



Restoration of the Mariposa Grove of Giant Sequoias

Final Environmental Impact Statement
October 2013



United States Department of the Interior NATIONAL PARK SERVICE

Yosemite National Park
P. O. Box 577
Yosemite, California 95389

IN REPLY REFER TO:
L7617 (YOSE-PM)

OCT 24 2013

Dear Yosemite Friends:

On behalf of the National Park Service, I am pleased to announce the release of the *Restoration of the Mariposa Grove of Giant Sequoias Final Environmental Impact Statement (Mariposa Grove FEIS)*. The Mariposa Grove in Yosemite National Park contains about 500 mature giant sequoia trees that are among the oldest, rarest, and largest living organisms in the world. These "big trees" were so inspirational to early visitors that in 1864, in the midst of the Civil War, Congress passed landmark legislation signed by President Lincoln to permanently preserve both the Mariposa Grove and Yosemite Valley. This was the first time in American history that the government set aside public lands for the express purpose of preserving scenic and natural resources. Nearly 150 years later, the Mariposa Grove is in need of comprehensive restoration to ensure that it continues to thrive and provide inspiration and enjoyment for future generations.

The *Mariposa Grove FEIS* brings forth a plan to restore ecological processes and increase the resiliency of the Mariposa Grove while improving the overall experience for visitors. The plan describes and analyzes three action alternatives and a no action alternative. Key actions proposed in Alternative 2 (preferred alternative) include restoration of giant sequoia habitat and wetlands; removal of parking within the Grove and construction of a transit hub at the South Entrance of the park; addition of shuttle service between the South Entrance and the lower Grove area during peak use periods; and removal of the commercial tram service to improve soundscapes and allow for additional ecological restoration. The NPS would establish a new pedestrian trail between the South Entrance and the Mariposa Grove, as well as several new accessible trails.

Input from the public, our tribal partners, and other government agencies has helped to shape this plan since public scoping and consultation began in 2011. The park received 334 comments during the 60-day public review of the *Restoration of the Mariposa Grove of Giant Sequoias Draft Environmental Impact Statement* released in February of 2013. Key revisions to the preferred alternative between the draft and final EIS include refinements at the South Entrance to ensure adequate parking, provision of additional parking near the existing picnic area for periods when the shuttle is not in operation, and exploration of additional options for location(s) of the leach fields. Thank you for your involvement and participation so far.

The *Mariposa Grove FEIS* is available on the Planning, Environment, and Public Comment (PEPC) website at <http://www.parkplanning.nps.gov/mariposagrove>. To request printed documents or CDs, e-mail yose_planning@nps.gov or call (209) 379-1202. A minimum 30-day no-action period will follow the U.S. Environmental Protection Agency notice of availability of the *Mariposa Grove FEIS* in the Federal Register. The NPS will prepare a Record of Decision (ROD) no sooner than 30 days after release of the FEIS. After approval of the ROD by the Regional Director, the park will announce the selected plan through local and regional press and on the project website. The official responsible for project implementation is the Superintendent, Yosemite National Park.

Mail: Superintendent
Attn: Mariposa Grove/FEIS
P.O. Box 577
Yosemite National Park, CA 95389

Sincerely,

Don L. Neubacher
Superintendent

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Yosemite National Park
Lead Agency: National Park Service

ABSTRACT

In 1864, the U.S. Congress passed landmark legislation preserving the Mariposa Grove of Giant Sequoias and Yosemite Valley. Nearly 150 years later, comprehensive actions are needed to ensure that the Mariposa Grove continues to thrive and provide inspiration and enjoyment for future generations. The *Mariposa Grove Final Environmental Impact Statement (FEIS)* brings forth a plan to restore ecological processes and increase the resiliency of the Mariposa Grove while improving the overall experience for visitors. The plan describes and analyzes three action alternatives and a no action alternative to achieve these goals.

Alternative 1, No Action, serves as a baseline against which to compare the action alternatives. This alternative represents the continuation of current park management into the future, with no changes to existing facilities, transportation systems, or services.

