

Executive Summary

This *Tuolumne Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement (Final Tuolumne River Plan/EIS)* addresses all the elements required by the Wild and Scenic Rivers Act (WSRA) for the management of a designated river. It also analyzes these elements by following and documenting planning processes required by the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and other legal mandates governing decision making by the National Park Service (NPS).

Readers may gain a quick summary of the proposed action by reviewing, at a minimum, the following parts of the document:

- Executive Summary
- Table of Contents (for specific sections of interest)
- Chapter 8. Alternatives for River Management: Actions Common to Alternatives 1-4
- Chapter 8. Alternatives for River Management: Alternative 4 (Preferred): Improving the Traditional Tuolumne Experience

Readers who wish to review the plan in more depth will find additional key materials related to decision making in the following chapters:

- Chapter 1. The Tuolumne Wild and Scenic River
- Chapter 2. Purpose and Need for the Tuolumne River Plan
- Chapter 5. River Values and Their Management
- Chapter 8. Alternatives for River Management (This chapter includes site plan maps for the existing conditions and alternatives 1-4.)

The Tuolumne Wild and Scenic River

The Tuolumne Wild and Scenic River, designated in 1984, includes 54 miles of the Tuolumne River in Yosemite National Park, excluding the Hetch Hetchy Reservoir. The Tuolumne River originates high in the Sierra Nevada on the eastern side of Yosemite National Park and flows westward across the park for 62 miles before it continues into Stanislaus National Forest (see figure ES-1). The river has two principal sources: the Dana Fork, which drains the west-facing slopes of Mount Dana, and the Lyell Fork, which begins at the base of the glacier on Mount Lyell. The two forks converge at the eastern end of Tuolumne Meadows, one of the largest subalpine meadows in the Sierra Nevada. The Tuolumne River meanders through Tuolumne Meadows, and then cascades through the Grand Canyon of the Tuolumne before it enters the eastern end of Hetch Hetchy Reservoir (still within the park, but not part of the wild and scenic rivers system). Below O'Shaughnessy Dam, the river again is included in the wild and scenic rivers system as it continues through a low-elevation meadow and rocky gorge to the park boundary.



Figure ES-1. Tuolumne Wild and Scenic River and Vicinity.

More than 90 percent of the Tuolumne Wild and Scenic River inside Yosemite National Park flows through congressionally designated Wilderness and is managed to protect wilderness qualities. In these areas, natural river-related systems are sustained by natural ecological processes; the landscape is predominantly natural, with rustic, tribal, and archeological components; and recreational opportunities are primitive and unconfined.

Tioga Road, the only park road connecting the eastern and western slopes of the Sierra, and one of only a few trans-Sierra highways, passes through Tuolumne Meadows, then parallels the Dana Fork and one of its tributaries to the top of Tioga Pass. Rustic facilities for visitors have long been located in the Tuolumne Meadows area, which is accessible from Tioga Road, and at the Glen Aulin High Sierra Camp, which is located west of Tuolumne Meadows and is accessible only by trail.

Since the early days of Yosemite National Park, visitors have valued the Tuolumne River and Tuolumne Meadows as a place to recreate, rejuvenate, and connect with the sublime beauty of the natural landscape. Many visitors return year after year, maintaining their connections to the area for generations. This deep human connection with the area goes back for millennia. Artifacts dating back at least 6,000 years attest to the prehistoric importance of the river corridor as a seasonal hunting and gathering ground and a trans-Sierra trade and travel route. The river continues to play a significant role in cultural and religious traditions among American Indian tribes and groups.



The Tuolumne River as it leaves Tuolumne Meadows and enters the Grand Canyon of the Tuolumne, heading west.



The Tuolumne River in Tuolumne Meadows.

River Values

WSRA requires comprehensive planning for the Tuolumne Wild and Scenic River to provide for the protection of the river's free-flowing condition, water quality, and the outstandingly remarkable values that make it worthy of designation. The outstandingly remarkable values of the Tuolumne River are defined in this plan as follows:

Biological Values

- In Tuolumne Meadows, Dana Meadows, and along the Lyell Fork, the Tuolumne River sustains one of the most extensive Sierra complexes of subalpine meadows and riparian habitats with relatively high biological integrity.
- Poopenaut Valley contains a type of low-elevation riparian and wetland habitat that is rarely found in the Sierra.

Geologic Value

- Between Tuolumne Meadows and Pate Valley, the Tuolumne River demonstrates classic stairstep river morphology, repeatedly transitioning from calm stretches to spectacular cascades.

Cultural Values

- The rich archeological landscape along the Tuolumne River reflects thousands of years of travel, settlement, and trade.
- Parsons Memorial Lodge, a national historic landmark sited near the Tuolumne River, commemorates the significance of this free-flowing segment of the river in inspiring conservation activism and protection of the natural world on a national scale.

Scenic Values

- Lyell Canyon offers remarkable and varied views of lush meadows, a meandering river, a U-shaped glacially carved canyon, and surrounding peaks.
- Dana and Tuolumne Meadows offer dramatic views of a meandering river, adjacent meadows, glacially carved domes, and the Sierra Crest.
- The Grand Canyon of the Tuolumne offers views of a deep, rugged canyon with vast escarpments of granite, hanging valleys, and tall cascades of falling water.

Recreational Values

- Rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows is provided by the Tioga Road across the Sierra.
- Wilderness travelers along the Tuolumne River engage in a variety of activities in an iconic High Sierra landscape, where opportunities for primitive or unconfined recreation, self-reliance, and solitude shape the experience.

