improve operational efficiency through faster and more secure network capabilities, while reducing the demand on existing telecommunications infrastructure. The Wawona Meadow Restoration project may reduce the operational burdens of future restoration efforts in this area. The South Entrance Station Kiosk Replacement could enhance traffic flow and reduce congestion at the South Entrance, thereby reducing the park's overall transportation management burdens. In the future, park visitation is expected to continue growing at the present rate of 3 percent annually. As a result, the operational burden associated with managing large numbers of park visitors, including those associated with the provision of visitor services; the management of park resources; and the demands on and maintenance of administrative facilities, employee housing, and utilities; among other aspects of park operations would continue to increase. Present and future operational plans and projects would have a long-term minor beneficial impact on park operations.

Alternative 1 (No Action) does not propose changes to existing park and concessioner operations and facilities. Aging buildings and infrastructure at the Grove would continue to place demands on facilities management staff for repair and maintenance, resulting in overall increase in time and staffing. There would be a local, long-term moderate adverse impact on park operations under Alternative 1.

The long-term minor beneficial impact of past, present, and future actions, in conjunction with the long-term moderate adverse impacts of Alternative 1, would be long-term, minor, and adverse.

Alternative 2: South Entrance Hub (Preferred Alternative)

Construction-related Impacts. Alternative 2 would have temporary, short-term, and minor adverse impacts on facilities management staff and park operations during the construction phase. Additional demands would be placed on park staff to coordinate construction activities and visitor use, and construction work and traffic delays would disrupt normal traffic patterns, parking, and visitor activities. The park would need to take additional measures to notify visitors of the status of the roads, potential traffic delays, and the location of designated parking areas.

Impact Significance. Local, short-term, minor, adverse impact.

Restoration-related Impacts. Restoration of the Mariposa Grove would not interfere with or impact park operations. Existing operations and activities would remain essentially unchanged.

Impact Significance. Local, short-term, negligible impact.

Operation-related Impacts. Under Alternative 2, the commercial tram would be removed, lower Grove parking would be reduced, and primary visitor parking would be relocated to the South Entrance. Some Grove facilities and infrastructure would be removed and consolidated at the South Entrance to improve access and serviceability. Restrooms would be added, the existing water supply system repaired, and a new septic system would be installed. The consolidation of parking at the South Entrance, in conjunction with the support of traffic management staff, would improve traffic flow and reduce back-tracking and confusion by visitors. Alternative 2 would reduce the need for continual maintenance repairs to deteriorating utility infrastructure; however, the addition of new facilities and infrastructure and more complex utility systems would offset the savings. Alternative 2 would consolidate visitor education at the South Entrance indoor/outdoor visitor contact area, which would include interpretive program elements.

The NPS would need to increase the number of bus hours of the Mariposa Grove shuttle by about 35 percent under Alternative 2, with a proportional increase in transit costs. This estimate considers the reduced shuttle service between Wawona and the lower Grove area, additional service between the South Entrance and the lower Grove area, and expansion of shuttle operations into the shoulder seasons.

Elimination of the commercial tram service would result in a local adverse impact on the existing concessioner. The revenue generated by the tram is a very small percentage of the overall revenue generated by concessioner activities in the park. Although the NPS would no longer collect franchise fees generated by the commercial tram, these fees represent a small fraction of the park's overall operating budget.

Impact Significance. Local, long-term, minor, negligible adverse impact with respect to maintenance of facilities and septic systems, and long term, moderate adverse impact with respect to the increased cost of shuttle operations.

Conclusion. Consolidation of infrastructure and improvements to facilities and utilities would result in a negligible impact on park operations and facilities staff over the long term by reducing timely and costly maintenance repairs. Elimination of the tram service would result in a local adverse impact on the existing concessioner, although the revenue generated by the tram is a very small percentage of the overall revenue generated by concessioner activities in the park. Additional long-term costs would be incurred from the expansion of the shuttle service and infrastructure that must be maintained.