Alternative 2, South Entrance Hub, is the National Park Service (NPS) preferred alternative. Actions proposed in Alternative 2 would restore giant sequoia habitat and wetlands; remove parking within the Mariposa Grove and construct a transit hub at the South Entrance of the park; add shuttle service between the South Entrance and the lower Grove area during peak use periods; and remove the commercial tram service to improve soundscapes and allow for additional ecological restoration. The NPS would establish a new pedestrian trail between the South Entrance and the Grove, as well as several new accessible trails.

Alternative 3, Grizzly Giant Hub, would relocate public parking and visitor information services from the lower Grove area to a more centralized transit hub in proximity to the Grizzly Giant, outside of giant sequoia habitat. The NPS would construct a new access road around the lower Grove area to the new transit hub. The existing road, gift shop, and parking area would be removed from the Grove to allow for comprehensive restoration of giant sequoia and wetland habitat. Commercial tram operations would be eliminated.

Alternative 4, South Entrance Hub with Modified Commercial Tram Service, is similar to Alternative 2, but the commercial tram staging area would move to the South Entrance, and commercial tram operations would extend to the vicinity of the Museum in the upper Grove area.

Input from the public, tribal partners, and other government agencies has helped to shape this plan since public scoping and consultation began in 2011. The park received 334 comments during the 60-day public review of the *Restoration of the Mariposa Grove of Giant Sequoias Draft Environmental Impact Statement* released in February of 2013. Key revisions to the preferred alternative between the draft and final EIS include refinements at the South Entrance to ensure adequate parking, provision of additional parking near the existing picnic area for periods when the shuttle is not in operation, and exploration of additional options for the location(s) of leach fields.

The *Mariposa Grove FEIS* is available on the Planning, Environment, and Public Comment (PEPC) website at <http://www.parkplanning.nps.gov/mariposagrove>. To request printed documents or CDs, send an e-mail to (yose_planning@nps.gov) or call (209) 379-1202. A minimum 30-day no-action period will follow the U.S. Environmental Protection Agency noticing of the availability of the *Mariposa Grove FEIS* in the Federal Register. The NPS will prepare a Record of Decision (ROD) no sooner than 30 days after release of the FEIS. After approval of the ROD by the Regional Director, the park will announce the selected plan through local and regional press and on the project website. For further information, contact:

Mail: Superintendent
ATTN: Mariposa Grove/FEIS
P.O. Box 577
Yosemite National Park, CA 95389

October 2013
Abstract

EXECUTIVE SUMMARY

INTRODUCTION

The *Restoration of the Mariposa Grove of Giant Sequoias Final Environmental Impact Statement (Mariposa Grove FEIS)* presents and analyzes four alternatives to restore natural conditions and improve visitor experience and access to the Mariposa Grove of Giant Sequoias in Yosemite National Park, California (also referred to as the Mariposa Grove). This document fulfills the public review requirements of the National Environmental Policy Act as well as Section 106 of the National Historic Preservation Act and the California Environmental Quality Act.

PURPOSE OF AND NEED FOR THE PROJECT

The primary purpose of the *Mariposa Grove FEIS* is to restore the dynamic ecological processes that sustain the Mariposa Grove, increase the resiliency of the Grove to withstand emerging stressors, and improve the overall experience in the Grove for visitors. Additional project goals are to protect resources; enhance interpretation of natural and cultural resources; improve wayfinding and safety within the Grove; and meet accessibility requirements consistent with the Architectural Barriers Act of 1968, as amended, and Section 504 of the Rehabilitation Act of 1973. These requirements would improve access to comfort stations, parking areas, and on selected trails. Additionally, efficiencies in energy and water use, and reduced use of non-renewable resources would be incorporated into the action alternatives.

Comprehensive actions are needed to address the impacts of existing infrastructure, operations, and visitor use on the Mariposa Grove of Giant Sequoias and to ensure that the Grove thrives and continues to provide inspiration and enjoyment for current and future generations. Current conditions adversely affecting the ecological health of the Grove include the following:

- Roads, trails, and other infrastructure disrupt the natural hydrologic functioning of the Grove.
- Buildings and infrastructure concentrated in the lower portion of the Grove encroach on individual giant sequoias and their roots, and reduce habitat for giant sequoia propagation.
- Throughout the Grove, ongoing foot and vehicle access to trees damages giant sequoia trunks, compacts soils, and exposes shallow giant sequoia roots, potentially making the trees less resilient and more susceptible to external stressors.
- The deteriorated water distribution system through the Grove is leaking thousands of gallons of chlorinated water per day, and may be affecting shallow hydrology and local vegetation.