Purpose of and Need for the Plan

The purpose of the *Tuolumne River Plan* is to preserve the Tuolumne River in free-flowing condition, and to protect the water quality and outstandingly remarkable values that make the river worthy of designation, for the benefit and enjoyment of present and future generations. In accordance with WSRA “the plan shall address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purposes of this Act” (WSRA section 3(d)). This plan will fulfill the specific direction of the 1984 legislation designating the Tuolumne River as a component of the national wild and scenic river system and make appropriate revisions to the park’s 1980 *General Management Plan*. Consistent with the guidance provided by WSRA, the guidelines for its implementation, published jointly by the Secretary of Agriculture and the Secretary of the Interior, and the technical papers prepared by the Interagency Wild and Scenic Rivers Coordinating Council, the Tuolumne River Plan specifically addresses the elements listed below:

- Review, and if necessary revise, the boundaries and segment classifications (as wild, scenic, or recreational) of the Tuolumne Wild and Scenic River.
- Provide a clear process for protection of the river’s free-flowing condition in keeping with WSRA section 7.
- Refine descriptions of the river’s outstandingly remarkable values, which are the unique, rare, or exemplary river-related characteristics that make the river eligible for inclusion in the national wild and scenic rivers system. Document the condition of these values and of the river’s free-flowing condition and water quality.
- Identify management standards and an ongoing monitoring strategy specifically related to protecting the river’s free-flowing condition, water quality, and outstandingly remarkable values over the long term.
- Identify management actions that will be taken to protect and enhance river values.
- Establish a user capacity program that addresses the kinds and amounts of public use that the river corridor can sustain while protecting and enhancing the river’s outstandingly remarkable values.

This is the first comprehensive management plan for the portion of the Tuolumne Wild and Scenic River inside Yosemite National Park. To address this need, the NPS is issuing this plan, which will make long-term decisions about the range of different interests in and concerns about the Tuolumne River expressed by park managers, culturally associated American Indian tribes and groups, other public agencies, and the public. Since the plan’s initiation in 2006, the NPS has engaged in nearly continuous outreach (more than 120 public meetings) and communication with American Indian tribes and groups, gateway communities, organizations, other land management agencies, and the general public.

A thorough, science-based examination of river values informed the actions required to protect and enhance the river as part of this *Tuolumne River Plan*. Programmatic and site-specific actions proposed in the plan will address the management concerns raised during this examination.

A key management concern within the river corridor relates to the susceptibility of the subalpine meadows to impacts associated with historic uses, including stock grazing and road building; ongoing impacts associated with heavy foot traffic and localized stock use; and potential impacts of climate change. Although the meadows remain highly productive and support a great diversity of species, they may be transitioning toward communities that tolerate drier conditions, compared to the communities believed to have existed in prehistoric times. In addition, widespread parking along Tioga Road and associated social trailing in the Tuolumne Meadows area has resulted in effects on meadow and riparian communities, archeological

resources, and scenic values. Increasing visitor use in this popular area now requires the NPS to consider alternatives to the current management of allowing generally unrestricted access to the river at Tuolumne Meadows and along wilderness trails with trailheads on Tioga Road.

Overview of the Plan and Alternatives

The *Tuolumne River Plan* focuses on protecting and enhancing river values. Therefore, many of the actions that would be taken to address management concerns about those values are common to all the action alternatives. For example, a comprehensive ecological restoration program for the subalpine meadow and riparian complex is a central component of the plan that is included in all the action alternatives. The alternatives vary primarily in how they would balance the protection of river values with different kinds of visitor use and associated user capacities in the Tuolumne Meadows scenic segment and at the Glen Aulin potential wilderness addition within the Grand Canyon of the Tuolumne wild segment.

Protection and Enhancement of River Values

Free-Flowing Condition

The Tuolumne River above the Hetch Hetchy Reservoir is free flowing, and the NPS will protect its free-flowing condition by implementing a process under section 7 of WSRA to ensure that no potential water resource project within the bed and banks of the river could have a direct and adverse effect on this river value. The natural flow regime below O'Shaughnessy Dam is altered by the dam, as it was at the time of designation. The NPS will continue to work cooperatively with the San Francisco Public Utilities Commission to inform the timing, duration, and magnitude of flows that will reduce the effects of dam operations on downstream habitats. However, the Raker Act is the controlling authority over water releases from the dam. The NPS will apply the WSRA section 7 process to evaluate any potential water resource project below the dam.

The amount of water withdrawn from the Dana Fork for domestic use in the Tuolumne Meadows area currently amounts to less than 10% of lowest flow. According to recent research, withdrawing this amount of water has a minimal effect on downstream aquatic habitat; however, any increase in water withdrawals could decrease wetted habitat. NPS management must also consider the potential for future reductions in low flows associated with climate change, in which case withdrawals at the current rate could decrease habitat. The plan calls for long-term monitoring of river flows and caps water withdrawals at no more than 10% of lowest flows or 65,000 gallons per day, whichever is less. Water conservation measures, such as replacement of leaking water lines and installation of low-flow fixtures, are included in all the plan alternatives, and some alternatives would achieve additional decreases in water consumption through decreases in user capacity. If long-term monitoring detects a future decrease in river flows associated with natural cycles or climate change, those findings will trigger further decreases in water withdrawals for domestic use at Tuolumne Meadows, including reductions in the types and levels of visitor services, if necessary.

Water Quality

The Tuolumne River has exceptionally high water quality. All the measured indicators are within the NPS standards, which are considerably more protective than other federal or state standards. Although water quality is fully protected, a few risks are present within the river corridor, including an unstable road cut along Tioga Road, wastewater treatment facilities at Tuolumne Meadows and Glen Aulin, fuel storage tanks at Tuolumne Meadows, and packstock use. The plan includes actions to stabilize the road cut, to upgrade wastewater treatment facilities at Tuolumne Meadows, and to upgrade or eliminate wastewater treatment facilities at

Glen Aulin. The risks to water quality associated with the public fuel station and pack stock use will either be eliminated or reduced and mitigated, depending upon the alternative selected.

An ongoing monitoring program will continue to test for nutrients, *E. coli*, and petroleum hydrocarbons to ensure that the exceptional baseline water quality is sustained over time. Decreasing water quality for any of these indicators will trigger studies to identify the source of the concern. Depending on the source, appropriate action will be taken to address the concern prior to an adverse impact. If the concern is related to visitor use, use will be managed as needed to protect this river value.