Cumulative Impacts. The impact of past, present, and reasonably foreseeable projects affecting park operations would be the same as Alternative 1 (No Action)—a long-term minor beneficial impact on park operations in the Mariposa Grove area. Under Alternative 2, elimination of the tram service would result in a local adverse impact on concessioner revenues. This loss would constitute a very small percentage of the overall revenue generated by concessioner income in the park. The impacts of Alternative 2 on park operations would generally be local, long-term, and moderate, adverse from expansion of the shuttle service and infrastructure that must be maintained. The cumulative effect of past, present, and future actions, in conjunction with the long-term minor beneficial impacts of Alternative 2, would be long-term, moderate, and adverse.

Alternative 3: Grizzly Giant Hub

Construction-related Impacts. Alternative 3 would remove the commercial tram operation and consolidate the facilities and infrastructure at Grizzly Giant, but outside of giant sequoia habitat. Construction-related impacts would be similar to Alternative 2 except that Alternative 3 proposes to construct a new bypass road, two new bridges, and a new parking lot near Grizzly Giant. The increase in project components and associated construction would result in higher initial short-term impacts on operating costs compared to Alternative 2. Increased demands would be placed on park staff due to a larger area of construction, a longer time period for construction, and the potential for more traffic delays. The park would need to take additional measures to notify visitors of the status of the parking areas, bypass road, bridges, and potential traffic delays.

Impact Significance. Local, short-term, minor, adverse impact.

Restoration-related Impacts. Restoration of the Grove would not interfere with or impact park operations. Existing operations and activities would remain essentially unchanged.

Impact Significance. Local, short-term, negligible impact.

Operation-related Impacts. Consolidating the infrastructure and facilities at Grizzly Giant, upgrading existing facilities and utilities, simplifying traffic flow, and removing the commercial tram and shuttle operations would reduce the demand on park facilities staff over the long term and on the overall park operations and maintenance costs compared to the No Action Alternative. Traffic congestion related to the occasional closure of the Mariposa Grove Road during periods of heavy visitation would occur less frequently. This would reduce demands on park facilities staff to provide traffic control measures. Alternative 3 would eliminate the park's transit costs related to operating the shuttle between Wawona, the South Entrance and the lower Grove area. Although the park would no longer collect franchise fees generated by the commercial tram, these fees represent a small fraction of the total revenue generated by concessioner services in the park and the park's overall operating budget.

Elimination of the tram service would result in a local adverse impact by the existing concessioner, although the revenue generated by the tram is a very small percentage of the overall revenue generated by concessioner activities in the park.

Impact Significance. Local, long-term, major, beneficial impact.

Conclusion. The construction of a new bypass road, two bridges, and a new parking lot would result in an initial short-term increase in park operating costs. However, in the long term, Alternative 3 would improve and simplify operations in the Grove and reduce park operating and maintenance costs compared to the No Action Alternative.

Cumulative Impacts. The impact of past, present, and reasonably foreseeable projects affecting park operations would be the same as Alternative 1 (No Action)—a long-term minor beneficial impact on park operations in the Mariposa Grove area. Under Alternative 3, elimination of the tram service would result in a local adverse local impact on concessioner revenues. This loss would constitute a very small percentage of the overall revenue generated by concessioner income in the park. Construction of a new bypass road, two bridges, and a new parking lot would result in an initial short-term increase in park operating costs. In the long term, Alternative 3 would improve and simplify operations in the Grove and reduce the cost of maintenance on deteriorating infrastructure. The impacts of Alternative 3 on park operations would generally be local, long-term, and minor beneficial from consolidation of infrastructure and improvements to facilities and utilities. The cumulative effect of past, present, and future actions, in conjunction with the long-term minor beneficial impacts of Alternative 3, would be long-term, moderate, and beneficial.

Alternative 4: South Entrance Hub with Modified Commercial Tram Access

Construction-related Impacts. Construction-related impacts under Alternative 4 would result from the consolidation of most infrastructure and facilities to the South Entrance, realignment of the commercial tram access road, and construction of new restrooms and a leach field (if feasible). Short-term impacts would be minor and similar to Alternative 2, except that the road realignment may require additional park facilities staff and resources to monitor traffic conditions in local areas.

Impact Significance. Local, short-term, minor, adverse impact.

Restoration-related Impacts. Restoration of the Grove would not interfere with or impact park operations. Existing operations and activities would remain essentially unchanged.

Impact Significance. Local, short-term, negligible impact.