Current conditions diminishing the quality of the visitor experience include the following:

- Wayfinding information is insufficient to properly orient visitors upon arrival at the Grove and while on trails within the Grove.
- Poor road conditions between the South Entrance and the lower Grove area contribute to seasonal closures, limit vehicle types, and are a safety concern for visitors and park employees.
- The Grove parking lot often fills to capacity early in the day, forcing temporary closures of the lot and Mariposa Grove Road, and causing visitor frustration as they are redirected to

limited overflow parking at South Entrance or to Wawona to await a shuttle to return to the Grove.

- Long lines form at the South Entrance station kiosks and intersection as visitors attempt to get information, find parking, or turn around due to Grove parking lot and road closure.
- Shuttles from Wawona to the Grove are often full when they arrive at the South Entrance shuttle stop, limiting boarding there and increasing visitor wait times.
- Trails and facilities in and around the Grove need improvements to reduce grades and/or increase connectivity to provide better universal accessibility.
- Operation of the commercial tram within the Grove creates vehicle/pedestrian conflicts along the loop road, and intrudes on the experience of pedestrian visitors seeking to enjoy the majestic setting and natural soundscapes, particularly in the upper, more remote areas of the Grove.
- The vault toilets in the lower part of the Grove are inadequate and not fully accessible, and are the source of nuisance odors that detract from the Grove experience.
- The historic comfort station and the associated septic system and leach field in the upper Grove area need improvements to increase water-use efficiency and maintainability.
- Historic features at Wawona Point, including the masonry overlook wall, steps, and railing, are in disrepair and require repairs to meet current standards.

With the exception of Alternative 1, No Action, each of the alternatives meets the purpose and need of the plan to varying degrees and in different ways. All alternatives would retain the existing visitor use levels of a typical day in the Mariposa Grove, though visitor use would concentrate in different parts of the Grove. The daily visitor use level proposed in the *Mariposa Grove FEIS* approximates the visitor use level established for the Mariposa Grove in the 1980 GMP for Yosemite National Park (3,850 visitors per day).

OVERVIEW OF THE ALTERNATIVES

This FEIS presents a No Action Alternative (Alternative 1) and three action alternatives (Alternatives 2 through 4) to restore natural habitat within the Mariposa Grove and improve the visitor experience.

Several ecological restoration, infrastructure removal or improvement, and visitor experience actions would be common to each of the action alternatives including road/trail grading and culvert repair to improve hydrologic flows; removal of pavement and soil decompaction; repair/replacement of the leaking water distribution system and relocation of the water tank; and improvement of visitor orientation. The action alternatives also include actions to improve conformance with accessibility criteria outlined in NPS Director's Order 42 on accessibility for visitors with disabilities; the Architectural Barriers Act of 1968, as amended; and Section 504 of the Rehabilitation Act of 1973. The actions include improving ratios of accessible parking spaces and providing accessible paths of travel through giant sequoia and wetland habitats, as well as to visitor services at central transit hubs. Appropriately spaced benches, pullouts, and resting places would be added along trails, at viewpoints, and adjacent to congested paths of travel at transit hubs to improve the visitor experience for persons with limited mobility and other visitors. Rehabilitation, stabilization, protection, and/or enhanced interpretation of cultural resources at Mariposa Grove, Wawona Point, and South Entrance also would be components of all of the action alternatives. Moreover, restoration of giant sequoia habitat would preserve sequoia habitat as an integral part of the

Mariposa Grove Historic District and as an American Indian traditional cultural resource. Other components of the three action alternatives, as well as the no-action alternative, are briefly described below.