Subalpine Meadow and Riparian Complex

At the time of designation, the portion of the subalpine meadow and riparian complex in the Tuolumne Meadows segment was likely experiencing a shift in vegetation associated with historic grazing and disruptions to meadow hydrology caused by historic road-building and drainage projects. Stresses on meadow processes are now being increased by visitor foot traffic, which is creating informal trails across the meadow and causing habitat fragmentation. These problems will be addressed by a comprehensive program of ecological restoration and management of visitor use and development. Ecological restoration will include actions to restore riparian vegetation along riverbanks, restore more natural meadow hydrology, and continue research into possible additional restoration of historic vegetation communities. Management of visitor use and development will include the elimination of roadside parking to reduce informal trailing and removal of facilities from riverbanks and wet areas. These actions will be expected to enhance the meadow and riparian complex and allow for its long-term management in a condition equal to or better than the management standards. (Additional management of visitor use and development to further enhance this value is explored through alternative proposals to reduce use levels, reduce development, and/or confine use to resilient areas; these alternatives are explored in chapter 8).

At the time of designation, the portions of the subalpine meadow and riparian complex in the Lyell Fork and Lower Dana Fork segments were in good condition and they remain in that condition today. Stock use has been identified as a source of impacts on meadow and riparian areas in Lyell Canyon. Streambank stability is a management concern in at least one location on the Lyell Fork. This concern will be addressed under the plan either by eliminating or regulating commercial stock use (both alternatives are under consideration).

An ongoing program of monitoring and continuing study will be implemented to ensure that the subalpine meadow and riparian complex is returned to good condition and remains in good condition over the life of the plan. A suite of three indicators will be used to track the health and potential for impacts on this complex river value. An important part of the monitoring program will be management triggers that will identify any decline from good condition under any of the three indicators well before an adverse impact occurs. Any of these triggers would require additional action to protect the subalpine meadow and riparian complex.

Low-Elevation Riparian and Meadow Habitat

Since 1923 O'Shaughnessy Dam has influenced the magnitude, timing, duration, and frequency of river flows below the dam. Because of favorable site conditions, Poopenaut Valley continues to experience seasonal flooding and retains a rare mix of diverse riparian, wetland, and upland meadow plant communities. For reasons that are still the subject of ongoing research, some wetlands appear to be transitioning to drier upland habitat, while riparian areas appear to be expanding. The NPS is working collaboratively with the San Francisco Public Utilities Commission to scientifically inform dam releases to mitigate the impacts on natural ecological processes in Poopenaut Valley to the maximum extent possible; however, this management is constrained by the legal mandates of the commission to deliver water and power. Monitoring is ongoing to support this

collaborative effort; however, because the NPS does not have jurisdiction over the extent to which dam releases affect the ecology in Poopenaut Valley, no management standards or determinations of adverse effect or degradation have been established for this value.

Stairstep River Morphology

Stairstep river morphology is considered impervious to the intended human uses in this wild river segment. No management or monitoring is needed to protect this river value.

Archeological Landscape

At the time of designation, the known archeological resources in the river corridor were characterized generally as being in a fair condition. Since then ongoing documentation, condition assessments, and evaluation projects have expanded the body of knowledge about the importance and condition of this cultural value. Several decades of site condition assessments have found that archeological sites occurring in every river segment either have or appear to have important research potential. Almost all the archeological sites along the river and in meadows have been affected by informal trails, and many of these sites are at risk of losing some of their integrity.

Since the time of designation, the NPS has adopted the Archeological Sites Management Information System (ASMIS) to support improved archeological resource protection by providing a systematic, consistent methodology for assessing archeological site condition and impacts. Based on ASMIS evaluation criteria and standards, the collective character and significance of the archeological landscape remains well within the management standard of being fully protected. However, localized concerns about disturbances to sites caused by foot traffic and/or potential future facility development and maintenance remain.

Under the plan, sites will continue to be monitored through the ASMIS. The potential for effects associated with visitor foot traffic will be greatly reduced by eliminating roadside parking and removing informal trails. The potential for effects associated with future facility development, repair, and maintenance will be addressed by confining actions to nonsensitive areas wherever feasible, by mitigating unavoidable effects in compliance with section 106 of the National Historic Preservation Act, and by minimizing any adverse effects through consultation with Yosemite's traditionally affiliated tribes and the California State Historic Preservation Office. Any future downward trend in site conditions associated with human use will trigger a required management response to counteract or minimize the effect before an adverse impact occurs under WSRA.

Parsons Memorial Lodge

Parson Memorial Lodge National Historic Landmark was in good condition at the time of designation and remains in good condition, with no concerns identified. The lodge will continue to be preserved in accordance with all applicable standards, guidelines, and agreements. If future monitoring under the NPS Facility Management Software System detects deterioration or damage, repairs will be undertaken to correct the deficiency while the structure is still in an overall good condition.

Scenery through Lyell Canyon, Dana and Tuolumne Meadows, and the Grand Canyon of the Tuolumne

The scenic values across all segments are found to be within the management standard, although localized concerns are present at Glen Aulin (due to the visibility, if limited, of High Sierra Camp structures from the surrounding wilderness) and in Tuolumne Meadows (due to the roadside parking and lodgepole pine encroachment into the meadows). To remedy these concerns, a variety of actions are proposed, from replacement of the Glen Aulin tents to match the surrounding landscape more harmoniously, to the elimination

of roadside parking. Lodgepole encroachment will be managed according to the restoration program discussed under “Subalpine Meadow and Riparian Complex,” above. To prevent concerns from redeveloping, the monitoring program will subject all new proposed structures to a contrast analysis and compliance with the management standard.

Rare and Easy Access to the River through Tuolumne and Dana Meadows

Tioga Road continues to provide easy access to a diversity of recreational and educational opportunities in the Tuolumne River corridor that are little changed since the time of designation. Access to the meadows and river within the Tuolumne Meadows area remains largely unrestricted, and visitors report satisfaction with their ability to go “where they want, when they want.” However, visitors also report dissatisfaction with vehicle congestion and with crowding at popular spots along the river and in the meadows. Unrestricted access also contributes to impacts on other river values, as more than a third of all visitors currently park along the road shoulder and create informal trails across the meadows and along the riverbanks to reach popular attractions.