Operation-related Impacts. The facilities and infrastructure would be removed from the lower Grove area and consolidated at the South Entrance to improve access and serviceability. The existing ranger station at the South Entrance and existing restroom access would be rehabilitated, a new comfort station built, the existing water supply system repaired, and a new septic system would be installed. The addition of new facilities and infrastructure and more complex utility systems would off-set the savings from upgrading facilities that currently require frequent maintenance.

The NPS would need to increase the bus hours of the Mariposa Grove shuttle by about 35 percent under Alternative 4, with a proportional increase in transit costs. Although shuttle service would be reduced between Wawona and lower Grove area, additional service would be provided between the South Entrance and the lower Grove area and shuttle operations would be expanded into the shoulder seasons. Although the revenue generated by the commercial tram franchise fees would be reduced, this represents a small fraction of the total revenue generated by concessioner services in the park and the park's overall operating budget.

Impact Significance. Local, long-term, moderate, adverse impact.

Conclusion. Consolidation of infrastructure and improvements to facilities and utilities would result in a beneficial impact on park operations and facilities staff over the long term by reducing timely and costly maintenance repairs, but additional costs would be incurred from the expansion of the shuttle service and infrastructure that must be maintained.

Cumulative Impacts. The impact of past, present, and reasonably foreseeable projects affecting park operations would be the same as Alternative 1 (No Action)—a long-term minor beneficial impact on park operations in the Mariposa Grove area. The impacts of Alternative 4 on park operations would generally be local, long-term, moderate and adverse from expansion of the shuttle service, facilities and utilities. The cumulative effect of past, present, and future actions, in conjunction with the long-term minor beneficial impacts of Alternative 4, would be long-term, moderate, and adverse.

ENERGY USE AND SUSTAINABILITY

Affected Environment

One of the management objectives for park operations, as outlined in previous planning efforts and Executive Order 13123, is to install facilities and utility systems that conserve energy. Design

techniques and application of new technology to reduce energy and water consumption should be incorporated in the design of new facilities or replacement of existing facilities.

In April 1999, the U.S. Department of the Interior entered into a formal Memorandum of Understanding with the U.S. Department of Energy to promote the use of energy-efficient and renewable energy technologies and practices in national parks, and to educate the visiting public about these efforts. This partnership officially inaugurated the program titled “Green Energy Parks: Making the National Parks a Showcase for a Sustainable Energy Future.” This initiative would help to fulfill provisions of the Energy Policy Act of 1992, which directs the use of energy-efficient building designs and equipment and the use of alternative motor fuels where practicable. The Energy Policy Act of 2005 incorporates previous Energy Policy Acts and directs the federal government to increase its renewable energy use, with a goal of using 3 percent, 5 percent, and 7.5 percent of total energy consumption in incremental years through 2013.

NPS Management Policies 2006 includes a section (Section 9.1.1.6) on sustainable energy design in the operation of park facilities. Section 9.1.1.6 states that any facility development must include improvements in energy efficiency and reduction in greenhouse gas emissions, and that such efficiency should be achieved using solar thermal and photovoltaic application, as well as appropriate insulations, energy-efficient lighting and appliances, and renewable energy technologies. Furthermore, this section states that energy-efficient construction projects should be used as an educational opportunity, and that those built primarily for visitors must incorporate Leadership in Energy and Environmental Design® (LEED®) standards to achieve a silver rating (NPS 2006).

NPS Management Policies 2006 also includes a section (Section 9.1.7) on energy management in the operation of park facilities. Section 9.1.7 states that the NPS shall conduct its activities in ways that use energy wisely and economically, and that encourages the implementation of alternative transportation programs and the use of bio-based and alternative fuels. It also calls for the use of renewable sources of energy and new developments in energy-efficiency technology, including products from the recycling of materials and waste, where appropriate and cost-effective over the life cycle of a facility. Lastly, the management policies call for the interpretation of resource protection benefits resulting from the efficient use of energy, and education of park personnel and visitors to encourage use of sustainable practices in conserving energy (NPS 2006). These policies are derived from the laws that have been enacted to establish and guide the administration of the national park system, including

- Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- Executive Order 13123, Greening the Government through Efficient Energy Management, which calls on federal agencies to take the lead in implementing energy conservation, maximizing the use of renewable resources, and reducing greenhouse gas emissions; and
- Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance, signed in October 2009, which required federal agencies to set a 2020 greenhouse gas emissions reduction target; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable communities; and leverage federal purchasing power to promote environmentally responsible products and technologies.