Alternative 1, No Action, serves as a baseline against which effects of the action alternatives are compared. Alternative 1 would continue the current level of maintenance and operations at the Mariposa Grove of Giant Sequoias. Under this alternative, compliance with regulatory requirements (e.g., health and safety or historic preservation) or strategies in current and future adopted plans would be implemented over time. Ongoing adverse impacts on giant sequoia, wetlands, and wildlife would continue to result from tram operations, infrastructure-related hydrologic changes, soil compaction, and soundscape disturbance. Infrastructure would remain concentrated in the lower Grove area, and commercial operation of the tram and the gift shop would continue. Access to Mariposa Grove would remain challenging during peak use periods. Some visitors arriving at the South Entrance would be redirected to Wawona to board a park shuttle bus and return to the Grove, an inefficient process that takes about an hour. Renovation, rehabilitation, or upgrading of existing buildings and infrastructure to improve functionality and accessibility would occur as emergency actions in response to system failures rather than as planned, coordinated actions. The current level of interpretation and orientation would be retained, and utilities and comfort stations would not be upgraded. Stressors on the giant sequoia trees, wildlife, special status species, and other natural and cultural resources in the Grove and at South Entrance would not be addressed.

Alternative 2, South Entrance Hub, the National Park Service's Preferred Alternative, would remove the majority of visitor parking, commercial tram staging and operations, and the concessioner-operated gift shop from Mariposa Grove to allow for comprehensive restoration of wetlands, soundscape, and giant sequoia habitat. New visitor services for the South Entrance would include visitor information and educational and other sales items. Most parking would be relocated to a South Entrance transit hub. A limited number of parking spaces could be provided in the lower Grove area as well as at the picnic area adjacent to Mariposa Grove Road when the shuttle is not in operation. Vault toilets would be renovated or replaced, and accessible trails would be established in the ecologically restored lower Grove area and at the iconic Grizzly Giant. The abandoned historic Washburn Wagon Road alignment to the Grove would be cleared of vegetation and rehabilitated as a pedestrian path from South Entrance parking lot to the Mariposa Grove Road picnic area. Where the Washburn Wagon Road ends in the vicinity of the existing picnic area, a new trail would be constructed for the remaining distance to the lower portion of the Grove, including a pedestrian bridge across Rattlesnake Creek. An accessible trail would be constructed through the lower Grove area, and an accessible overlook to the Grizzly Giant would be provided. This alternative includes options for realigning the entrance to the Grove to enhance restoration efforts and straighten the existing tight curve near the giant sequoias in the vicinity of the Three Sentinels, which would include a new drainage crossing structure to protect giant sequoias in that area from erosion and from placement of roadway embankment over sensitive root zones. At the South Entrance, the intersection of Wawona Road and Mariposa Grove Road would be realigned to the west of its current location, and a roundabout would replace the current T-intersection should traffic conditions warrant this action.

Alternative 3, Grizzly Giant Hub, would relocate public parking and visitor services from the lower Grove area to a location outside giant sequoia habitat in the vicinity of Grizzly Giant. This would include removing the lower Grove area parking lot, gift shop, and commercial tram staging area and operations to allow for comprehensive restoration of giant sequoia habitat, wetlands, and soundscapes. A new road segment with two bridges would be constructed to skirt the lower Grove. Within the lower Grove area, the existing road to Grizzly Giant would be converted into a pedestrian trail. Accessible parking would be provided at the lower Grove area, accessible trails would be

constructed in the lower and mid-Grove areas, and vault toilets would be installed at the Grizzly Giant parking area. The existing T-intersection at South Entrance would be retained.

Alternative 4, South Entrance Hub with Modified Commercial Tram Service, would maintain the commercial tram operations for visitor access and enjoyment, but tram staging would be moved to a South Entrance Hub, similar to that described for Alternative 2, and the route and hours of operation would be reduced to provide a balance between visitor access and opportunities for quiet enjoyment and solitude in the upper part of the Grove. As under Alternative 2, new visitor services would be provided for the South Entrance including visitor information and educational and other sales items. The majority of public parking would be relocated to the South Entrance, and additional off-season overflow parking would be provided near the Mariposa Grove Road picnic area. An accessible overlook to the Grizzly Giant would be provided. Similar to Alternative 2, the abandoned Washburn road alignment to the Grove would be cleared of vegetation and rehabilitated as a pedestrian path extending from the South Entrance parking lot to the picnic area. Where the abandoned Washburn road ends in the vicinity of the existing picnic area, a new trail would be constructed for the remaining distance to the lower portion of the Grove, including a pedestrian bridge across Rattlesnake Creek. The current T-intersection design at South Entrance would be modified to improve traffic flow.