Under the plan the roadside parking along Tioga Road will be eliminated, reducing the traffic congestion, safety hazards, and intrusion of parked cars into the viewing experience of people traveling Tioga Road. Under most alternatives the amount of designated parking would be increased, making it possible for more visitors to find a space in designated parking areas. Also, under all alternatives a visitor capacity will be enforced to protect the quality of the visitor experience from increasing congestion, as well as protecting other river values from visitor use related impacts. The day use capacity will be managed through the availability of day parking and through the capacity of the buses that serve the Tuolumne River corridor, while the overnight capacity will be managed by the number of lodging units, campsites, and wilderness permits.

Wilderness Experience along the River

At the time of designation the wild segments of the Tuolumne River offered outstanding opportunities for river-related recreation characterized by self-reliance and solitude, and those opportunities continue today. Since the 1970s an overnight zone capacity and trailhead quota system has helped protect this river value, particularly in more remote portions of the corridor. However, increasing day use on wilderness trails within the first few miles of the Tuolumne Meadows trailheads now threatens to diminish opportunities for solitude on certain trail segments. The plan will address this issue by managing day use levels in the river corridor and by monitoring the indicator of encounters with other parties on trails, which is a widely used indicator for a quality wilderness experience. Use on wilderness trails will be managed to remain within the management standard established for this indicator, through actions that could include changes to the overnight trailhead quota system and/or the implementation of a day use trailhead quota system if determined necessary.

Overview of the Alternatives

Five alternatives (no action plus four action alternatives) are under consideration in the *Final Tuolumne River Plan/EIS*. They explore a reasonable range of variations in visitor use and user capacity. A table comparing the user capacities of the alternatives is included at the end of this section.

No-Action Alternative

The no-action alternative would preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the more than 90 percent of the river corridor that is congressionally designated Wilderness. In the Tuolumne Meadows area, opportunities for day and overnight use would continue to include a range of recreational activities supported by modest commercial

services and overnight camping and lodging. The existing management would perpetuate the current resource conditions and landscape character at Tuolumne Meadows and Glen Aulin.

Wild Segments

Overnight use in wilderness would continue to be managed through established wilderness zone capacities and associated overnight trailhead quotas, which currently accommodate a maximum of 400 people per night (350 in zones above Hetch Hetchy Reservoir and 50 below O'Shaughnessy Dam). The Glen Aulin High Sierra Camp would be retained at the current capacity of 32 guests. Day use in wilderness would remain unrestricted and would be expected to continue to increase. Concessioner stock day rides would continue to serve a maximum of 62 people per day. Commercial use in wilderness would continue under current management; current levels of use for guided stock trips averaged 263 person-nights per season during the years 2005 to 2009, and for guided hiking trips averaged 188 person-nights per season. Commercial users and the general public currently have equal access to backcountry overnight permits.

Scenic Segments

A full range of orientation, interpretation, and education programs would continue to be conducted at the existing visitor center, wilderness center, Parsons Memorial Lodge, and in the field. Current commercial services (store/grill, public fuel station, mountaineering shop and school, concessioner stock day rides) would be retained at Tuolumne Meadows. The campground and Tuolumne Meadows Lodge would be retained at current capacities.

Current maximum visitor day use in the Tuolumne Meadows area and adjacent wilderness is estimated at 1,762 people at one time. (This number has been calculated from the actual day use parking counts from 2011 and the estimated maximum number of visitors arriving by bus.) Day use would be expected to continue to increase. The visitor overnight capacity at Tuolumne Meadows is 2,460 people per night: 2,184 people are accommodated in the 329 campsites and 7 group campsites in the campground, and 276 people are accommodated in the 69 guest cabins at Tuolumne Meadows Lodge.

Currently 104 NPS employees are housed at Tuolumne Meadows, although this amount of housing is inadequate to accommodate the up to 150 employees who work in the Tuolumne Meadows area on full-time or intermittent work assignments. Currently 103 concessioner employees are housed at Tuolumne Meadows.

Actions Common to Alternatives 1-4

All of the action alternatives would protect river values through a set of common actions, which taken together, would fully protect river values in compliance with WSRA. These actions are described under "Protection and Enhancement of River Values," above, and summarized here to complete the description of each alternative.

Free Flow

Under all alternatives the NPS would continue to work cooperatively with the SFPUC and others to inform releases from O'Shaughnessy Dam intended to more closely mimic natural flows. Water withdrawals from the Dana Fork would be limited to no more than 65,000 gallons per day or 10% of low flow, whichever was less, and water conservation measures would be a high priority throughout developed areas. Obstructions to free flow caused by the short section of riprap near the Tuolumne Meadows campground would be eliminated.

Water Quality

Under all alternatives the NPS would greatly reduce risks to water quality by upgrading wastewater treatment facilities, managing the amount of wastewater production, and stabilizing the road cut east of Tuolumne

Meadows along Tioga Road. Best management practices would continue in effect to mitigate any potential impacts of stock use on water quality throughout the river corridor.

Subalpine Meadow and Riparian Complex

Under all alternatives the NPS would conduct an extensive program of ecological restoration of Tuolumne Meadows, as outlined in the *Ecological Restoration Planning Report* developed as part of this planning process and appended to the Tuolumne River Plan. The program outlines specific actions for eliminating informal trails and inappropriately sited facilities from meadow and riparian habitats, restoring riparian vegetation along riverbanks, eliminating known disruptions to natural meadow hydrology, and pursuing research to identify and address the causes of altered riparian and meadow conditions in Tuolumne Meadows. In Lyell Canyon, the potential for stock-related impacts to meadows and riparian areas would be reduced by regulating stock use based on meadow conditions and avoidance of sensitive resources.

Low-Elevation Riparian and Meadow Habitat

Management to encourage more natural flows below O'Shaughnessy Dam would maximize the ecological benefits to the river-dependent riparian and meadow system through Poopenaut Valley, within the constraints imposed by the Raker Act.

Prehistoric Archeological Landscape

Under all alternatives visitor use would be managed to avoid sensitive archeological resources. Many of the actions to minimize the effects of foot and stock traffic through meadows would also protect archeological sites. In addition, the ecological restoration program would be conducted using noninvasive techniques wherever possible to mitigate the potential effects of these management actions on prehistoric archeological sites.