Sustainable Design

President Obama's Executive Order 13514 provides a unique opportunity for federal agencies and facilities to improve sustainability across their operations. The executive order, in addition to its call for agencies to implement sustainable practices when constructing and operating high-performance Federal buildings, and establishes goals for the conservation of water resources at federal facilities, including potable, industrial, landscaping, and agricultural water. The executive order also calls for pollution prevention through a variety of landscape management practices (CEQ 2012).

To help achieve these policy goals, on October 31, 2011 CEQ issued *Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes*, which describes strategies to achieve sustainable Federal landscape practices. This guidance is to be used by federal agencies for landscape practices when constructing new, or rehabilitating existing, owned or leased facilities, or when landscaping improvements are otherwise planned (CEQ 2012). This guidance is based in part on the Sustainable Sites Initiative.



Figure 3-37 – Solar-powered Sign at South Entrance

The Sustainable Sites Initiative (SITES) is an interdisciplinary effort by the American Society of Landscape Architects and partners to create voluntary national guidelines and performance benchmarks for sustainable land design, construction, and maintenance practices. The U.S. Green Building Council, a stakeholder in the initiative, anticipates incorporating these guidelines and performance benchmarks into future iterations of the LEED® Green Building Rating System. SITES is not intended to be a restoration tool; it is most appropriate as a tool to guide the development of designed landscapes. However portions of the project that would be designed, such as parking areas, shuttle infrastructure, and other facilities/utilities, could use SITES guidelines to provide the most sustainable strategies and practices. As stated in the SITES guidelines, “agencies should strive to balance natural resource management priorities with development needs (energy, security, infrastructure) while considering cultural, recreational, and environmental resources inherent in the landscape. These guidelines are intended to enhance, not inhibit, planning, operations and maintenance” (SITES 2012).

Mariposa Grove Energy Use

Park facilities and infrastructure within the Grove include comfort stations, small office and storage area, the Mariposa Museum, concession gift/snack shop, commercial tram ticket booth structure, two water tanks, restroom facilities, paved road, and a paved shuttle bus parking and commercial tram staging area. Other amenities include sitting areas, wayside exhibits, trailheads, drinking fountain, and trash containers. The NPS Division of Facilities Management performs preventive and corrective maintenance on utility infrastructure throughout Mariposa, which includes the water supply system, wastewater disposal infrastructure, power, and communications. Electricity at the gift shop is supplied by a portable diesel generator and communications equipment at Wawona Point is supplied by propane and solar power.

The concessioner at Mariposa Grove is one of the first such companies in the United States – and the first operating in a national park – to be registered to the ISO 14001 environmental management standard (Eaton 2012). The use of tractors with clean-diesel engines in Mariposa Grove has reduced vehicle emissions (Eaton 2012). The shuttle buses that transport visitors from Wawona and the South Entrance to the Mariposa Grove are also alternatively fueled.

Energy consumption at the Mariposa Grove occurs largely from May through October. Energy sources at the Mariposa Grove include electricity (from an onsite, diesel-fueled generator), propane, and diesel fuel. The communications equipment at Wawona Point is supplemented with propane during the winter months when meteorological conditions prohibit sole reliance on solar power. Waste recycling occurs at both the Grove and at the South Entrance.

South Entrance Energy Use

Park facilities and infrastructure at the Yosemite National Park South Entrance area include a single-story ranger building, garage, entrance office, kiosk, parking lot, paved road, comfort stations, shuttle stop, and entrance comfort station. Electricity for the South Entrance comfort station and ranger building is supplied by Pacific Gas and Electric Company via above- and below-ground power lines. The ranger building also contains a generator, satellite dish, propane tanks, hazardous materials storage, and electrical transformer.

The South Entrance and ranger residence operate year-round. Energy consumption at the South Entrance includes electricity (ranging from 996 kilowatt hours per month in the summer up to 3,800 kilowatt hours per month in the winter), propane, and diesel fuel.