Summary Comparison of No-Action and Action Alternatives

	Alternative 1: No Action	Alternative 2: South Entrance Hub	Alternative 3: Grizzly Giant Hub	Alternative 4: South Entrance Hub with Modified Commercial Tram Service
Existing Conditions				
Existing impervious (asphalt) surface in project area	3.21 acres	N/A	N/A	N/A
Existing road through the Grove	8.4 acres	N/A	N/A	N/A
Existing trails within the Grove	3.5 acres	N/A	N/A	N/A
Restoration				
Restoration of giant sequoia habitat through reduction of impervious surfaces in lower Grove	N/A	Removal of 1.44 acres, a 50% reduction of impervious surfaces	Removal of 2.38 acres, an 82% reduction of impervious surfaces	Removal of 1.59 acres, a 55% reduction of impervious surfaces
Restoration of giant sequoia habitat through removal of trails	N/A	0.43 acre	0.58 acre	0.02 acre
Restoration of giant sequoia habitat resulting from narrowing of Mariposa Grove Road, conversion of road segments to trails, or trail removal	N/A	Removal of 2.11 acres of existing paved road in the Grove, a 25% reduction of road	Removal of 2.79 acres of existing paved road in the Grove, a 33% reduction of road	Removal of 0.23 acres of existing paved road in the Grove, a 3% reduction of road
Giant sequoia habitat restoration within the Grove (total)	N/A	3.98 acres removal of built footprint within the Grove (27% reduction)	5.75 acres removal of built footprint within the Grove (39% reduction)	1.84 acres removal of built footprint within the Grove (12% reduction)
Net, project-wide change in development, excluding areas for leach fields	N/A	0.74 acre <i>addition</i> developed area (comprised of 3.98 acre net reduction of developed area within the Grove plus 4.72 acres new development at the South Entrance)	0.50 acre <i>addition</i> of developed area (comprised of 5.75 acre net reduction of developed area within the Grove plus 6.25 acres new development at Grizzly Giant and new Grove bypass road)	2.88 acre <i>addition</i> of developed area (comprised of 1.84 acre net reduction of developed area within the Grove plus 4.72 acres new development at the South Entrance)
Infrastructure Redesign and Relocation				
Accessible parking spaces	2 at lower Grove area	8 at South Entrance; 6 at lower Grove area; 3 at picnic area; 8 at Grizzly Giant	7 at Grizzly Giant; 10 at lower Grove area	8 at South Entrance; 6 at lower Grove area; 3 at picnic area, 4 at Grizzly Giant; 4 at upper Grove area
Standard vehicle parking spaces	20 at South Entrance, 115 seasonal at lower Grove area. Over 100 spaces at Wawona are used for overflow parking.	248 regular, 30 oversize at South Entrance, 25-50 seasonal at lower Grove area, 25-50 seasonal at picnic area	20 seasonal at South Entrance, 189 regular, 27-32 oversize at Grizzly Giant	248 regular, 30 oversize at South Entrance, 25-50 seasonal at lower Grove area, 25-50 seasonal at picnic area
South Entrance area build out (net footprint after construction)	N/A	4.72 acres of non-giant sequoia forest	N/A	Same as Alternative 2

Restoration of the Mariposa Grove of Giant Sequoias

	Alternative 1: No Action	Alternative 2: South Entrance Hub	Alternative 3: Grizzly Giant Hub	Alternative 4: South Entrance Hub with Modified Commercial Tram Service
Grizzly Giant area build out (net new footprint after construction)	N/A	0.06 acre of non-giant sequoia forest (includes 0 acres impervious surfaces)	3.13 acres of non-giant sequoia forest (includes 2.92 acres impervious surfaces)	0.06 acre of non-giant sequoia forest (includes 0 acres impervious surfaces)
New bypass road build out (net footprint after construction)	N/A	N/A	2.20 acres, primarily through non-giant sequoia forest	N/A
Primary visitor contact	At lower Grove staging area	At South Entrance Hub	At Grizzly Giant Hub	At South Entrance Hub
Trail from South Entrance to picnic area using abandoned Washburn Road to picnic area and construction of a new trail extending from picnic area to lower Grove	N/A	0.66 acre of development	N/A	Same as Alternative 2

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with NPS *Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making* and Council on Environmental Quality requirements, the NPS is required to identify the environmentally preferred alternative in all environmental documents, including EISs. Generally, the environmentally preferred alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources.