Parsons Memorial Lodge

Parsons Memorial Lodge would continue to be managed through periodic assessments and appropriate treatments directed by the NPS Facility Management Software System (FMSS).

Scenery through Lyell Canyon, Dana and Tuolumne Meadows, and the Grand Canyon of the Tuolumne

Under all alternatives natural scenery would continue to evolve in response to natural ecological processes. Human intrusions into views would be reduced by eliminating undesignated roadside parking, removing informal trails, and restoring more natural conditions to many currently disturbed areas. New or rehabilitated facilities would be subject to evaluation to ensure that they were protective of adopted visual standards.

Wilderness Experience along the River

Under all alternatives individuals would continue to have opportunities for all the kinds of recreational activities that currently occur in wild segments of the corridor, including backpacking, wilderness camping, day hiking, nature study, fishing, swimming and wading, climbing, horseback riding and pack stock use, winter skiing, and trans-Sierra treks .

Rare and Easy Access to the River through Tuolumne and Dana Meadows

Under all alternatives Tioga Road would be retained along its current alignment. At Tuolumne Meadows visitors would continue to have easy access to a wide range of recreational activities, including sightseeing (by vehicle or on foot), nature study, day hiking, fishing, swimming and wading, picnicking, climbing, camping in the campground, and staging for trips into the Yosemite Wilderness. Opportunities for rustic lodging and concessioner stock day rides would remain available under some, but not all, the alternatives.

Most differences among the alternatives would involve differences in the kinds and levels of visitor use associated with the two recreational river values, as summarized below.

Action Alternative 1: Emphasizing a Self-Reliant Experience

Like all alternatives, alternative 1 would preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the more than 90 percent of the river corridor that is congressionally designated Wilderness. In the Tuolumne Meadows area and Glen Aulin, alternative 1 would focus on restoring conditions for primitive, unconfined recreation in an undeveloped natural area. Natural river values would be enhanced by greatly reducing the footprint of development, by greatly reducing demands for water supply and wastewater treatment, and by eliminating most potential risks to water quality.

Wild Segments

All commercial use would be discontinued in wild segments of the river corridor. This would include the Glen Aulin High Sierra Camp, all concessioner stock day rides, and all commercial day hikes, overnight hikes, and overnight stock trips. All other existing activities would continue.

The day use levels along the most popular wilderness trails within reach of day hikes from Tioga Road (two Lyell Canyon trail segments and the Glen Aulin trail) would be managed to achieve no more than four encounters with other parties per hour, making them more commensurate with use levels in remote wilderness and enhancing opportunities for solitude. For the less-used trail from Rogers Creek Crossing to Pate Valley, the standard would be no more than two other parties per hour to protect the existing opportunities for solitude along that trail. The encounter rate for the Lyell Canyon and Glen Aulin trails would be more protective of solitude than the standard adopted for this river value (8-12 encounters, depending on the trail, as described in chapter 5) in keeping with the greater emphasis on solitude and self-reliance under this alternative. The overnight capacity for wild segments would be retained at 400 persons per night (350 persons per night above the reservoir and 50 persons per night below the dam).

Scenic Segments

To achieve a visitor experience characterized by self-reliance and unconfined exploration, all commercial services (including the Tuolumne Meadows Lodge, store, grill, fuel station, and mountaineering shop/school), would be eliminated. The campground would be retained at a reduced capacity, and the NPS would provide minimal camper supplies at the campground office.

The maximum visitor day use above the Hetch Hetchy Reservoir (which could disperse from scenic into wild segments) would be reduced from 1,762 people at one time to a maximum of 1,021 people at one time to reduce the effects of dispersed foot traffic on sensitive resources, including meadow and riparian areas and archeological sites, and to avoid perceptions of crowding along wilderness trails close to Tioga Road trailheads. At Tuolumne Meadows, the visitor overnight capacity would be reduced from 2,460 people per night to a maximum of 1,782 people per night (the reduced capacity of the campground), to reduce demands for water supply and wastewater disposal and to allow for the restoration of the campground A-loop road nearest the river without replacing the sites in another part of the campground.

Commensurate with the reduction in visitor use levels and the discontinuation of commercial services, the number of NPS employees housed in the river corridor would be slightly reduced (from 104 to 100 employees), and almost all the concessioner housing would be removed.

Action Alternative 2: Expanding Recreational Opportunities

Like all alternatives, alternative 2 would preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the more than 90% of the river corridor that is congressionally designated Wilderness. In the Tuolumne Meadows area, alternative 2 would focus on facilitating resource enjoyment and stewardship by a broad spectrum of visitors, including visitors with only a short time to spend in the area. All current activities and services would be retained, and some would be expanded.

Wild Segments

All ongoing uses would continue. The Glen Aulin High Sierra Camp would be converted to a seasonal outfitter camp with no permanent facilities except a vault toilet; the camp would continue to accommodate 32 visitors per night. The overnight quota for backpacker camping in wilderness management zones that overlap wild segments of the river corridor would be retained at 400 persons per night; because the area occupied by the Glen Aulin outfitter camp would be included in the Yosemite Wilderness, camp guests would be subject to the existing wilderness trailhead quota system for that zone. Maximum day use along popular wilderness trails would differ by trail as follows: Glen Aulin trail and lower Lyell Canyon trail, no more than 12 encounters per hour; upper Lyell Canyon trail, no more than 8 encounters per hour; Grand Canyon trail, no more than 2 encounters per hour. Concessioner stock day rides would be reduced to a maximum of 24 people per day. Commercial use would be restricted to no more than 2 groups per wilderness management zone per night and no more than 2 day groups per trail per day (these restrictions are described more fully in chapter 8 and appendix C).

Under this alternative, limited recreational kayaking would be allowed on portions of the river. Use levels would be managed as part of the existing wilderness overnight trailhead quota system; however, the number of whitewater boaters would be expected to be relatively low because the boating season on the Tuolumne is only about 6-8 weeks long (only about a third of the area's full season of accessibility), few boaters have the requisite skills to float this advanced stretch of whitewater, and all boaters would not only have to carry their boats about 3 miles to the put-in but would also have to carry them up 4,000 feet (over about 8 miles) from Pate Valley to the White Wolf trailhead. Additional restrictions on boating might be implemented during the trial period.