Environmental Consequences

Intensity Level Definitions

The analysis of energy was based on a qualitative comparison of energy use for the operation, construction, and maintenance (including repairs) of each alternative. The evaluation is based on available data and forecasts. For purposes of this analysis, implementation of an alternative is assumed to have an impact on energy if it results in the following:

Adverse impact:

- Increased overall per capita energy consumption
- Increased reliance on natural gas and oil
- Continued use of inefficient building design

Beneficial impact:

- Decrease in overall per capita energy consumption
- Decrease reliance on natural gas and oil
- Increase use of renewable energy (e.g., photovoltaic cells, wind, geothermal)
- Energy-efficient design for new infrastructure
- Incorporation of energy-efficient features into existing infrastructure

Negligible – Energy use would not be affected, or effects would not be measurable.

Minor – Effects on energy use, such as increase/decrease in overall consumption, would be measurable.

Moderate – Effects on energy use, such as increase/decrease in overall consumption, would be apparent.

Major – Effects on energy use, such as increase/decrease in overall consumption, would be readily apparent.

Alternative 1: No Action

Under Alternative 1 current infrastructure, concessioner services and maintenance, and park management would remain as is. No rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvement of visitor orientation and interpretation, would be implemented.

Operation-related Impacts. Consumption of non-renewable energy (propane and diesel fuel) at the lower Grove gift shop and commercial tram would continue. The current dispersed transit and access patterns among the Mariposa Grove, the South Entrance, and Wawona result in extraneous vehicular mileage, particularly for those visitors who are turned away from the Mariposa Grove when parking is full and who then board a shuttle bus and drive all back to the Mariposa Grove from Wawona. This dispersal also adversely impacts maintenance and service expenditures. Long lines at the South Entrance kiosks and visitor disorientation result in consistent engine idling. There are no planned improvements to building design in terms of energy and water efficiency.

Impact Significance. Local, long-term, moderate, adverse.

Conclusion. Under Alternative 1 there would be no concerted effort to decrease energy consumption through sustainable design and no impetus to use alternative energy sources, resulting in local, long-term, moderate adverse impacts on energy use and sustainability.

Cumulative Impacts. This cumulative impact analysis considers the present and reasonably foreseeable future actions related to energy use and sustainability in the Mariposa Grove area, in combination with the impacts of Alternative 1. The potential impacts from the operation, construction, and maintenance of most of the present plans and projects listed in Appendix B would result in a small increase in overall per capita energy consumption. Overall, these actions constitute a short-term negligible adverse impact on energy use and sustainability in the area. Under Alternative 1, there would be no actions taken to decrease energy consumption through sustainable design and no use of alternative energy sources, resulting in local, long-term, moderate adverse impacts on energy use and sustainability.

Alternative 2: South Entrance Hub (Preferred Alternative)

Alternative 2 would remove the commercial tram operation and reduce the amount of lower Grove parking while expanding and relocating primary visitor parking to the South Entrance, making the South Entrance the departure point for visitors accessing the Grove. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvement of visitor orientation and interpretation, would be components of this alternative.

Construction-related Impacts. Construction energy expenditures for the development of the new parking lot and visitor contact area at the South Entrance and the Three Sentinels Bridge under Alternative 2 would include both direct and indirect uses of energy. Combustion of petroleum products needed to operate construction equipment would be included in the direct energy use during the construction period. The energy consumed through mining and extraction of raw materials, manufacturing, and transportation to produce the construction materials is considered indirect energy use. Indirect energy typically represents about three-quarters of total construction

energy, while direct energy represents about one-quarter of the total construction energy (Hannon et al. 1978). Though construction energy would be consumed only during the construction period, it would represent the irreversible consumption of finite natural energy resources.

Construction activities under Alternative 2 would consume fuel and electricity, along with indirect energy for materials used in constructing development components. Construction equipment, including haul trucks and vehicles onsite, is expected to consume a majority of the energy resources. Electricity would be used by construction equipment, such as welding machines and power tools. Energy consumed by construction power equipment would be relatively minimal.