Alternative 2 (the preferred alternative) on balance best achieves these following national environmental policy goals:

- (1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

All of the action alternatives would, to varying degrees, reduce development footprints within the Mariposa Grove, restore hydrologic and ecological systems to more natural conditions, and stabilize and/or rehabilitate cultural resources at South Entrance, the Grove, and Wawona Point. Alternative 2 best meets this objective because it would result in a net reduction of developed areas, would reduce developed area within sequoia habitat, better protect Pacific fishers from road fatalities, and restores the soundscape in the upper Grove area.

- (2) Assure for all visitors safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

All of the action alternatives would meet this goal. Alternative 2 best removes much of the transportation infrastructure from within the Grove and provides the highest quality universal access experience in the lower Grove area and at the Grizzly Giant. The alternative enhances the sense of solitude and natural soundscape in the upper Grove area through elimination of commercial tram operation.

- (3) Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

Alternative 2 would attain the widest range of beneficial uses of the environment while minimizing further degradation of the sensitive giant sequoia environment, manages risks to visitor health and safety concerns by eliminating vehicle/pedestrian conflicts within the Grove, reduces traffic/parking safety hazards.

- (4) Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, access, and a variety of options for experiencing the Grove.

Alternative 2 would best restore and preserve the giant sequoias of the Mariposa Grove. Alternatives 2 and 3 would provide a better opportunity for solitude in the upper Grove with the removal of the tram and private vehicles. All of the action alternatives would avoid and/or minimize adverse effects to historic and traditional cultural aspects of the Grove and South Entrance.

- (5) Achieve a balance between population and resource use, which will permit high standards of living and a wide sharing of life's amenities.

Alternative 2 would reduce in-Grove infrastructure and best conserves energy by significantly restricting private vehicle access to the Grove and eliminating commercial tram operations within the Grove. Alternative 2 offers the best opportunity for expanding the range of visitor experiences by expanding accessible trail opportunities in diverse areas in the lower Grove area and at Grizzly Giant.

- (6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative 2 represents the most efficient management of depletable fossil fuels both by eliminating in-Grove tram operations, limiting most private vehicle access during peak visitor season, and by concentrating visitor and employee parking near a park entrance and implementing efficient shuttle service using buses that operate on alternative fuels.

On balance, Alternative 2 (the preferred alternative) best achieves these national environmental policy goals, and therefore is identified as the environmentally preferred alternative.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action Alternative

The No Action Alternative would have long-term, moderate adverse impacts on natural and sociocultural resources at the Mariposa Grove of Giant Sequoias, including wildlife, special status species, wetlands, hydrology and water quality, soils, soundscapes, archeological and traditional cultural resources, and energy use and sustainability. Under Alternative 1, vegetation would be subject to continued long-term major adverse impacts as a result of ongoing soil compaction and erosion, root disturbance, bark and bole damage from commercial tram impact, and modified hydrologic flow and processes. Under Alternative 1 visitor experience would be subject to continued long-term, moderate to major, adverse impacts as a result of in some areas insufficient resource interpretation and orientation; soundscape disturbances from vehicles and the in-Grove commercial tram; inadequate and poorly functioning restrooms and vault toilets; and lack of accessible facilities and trails. The inconvenience associated with periodic closure of the Mariposa Grove Road as the Grove parking lot fills to capacity, redirection to Wawona for shuttle service, and waits at poorly designed shuttle stops would continue to negatively affect visitor experience. The concessioner-operated gift shop and tram would continue to operate in the Grove. Visitors with limited mobility could access the mid- and upper Grove areas via the fee-for-service tram, or those with appropriate accessible parking placards could follow the tram in a personal vehicle to the Grizzly Giant and along the loop road in the upper Grove area.

Deterioration of the historic road and built features at Wawona Point would continue under Alternative 1. Degradation of archeological resources also would continue as a result of the current location of infrastructure on sensitive archeological resources, which in turn could affect traditional cultural use of the Grove. Although the estimated construction costs would be negligible compared to the action alternatives, deferred maintenance costs under Alternative 1 would exceed the estimated operating costs for the action alternatives.