Scenic Segments

To allow for a modest expansion of opportunities for recreational use in the Tuolumne Meadows area, visitor services, facilities, and management strategies would be adjusted to direct visitors to resilient locations where they could enjoy recreational activities without adversely affecting river values. For example, rather than dispersing across the meadows, visitors would be directed from trailheads at designated parking lots to trails and boardwalks, some with fencing or other forms of delineation to discourage dispersed foot traffic through these sensitive environments; rather than picnicking informally on the banks of the river, visitors would have access to new formal picnic areas. A full range of orientation, interpretation, and education programs would be conducted, and all commercial services except the mountaineering shop would be retained. Opportunities for day visitors with only a short time to spend would be enhanced by a new day parking and picnic area near the trailhead for Parsons Memorial Lodge. The campground would be expanded and the lodge would be retained.

The maximum visitor day use above Hetch Hetchy Reservoir (which could disperse from scenic into wild segments) would be increased from an estimated 1,762 to a maximum of 1,901 people at one time. At Tuolumne Meadows, the visitor overnight capacity would be increased to 2,706 people per night: 2,430 people accommodated by 370 campsites and 7 group sites in the campground, and 276 people accommodated by the 69 guest tent cabins at Tuolumne Meadows Lodge.

The number of NPS employees housed in the river corridor would be increased to 174 to meet the staffing needs for visitor and resource protection, interpretive and educational services, resource management and monitoring, and maintenance under this alternative. Concessioner housing needs would remain unchanged at 103 employees.

Action Alternative 3: Celebrating the Tuolumne Cultural Heritage

Like all alternatives, alternative 3 would preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the more than 90% of the river corridor that is congressionally designated Wilderness. In the Tuolumne Meadows and Glen Aulin areas, alternative 3 would focus on preserving the opportunity for a classic national park experience in a historic setting. Visitors who have developed deep personal connections with these areas through repeated experiences shared among generations would continue to have these opportunities in a setting that would appear little changed over time.

Wild Segments

All ongoing uses would continue. The overnight quota for wilderness management zones that overlap wild segments of the river corridor would be retained at 400 persons per night. The Glen Aulin High Sierra Camp would be retained at a reduced capacity of 28 persons per night. Maximum day use along popular wilderness trails would be managed the same as in alternative 2. Concessioner stock day rides and commercial use would be managed the same as in alternative 2, with the following exception: Commercial use would be restricted to no more than 1 group per zone per night and no more than 1 day group per trail per day.

Scenic Segments

To enhance opportunities for visitors to connect with the history and traditional uses of the Tuolumne River, the historic setting would be preserved, and use levels would be reduced to allow for a mix of traditional park programs and relatively unstructured exploration at a level that would be protective of river values. A full range of orientation, interpretation, and education programs would be conducted, and the store and grill and concessioner day rides would be retained. The campground would be retained at its current capacity, and the lodge would be retained, but at half its current capacity.

The maximum visitor day use above the Hetch Hetchy Reservoir (which could disperse from scenic into wild segments) would be reduced from 1,762 people at one time to a maximum of 1,556 people at one time. At Tuolumne Meadows, the visitor overnight capacity would be reduced to 2,320 people per night: 2,184 people accommodated by the 329 campsites and 7 group sites in the campground, and 136 people accommodated by the 34 guest tent cabins at Tuolumne Meadows Lodge.

The number of NPS employees housed in the river corridor would be increased to 124 to meet the staffing needs for visitor and resource protection, interpretive and educational services, resource management and monitoring, and maintenance under this alternative. Concessioner housing needs would remain unchanged at 103 employees.

Action Alternative 4 (Preferred): Improving the Traditional Tuolumne Experience

Like all alternatives, alternative 4 would preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the more than 90 percent of the river corridor that is congressionally designated Wilderness. In the Tuolumne Meadows area, alternative 4 would seek to balance the retention of a traditional Tuolumne experience with the need to reduce the impacts of development and an opportunity to provide a more meaningful introduction to the Tuolumne River for the growing number of short-term visitors.

Wild Segments

All noncommercial uses would continue; however, concessioner stock day rides into wilderness would be discontinued, and commercial use would be restricted to no more than 2 overnight groups per zone and no more than 2 day groups per trail per day. The overnight quota for wilderness management zones that overlap wild segments of the river corridor would be retained at 400 persons per night. The Glen Aulin High Sierra Camp would be retained at a capacity of 28 visitors per night or less, with the level of service reduced as necessary to achieve a significant reduction in packstock supply trips to the camp and to cap wastewater production at no more than 500 gallons per day. Maximum day use along popular wilderness trails would be managed the same as in alternative 2.

Under this alternative, limited recreational kayaking would be allowed on portions of the river. Use levels would be managed as part of the existing wilderness overnight trailhead quota system; however, the number of whitewater boaters would be expected to be relatively low because the boating season on the Tuolumne is only about 6-8 weeks long (only about a third of the area's full season of accessibility), few boaters have the requisite skills to float this advanced stretch of whitewater, and all boaters would not only have to carry their boats about 3 miles to the put-in but would also have to carry them up 4,000 feet (over about 8 miles) from Pate Valley to the White Wolf trailhead. Additional restrictions on boating might be implemented during the trial period.

Scenic Segments

Visitor facilities would be reoriented to protect river values while generally maintaining current kinds and levels of use. A full range of orientation, interpretation, and education programs would be provided, and opportunities for day visitors to connect with the river would be improved by providing a visitor contact station, picnic area, and trail connection to the river and Parsons Memorial Lodge. Existing opportunities for traditional overnight use would be retained. In order to accommodate slightly increased use levels while protecting and enhancing recovering meadow and riparian habitats, day use would generally be confined to formally maintained trails and specific destinations.