The amount of energy consumed each day would vary depending on a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the number of construction workers needed, the number of haul trips, and trip length. Construction energy consumption would occur for the duration of the construction period and therefore would not be an ongoing drain on finite natural resources. Construction energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure. The design plan under Alternative 2 includes measures that would reduce construction energy expenditure through the use of recycled materials. BMPs for air quality and noise would help reduce fuel consumption by construction equipment (e.g., ensuring all construction equipment is properly tuned and maintained, turning off equipment when not in use). Furthermore, materials removed as part of the demolition of existing campus facilities would be sorted and salvaged for reuse or recycling.

Impact Significance. Local, short-term, moderate, and adverse.

Restoration-related Impacts. Restoration energy consumption would occur as pavement is ripped up along the Mariposa Grove Road and in the lower Grove parking lot and during culvert work and installation. However, this would not be an ongoing drain on finite natural resources. Restoration energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure.

Impact Significance. Local, short-term, minor, and adverse.

Operation-related Impacts. The consumption of non-renewable energy (propane and diesel fuel) and electricity in the lower Grove area would be eliminated. Under this alternative there is an option to be “off the grid.” Consolidation of Mariposa Grove facilities and infrastructure at the South Entrance would result in improved access and serviceability, reducing expenditures. The South Entrance intersection congestion would be alleviated by installation of a roundabout if needed, and current plans to move the entrance kiosks southward away from the Wawona Road/Mariposa Grove Road intersection. This improvement in traffic flow would result in fewer or shorter back-ups and less idling by vehicles. Vehicle miles traveled would also be reduced as fewer visitors would be driving to Wawona and “backtracking” to the Mariposa Grove on the park shuttle bus system.

Under Alternative 2, a new visitor contact area at the South Entrance would be designed in accordance with the NPS *Guiding Principles of Sustainable Design* (1993). These principles include the orientation of buildings to maximize sun exposure for heat gain and to minimize the effects of prevailing winds, design that incorporates the use of natural ventilation, entry vestibules to reduce heat loss, energy-efficient lighting, and the installation of energy- and water-efficient features and utilities. Other “green” elements to be incorporated include energy-efficient construction design, sustainability and “green” technology, lighting, site drainage, water conservation, wastewater management, and energy conservation.

Impact Significance. Local, long-term, moderate, beneficial.

Conclusion. Under Alternative 2 there would be a concerted effort to decrease energy consumption through sustainable design while using alternative energy sources, resulting in local, long-term, moderate beneficial impacts on energy use and sustainability.

Cumulative Impacts. The impact of past, present and reasonably foreseeable projects affecting energy use and sustainability would be the same as Alternative 1 (No Action)—a long-term negligible adverse impact on energy use and sustainability in the Mariposa Grove area. Under Alternative 2, there would be a concerted effort to decrease energy consumption through sustainable design while using alternative energy sources, resulting in local, long-term, moderate beneficial impacts on energy use and sustainability. Present and past plans and projects, in conjunction with the moderate beneficial impacts of Alternative 2, would result in an overall long-term moderate beneficial impact on energy use and sustainability in the Mariposa Grove area.

Alternative 3: Grizzly Giant Hub

Alternative 3 would remove the commercial tram operation and build a new bypass road, including two new bridges, and a new larger parking lot near the Grizzly Giant, but outside of giant sequoia habitat. This alternative would make the Grizzly Giant the primary departure point for visitors to the Grove. The current South Entrance parking lot would remain as is and the lower Grove parking lot would be removed; a small lot of ABAAS-compliant parking spaces would be constructed. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow and universal access, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvement of visitor orientation and interpretation, would be components of this alternative.

Construction-related Impacts. Construction energy expenditures for the new access road, two bridges, and parking lot near the Grizzly Giant under Alternative 3 would include both direct and indirect uses of energy. Combustion of petroleum products needed to operate construction equipment would be included in the direct energy use during the construction period. The energy consumed through mining and extraction of raw materials, manufacturing, and transportation to produce the construction materials is considered indirect energy use. Indirect energy typically represents about three-quarters of total construction energy, while direct energy represents about one-quarter of the total construction energy (Hannon et al. 1978). Though construction energy would be consumed only during the construction period, it would represent the irreversible consumption of finite natural energy resources.