Alternative 2: South Entrance Hub (Preferred Alternative)

Actions under Alternative 2 would result in long-term, major, beneficial impacts on vegetation, wildlife, special status species, and wetlands. Implementation of Alternative 2 would result in a reduction in paved area within Mariposa Grove; drainage improvements along trails and roads; and actions to restore hydrologic flow and processes, reduce soil erosion, and reduce soil compaction near giant sequoias and wetlands. Removal of the commercial tram and tram staging area and

relocation of visitor parking, museum functions, and other services to the South Entrance would reduce noise and enhance soundscapes throughout the Grove, and reduce traffic/wildlife conflicts along the Mariposa Grove Road, which would benefit wildlife. Visitor use and experience would also incur long-term, major, beneficial impacts as a result of improved traffic flow and orientation, enhanced accessibility of trails and visitor facilities, improved soundscapes due to removal of the commercial tram and incompatible elements in the lower Grove area, improved signage and interpretation, and construction of a larger parking lot, visitor services, and shuttle stop at South Entrance. Removal of the commercial tram, consolidation of infrastructure at the South Entrance, repair of the Grove water system, and use of water- and energy-efficient sustainable design in new and renovated facilities would result in long-term, major beneficial impacts on park operations and energy use and sustainability. Historic preservation goals would be advanced through improved interpretation of cultural resources; rehabilitation of segments of historic trails/road, Wawona Point overlook features, and other cultural landscape elements; and removal of infrastructure from and revegetation of sensitive archeological sites. Adverse effects on historic structures, features, and cultural landscapes and archeology are likely under Alternative 2, primarily due to proposed road alignment shifts, conversion of some roadway to trail, and narrowing of historic roads within the Mariposa Grove Historic District. However, ecological restoration of the Grove would also serve to protect the iconic giant sequoias that are character-defining components of the Mariposa Grove Historic District.

Overall, Alternative 2 would result in a 0.74 acre addition of developed areas project-wide, which would be comprised of 3.98 acre net reduction of developed area within the Grove plus 4.72 acres of new development at the South Entrance. Preliminary cost estimates indicate that construction costs for Alternative 2 would be slightly less than the other action alternatives, but operating costs would be slightly higher than other action alternatives. If the optional new bridge/box culvert across the Rattlesnake Creek drainage in the vicinity of the Three Sentinels were constructed under this alternative, it would add an additional major capital cost.

Alternative 3: Grizzly Giant Hub

Actions under Alternative 3 would result in long-term, major, beneficial impacts on vegetation, wildlife, special status species, and wetlands within giant sequoia habitat at Mariposa Grove. These actions include reduction in paved area, drainage improvements along trails and roads, and repairs to restore hydrologic flow and processes, reduce soil erosion, and reduce soil compaction near giant sequoias and wetlands in the lower Grove area. Removal of the commercial tram and tram staging area and relocation of visitor parking, museum functions, and other services outside of giant sequoia habitat in the vicinity of the Grizzly Giant would have a major, long-term beneficial impact on soundscapes in the upper and lower parts of the Grove, but would have moderate long-term, adverse impacts on soundscapes in the mid-Grove area of the Grizzly Giant. However, wildlife, vegetation, and special status species outside of giant sequoia habitat would be subject to moderate to major, long-term adverse impacts as construction of new road and the Grizzly Giant Hub facilities, and the resulting increase in private vehicle trips, would remove habitat and increase the potential for wildlife/vehicle conflicts along the Mariposa Grove Road and the new extension to the hub. The new bypass road would affect Pacific fisher denning habitat in a previously undisturbed area.

Visitor use and experience would incur long-term, major, beneficial impacts as a result of improved traffic flow and orientation, removal of the concessioner-operated tram and other incompatible elements from the lower area of the Grove, improved signage and interpretation, elimination of reliance on the park shuttle service to reach the Grove, and construction of a parking lot outside the bounds of giant sequoia habitat, in the vicinity of the Grizzly Giant. Removal of tram operations, consolidation of infrastructure near the Grizzly Giant, repair of the Grove water system, and use of water- and energy-efficient sustainable design in facilities would result in long-term major beneficial

impacts on park operations and energy use and sustainability. Historic preservation goals would be advanced through rehabilitation of historic road and trail segments, and Wawona Point overlook features. However, introduction of a new parking lot near the iconic Grizzly Giant, and modification of segments of the Mariposa Grove Road would result in indirect and direct adverse effects, respectively, on these contributing historic cultural landscape features. Construction of the new access road also would adversely affect sensitive cultural resources. However, restoration of the Grove would also protect the cultural landscape, in which the giant sequoias are considered a cultural resource.