The maximum visitor day use above the Hetch Hetchy Reservoir (which could disperse from scenic into wild segments) would increase slightly, from 1,762 people at one time to a maximum of 1,827 people at one time. At Tuolumne Meadows, the current visitor overnight capacity of 2,460 people per night would be retained: 2,184 people accommodated by the 329 campsites in the campground, and 276 people accommodated by the 69 guest tent cabins at Tuolumne Meadows Lodge.

The number of NPS employees housed in the river corridor would be increased to 163 to meet the staffing needs for visitor and resource protection, interpretive and educational services, resource management and monitoring, and maintenance under this alternative. Concessioner housing needs would decrease to 90 employees because 13 fewer people would be needed to run the reduced concessioner stable operation.

Revisions to the Preferred Alternative in Response to Public Review of the Draft Plan/EIS

Plan Revisions in Response to Public Review

The key revisions in this *Final Tuolumne River Plan/EIS* made in response to comments received during the public review of the draft plan and EIS are summarized below:

Outstandingly Remarkable Values

The statement of the outstandingly remarkable recreational value related to Tioga Road across the Sierra Nevada has been reworded to clarify that rare and easy access to high-elevations portions of the river corridor is the value, not the Tioga Road itself.

Glen Aulin High Sierra Camp

All tents at the Glen Aulin High Sierra Camp will remain in the preferred alternative, to minimize adverse impacts on historic resources. While the tents will remain, the capacity of the camp will be capped at 28 beds and the number of beds in two tents will be reduced from four to two. The following constraints will also apply to protect river values:

- Water consumption/wastewater production at the camp will not exceed 500 gallons per day, to protect water quality. At this volume of wastewater production, the existing wastewater treatment mound is expected to function without failure. At 700 gallons per day, the mound failed four times between 1996 and 2003; at 600 gallons per day (its current capacity), the mound appears to be operating at its maximum capacity. As no other alternatives exist for expanding or replacing the mound within the boundary of the camp, no more than 500 gallons per day will be treated at the camp under the revised Tuolumne River Plan.
- Pack stock trains to supply the camp will not exceed two strings per week (with a string consisting of 5 mules, 1 horse, and 1 rider). This constraint is necessary to protect the wilderness experience. At the current level of service (an average of three pack strings per week), visitors report unacceptable stock impacts on the trail to Glen Aulin. Reducing pack stock use by one-third, coupled with eliminating stock day rides along the trail, will substantially improve the wilderness experience.

The NPS will work with the concessioner to find operational solutions to meet these constraints. For example, specific services at the camp could be modified. Initially the capacity of the camp will be reduced to 28 guests. If after two years of operation, either one (or both) of the restrictions is not met, the camp's capacity will be progressively lowered until both restrictions are met.

Boating through the Grand Canyon of the Tuolumne

Opportunities for wilderness recreation along the river will be enhanced by allowing limited boating through the Grand Canyon of the Tuolumne, from Pothole Dome to Pate Valley. The NPS will provide for such use on a trial basis, initially managing use levels as part of the existing overnight wilderness trailhead quota system, and will monitor and adjust the provision of this opportunity as needed.

Campground A Loop

Riparian vegetation along the Lyell Fork will be protected and enhanced by removing all development from within 100 feet of the river. This will involve relocating the A-loop road and 21 A-loop campsites to a location just to the west of the existing A loop (at least 150 feet from the river).

Mountaineering School

To minimize impacts on other recreational uses within the river corridor, the mountaineering school function will be retained and accommodated at the Tuolumne Meadows Lodge. This accommodation will have no effect on river values.

Dining Hall at Tuolumne Meadows Lodge

The NPS would seek to move the dining hall and kitchen upslope, more than 150 feet from the Dana Fork and within the Tuolumne Meadows Lodge complex. The Tuolumne Meadows Lodge is within a historic district, so this move would be dependent on identification of a suitable site and would be done in consultation with the California state historic preservation officer.

Stock Grazing Capacity for Lyell Fork Meadows

Based on updated information related to a condition assessment of meadows along the Lyell Fork (NPS, Abbe and Ballenger 2012), the grazing capacity for meadows along the Lyell Fork was adjusted from a set capacity of 192 grazing-nights to a more flexible capacity of 167 – 249 grazing-nights per season, depending on the year and its snowfall and rainfall patterns.

Trail Standards in Wilderness

The trail standards for encounter rates with other parties in wilderness segments was adjusted to reflect documented differences in people's expectations about levels of solitude on different trail segments, depending on the distance of that segment from a trailhead easily accessible by road. Trails accessible by road can provide abundant opportunities for a primitive or unconfined type of recreation, although opportunities for solitude may be reduced compared to trails through remote wilderness. To better reflect the range of opportunities for a wilderness experience along the river, the trail standards were adjusted as follows: encounters would average no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below the Ireland Lake trail junction, 8 parties per hour on the Lyell Canyon trail above the Ireland Lake trail junction, and 2 parties per hour on the trail from the Rogers Creek crossing through the Grand Canyon of the Tuolumne. These new standards replace the more uniform standard in the draft plan and EIS of 10 parties per hour on most trails in most alternatives.

Commercial Use in Wilderness

Existing commercial use in the wild segments of the Tuolumne River corridor is relatively minor and serves to further the educational, scenic, and recreational purposes of the Wilderness Act. To clarify this finding, the determination of extent necessary (DEN) for commercial use was revised to slightly raise the percentages of the total overnight capacity for Lyell Canyon to be allocated to commercial use on weekends and holidays during July and August: The percentage of total use allocated for commercial educational trips was raised from 10% to 15%, and the percentage of total use allocated for commercial recreational/scenic trips was raised from 5% to 10%. These levels constitute a small portion of total use in Lyell Canyon—85 % of the overnight capacity for Lyell Canyon will be allocated to noncommercial use.

Picnic Area Change

To allow greater turnaround at the new parking/viewing area east of Pothole Dome viewing area, picnic tables are no longer proposed at that site. Rather, a picnic area will be added at the existing commercial services core, near the store and grill.

Ranger Station and Maintenance Offices

A discrepancy in the draft plan and EIS mistakenly showed the ranger station being relocated in alternative 4 to the existing visitor center. That mistake has been corrected, and this final plan and EIS confirm that the ranger station will be retained in its existing location, with the maintenance offices to occupy the old visitor center once the new visitor contact station is constructed.