Construction activities under Alternative 3 would consume fuel and electricity, along with indirect energy for materials used in constructing development components. Construction equipment, including haul trucks and vehicles onsite, is expected to consume a majority of the energy resources. Electricity would be used by construction equipment, such as welding machines and power tools. Energy consumed by construction power equipment would be relatively minimal.

The amount of energy consumed each day would vary depending on a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the number of construction workers needed, the number of haul trips, and trip length. Construction energy consumption would occur for the duration of the construction period and therefore would not be an ongoing drain on finite natural resources. Construction energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure. The design plan under Alternative 2 includes measures that would reduce construction energy expenditure through the use of recycled materials. BMPs for air quality and

noise would help reduce fuel consumption by construction equipment (e.g., ensuring all construction equipment is properly tuned and maintained, turning off equipment when not in use). Furthermore, materials removed as part of the demolition of existing campus facilities would be sorted and salvaged for reuse or recycling.

Impact Significance. Local, short-term, moderate, and adverse.

Restoration-related Impacts. Restoration energy consumption would occur as pavement is ripped up along the Mariposa Grove Road and in the lower Grove parking lot and during culvert work and installation. However, this would not be an ongoing drain on finite natural resources. Restoration energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure.

Impact Significance. Local, short-term, moderate, and adverse.

Operation-related Impacts. This alternative would include a reduction in the use of non-renewable energy (propane and diesel fuel) as the proposed Grizzly Giant visitor contact area would be completely “off the grid.” All development would showcase sustainable design and establish precedence. No shuttle infrastructure would be required. The simplified access pattern to the Mariposa Grove directly from the South Entrance would likely reduce vehicular mileage due to visitor confusion and back-tracking from Wawona, but this would likely be offset by the lack of alternative transit to the Grove and additional vehicle miles traveled to the Grizzly Giant Hub. Consolidation of Mariposa Grove facilities and infrastructure at the Grizzly Giant Hub would clarify access and improve serviceability. Most winter access would be from the South Entrance and plowing of the Mariposa Grove Road would be minimal. Seasonal shuttle operations would be extended. Service access to Wawona Point and the upper Grove comfort station and repurposed museum would be via hardened narrow road.

Under Alternative 3, a new visitor contact area at the Grizzly Giant would be “off the grid” and designed in accordance with the NPS *Guiding Principles of Sustainable Design* (1993). These principles include the orientation of buildings to maximize sun exposure for heat gain and to minimize the effects of prevailing winds, design that incorporates the use of natural ventilation, entry vestibules to reduce heat loss, energy-efficient lighting, and the installation of energy- and water-efficient features and utilities. Other “green” elements to be incorporated include energy-efficient construction design, sustainability and “green” technology, lighting, site drainage, water conservation, wastewater management, and energy conservation.

Impact Significance. Local, short-term, moderate, and beneficial.

Conclusion. Under Alternative 3 there would be a concerted effort to decrease energy consumption through sustainable design and to use alternative energy sources, resulting in local, long-term, moderate beneficial impacts on energy use and sustainability but slightly less than that described for Alternative 2.

Cumulative Impacts. The impact of past, present and reasonably foreseeable projects affecting energy use and sustainability would be the same as Alternative 1 (No Action)—a long-term negligible adverse impact on energy use and sustainability in the Mariposa Grove area. Under Alternative 3, there would be a concerted effort to decrease energy consumption through sustainable design while using alternative energy sources, resulting in local, long-term, moderate beneficial impacts on energy use and sustainability. Present and past plans and projects, in conjunction with the moderate

beneficial impacts of Alternative 3, would result in an overall long-term moderate beneficial impact on energy use and sustainability in the Mariposa Grove area.

Alternative 4: South Entrance Hub with Modified Commercial Tram Service

Alternative 4 would maintain the commercial tram but with a limited route and hours of operation while also relocating the majority of the parking to the South Entrance, making the South Entrance the primary departure point for visitors to the Grove. Numerous other rehabilitation and restoration actions, such as improvement of hydrologic flow, project-specific prescribed fire and hazardous fuel reduction treatments, soil decompaction, and improvement of visitor orientation and interpretation, would be components of this alternative.