Overall, Alternative 3 would result in a net addition of 0.5 acre of developed area project-wide, which would be comprised of 5.75 acre net reduction of developed area within the Grove plus 6.25 acres of new development at the Grizzly Giant arrival area and new bypass road. Alternative 3 would have the highest cost relative to Alternatives 1, 2, and 4.

Alternative 4: South Entrance Hub with Modified Commercial Tram Service

Actions under Alternative 4 would result in long-term, major beneficial impacts on vegetation, wildlife, special status species, and wetlands within the Mariposa Grove of Giant Sequoias. Similar to Alternative 2, implementation of Alternative 4 would result in a reduction in paved area in the Grove, drainage improvements along trails and roads, and utility repairs to restore hydrologic flow and processes, reduce soil erosion, and reduce soil compaction near giant sequoias and wetlands. Relocation of visitor parking, tram staging, and other services to South Entrance would reduce traffic/wildlife conflicts along the Mariposa Grove Road. Visitor use and experience would also incur long-term, major, beneficial impacts as a result of improved traffic flow at a modified T-intersection at South Entrance, removal of incompatible elements from the lower Grove area, improved signage and interpretation, and construction of a larger parking lot at South Entrance. Beneficial impacts on soundscapes would be less than those under Alternative 2 because commercial tram service would continue, albeit at a reduced frequency and along a shortened in-Grove route. Consolidation of infrastructure at South Entrance, repair of the Grove water system, and use of water- and energy-efficient sustainable design in facilities would result in long-term moderate beneficial impacts on park operations and energy use and sustainability. Historic preservation goals would be advanced through rehabilitation of historic road and trail segments and Wawona Point overlook features. However, removal of infrastructure and modifications to sections of Mariposa Grove Road would result in adverse effects on cultural resources.

Overall, Alternative 4 would result in a net addition of 2.88 acres of developed area project-wide, which would be comprised of 1.84 acre net reduction of developed area within the Grove plus 4.72 acres of new development at the South Entrance. Alternative 4 construction cost would be greater than that of Alternatives 1 and 2, and possibly less than Alternative 3. If the optional new bridge/box culvert across the Rattlesnake Creek drainage in the vicinity of the Three Sentinels were constructed under this alternative, it would add an additional major capital cost.

Considerations for All Action Alternatives

The potential long-term benefits of the action alternatives would be realized only if routine and proposed site-specific management actions are implemented consistently in the future. If maintenance or other actions are deferred, long-term benefits may be marginal. Future funding and prioritization of management actions at Mariposa Grove are essential to maintaining the proposed ecological restoration embodied in the action alternatives.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABAAS	Architectural Barriers Act Accessibility Standards
ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
Army Corps	U.S. Army Corps of Engineer
BMP	Best Management Practice
Caltrans	California Department of Transportation
CBA	Choosing by Advantages
CDFW	California Department of Fish and Wildlife
CDN	Communications Data Network
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIP	Comprehensive Interpretive Plan
CSC	California Species of Special Concern
dB	decibel
EIS	Environmental Impact Statement
EO	Executive Order
EPA	United States Environmental Protection Agency
FC	Federal Candidate for Listing
FEIS	Final Environmental Impact Statement
FRID	Fire Return Interval Departure
GHG	greenhouse gas
GMP	General Management Plan
LEED®	Leadership in Energy and Environmental Design
LRIP	Long-range Interpretive Plan
MOA	Memorandum of Agreement
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
PEPC	Planning, Environment and Public Comment
PM ₁₀	particulate matter greater than 10 microns in diameter
PM _{2.5}	particulate matter greater than 2.5 microns in diameter
POV	privately owned vehicle
RAWS	Remote Access Weather Station
ROG	reactive organic compound
RWQCB	Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SITES	Sustainable Sites Initiative
SWRCB	State Water Resources Control Board
USFWS	United States Fish and Wildlife Service
YARTS	Yosemite Area Regional Transportation System