Construction-related Impacts. Construction energy expenditures for the development of the new parking lot and visitor contact area at the South Entrance under Alternative 4 would include both direct and indirect uses of energy. Combustion of petroleum products needed to operate construction equipment would be included in the direct energy use during the construction period. The energy consumed through mining and extraction of raw materials, manufacturing, and transportation to produce the construction materials is considered indirect energy use. Indirect energy typically represents about three-quarters of total construction energy, while direct energy represents about one-quarter of the total construction energy (Hannon et al. 1978). Though construction energy would be consumed only during the construction period, it would represent the irreversible consumption of finite natural energy resources.

Construction activities under Alternative 4 would consume fuel and electricity, along with indirect energy for materials used in constructing development components. Construction equipment, including haul trucks and vehicles onsite, is expected to consume a majority of the energy resources. Electricity would be used by construction equipment, such as welding machines and power tools. Energy consumed by construction power equipment would be relatively minimal.

The amount of energy consumed each day would vary depending on a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the number of construction workers needed, the number of haul trips, and trip length. Construction energy consumption would occur for the duration of the construction period and therefore would not be an ongoing drain on finite natural resources. Construction energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure. The design plan under Alternative 4 includes measures that would reduce construction energy expenditure through the use of recycled materials. BMPs for air quality and noise would help reduce fuel consumption by construction equipment (e.g., ensuring all construction equipment is properly tuned and maintained, turning off equipment when not in use). Furthermore, materials removed as part of the demolition of existing campus facilities would be sorted and salvaged for reuse or recycling.

Impact Significance. Local, short-term, moderate, and adverse.

Restoration-related Impacts. Restoration energy consumption would occur as pavement is ripped up in the lower Grove parking lot and during culvert work and installation. However, this would not be an ongoing drain on finite natural resources. Restoration energy consumption would primarily be in the form of fuel, would not have a significant effect on the energy resources of the park, and would not require new infrastructure.

Impact Significance. Local, short-term, minor, and adverse.

Operation-related Impacts. In-park vehicular mileage for visitors would be reduced through much improved transit and access patterns and improved transit communication through the proposed electronic parking availability system. Consolidation of Mariposa Grove facilities and infrastructure at the South Entrance would result in improved access and serviceability, reducing expenditures. The South Entrance congestion would be alleviated by modifying the existing T-intersection moving the entrance kiosks southward away from the Wawona Road/Mariposa Grove Road intersection. This improvement in traffic flow would result in fewer or shorter back-ups and less idling by vehicles. New flush restrooms for lower Grove area would replace existing vault toilets. Most winter access would be from the South Entrance and plowing of the Mariposa Grove Road would be minimal. Seasonal shuttle operations would be extended. Service access to the upper Grove comfort station and repurposed museum would be via a paved road. Access to Wawona Point would be via a hardened narrow road.

Under Alternative 4, a new visitor contact area at the South Entrance would be designed in accordance with the NPS *Guiding Principles of Sustainable Design* (1993). These principles include the orientation of buildings to maximize sun exposure for heat gain and to minimize the effects of prevailing winds, design that incorporates the use of natural ventilation, entry vestibules to reduce heat loss, energy-efficient lighting, and the installation of energy- and water-efficient features and utilities. Other “green” elements to be incorporated include energy-efficient construction design, sustainability and “green” technology, lighting, site drainage, water conservation, wastewater management, and energy conservation.

Impact Significance. Local, short-term, minor, and beneficial.

Conclusion. Under Alternative 4 there would be a concerted effort to decrease energy consumption through sustainable design and to use alternative energy sources; however, these would be partially offset by the continued use of the commercial tram which would result in local, long-term, minor beneficial impacts on energy use and sustainability.

Cumulative Impacts. The impact of past, present and reasonably foreseeable projects affecting energy use and sustainability would be the same as Alternative 1 (No Action)—a long-term negligible adverse impact on energy use and sustainability in the Mariposa Grove area. Under Alternative 4, there would be a concerted effort to decrease energy consumption through sustainable design while using alternative energy sources; however, these would be partially offset by the continued use of the commercial tram which would result in local, long-term, minor beneficial impacts on energy use and sustainability. Recent and past plans and projects, in conjunction with the minor beneficial impacts of Alternative 4, would result in an overall long-term minor beneficial impact on energy use and sustainability in the Mariposa Grove area.