Administrative Fuel Tanks

To reduce impacts on park operations, administrative fuel tanks (aboveground tanks for gasoline and diesel) will be provided near the wastewater treatment plant. Visitors who run out of gas could also get fuel there.

Restrooms at Base of Lembert Dome

The ventilation systems in the existing Lembert Dome trailhead vault toilets will be upgraded to be active (powered electrically), not passive. Upon completion of the campground rehabilitation (which will retrofit existing toilets there with low-flow fixtures and repair or replace leaking water lines), the NPS will determine the updated demand for water, and if sufficient supply exists the agency will consider replacing the pit toilets at Lembert Dome with a comfort station with low-flow flush toilets, to be located as closely as possible to the existing vault toilets.

Vault toilets at Skier Hut

The skier pit toilet behind the campground office will be converted to a vault toilet, with a design allowing the door to open above the snowpack.

Environmentally Preferable Alternative

The Council on Environmental Quality (CEQ) regulations implementing NEPA and the National Park Service NEPA guidelines require that “the alternative or alternatives which were considered to be environmentally preferable” be identified (CEQ Regulations, section 1505.2). Environmentally preferable is defined as “the alternative that will promote the national environmental policy as expressed in NEPA’s Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ 1981).

Upon full consideration of the elements of NEPA section 101, alternative 4 was determined to represent the environmentally preferable alternative for the *Final Tuolumne River Plan/EIS*. This conclusion is analyzed in chapter 8.

Summary Comparison of Alternatives

A comparison of user capacities under all the alternatives is shown in table ES-1.

Table ES-1.
Corridorwide Comparison of Visitor Use Capacities, by Alternative

Visitor Overnight Capacity					
Segment	Current Overnight Visitors	Maximum Overnight Visitors, Alternative 1	Maximum Overnight Visitors, Alternative 2	Maximum Overnight Visitors, Alternative 3	Maximum Overnight Visitors, Alternative 4 (Preferred)
Scenic Segments					
Tuolumne Meadows Lodge	276	0	276	136	276
Tuolumne Meadows Campground	2,184	1,782	2,430	2,184	2,184
Wild Segments					
Glen Aulin HSC	32	0	32	28	28
Wilderness	400	400	400	400	400
Subtotal, Overnight	2,892	2,182	3,138	2,748	2,888
Visitor Day Use Capacity					
Segment	Maximum People At One Time, Based on 2011 Vehicle Count	Maximum People At One Time, Alternative 1	Maximum People At One Time, Alternative 2	Maximum People At One Time, Alternative 3	Maximum People At One Time, Alternative 4
Scenic Segments					
Access from Tuolumne Meadows (designated parking)	986	796	1,676	1,331	1,467
Access from Tuolumne Meadows (undesignated parking)	551	0	0	0	0
Access from Tuolumne Meadows (arrival by bus)	225	225	225	225	360
Access from below O'Shaughnessy Dam	12	12	12	12	12
Subtotal, Day Use	1,774	1,033	1,913	1,568	1,839
Total Visitor Overnight and Day Use People At One Time	4,666	3,215	5,051	4,316	4,727
Total Visitor Overnight and Day Use People At One Time, Tuolumne Meadows^a	4,222	2,803	4,607	3,876	4,287
Administrative Capacity					
Segment	Maximum employees (existing)	Maximum employees, Alternative 1	Maximum employees, Alternative 2	Maximum employees, Alternative 3	Maximum employees, Alternative 4
Wild Segments					
Concessioner	9	0	9	9	8
Scenic Segments					
NPS	150	100	174	124	163
Concessioner	103	2	103	103	90
Total Administrative People At One Time	262	102	286	236	261
Total People At One Time	4,928 (existing)	3,317 (proposed)	5,337 (proposed)	4,552 (proposed)	4,988 (proposed)

a Number used to calculate maximum water demand in Tuolumne Meadows, by alternative.

Organization of this Final Plan and Environmental Impact Statement

The information in this document is organized as follows:

Chapter 1. The Tuolumne Wild and Scenic River describes the purpose of the nation's wild and scenic rivers system and what the designation of the Tuolumne River as part of that system means in terms of river planning and management.

Chapter 2. Purpose of and Need for the Tuolumne River Plan describes the purpose and organization of the plan, the major planning issues identified during internal and public scoping, and the interrelationships with other plans and projects.

Chapter 3. Wild and Scenic River Corridor Boundaries and Segment Classifications explains the legal requirements for establishing a river corridor boundary and classifying its segments, and describes the boundary and segment classifications for the Tuolumne River in Yosemite National Park.

Chapter 4. Determination Process for Water Resource Projects explains the legal requirements for protecting the river's free-flowing condition and describes the process that will be used to fulfill that requirement.

Chapter 5. River Values and Their Management is the heart of the *Tuolumne River Plan*. The chapter presents detailed discussions for each river value of its condition, at least one measurable indicator and a long-term monitoring program, and the management actions that will be taken to ensure the value is protected and enhanced over time. The actions presented in this chapter to ensure protection of river values will be common to all alternatives.

Chapter 6. Visitor Use and User Capacity describes the process used to address the WSRA user capacity requirement. The major differences among the plan alternatives (presented in chapter 8) have to do with the kinds and amounts of use the river corridor could receive in the future, and these are summarized in this chapter.

Chapter 7. Existing Facilities Analysis for the Tuolumne Wild and Scenic River Corridor evaluates all existing facilities in the river corridor for their effect on river values, whether they are necessary for public use or resource protection, and whether it would be feasible to locate or relocate them outside the river corridor.

Chapter 8. Alternatives for River Management presents the five alternatives (no action plus four action alternatives) currently under consideration in the *Final Tuolumne River Plan/EIS*. The differences among the alternatives revolve primarily around possible differences in visitor use and user capacity. Most of the actions needed to protect and enhance river values are common to all the action alternatives, although some differences exist and are described in this chapter.

Chapter 9. Affected Environment and Environmental Consequences identifies and describes the natural and sociocultural resources and values that could be affected by the alternatives presented in chapter 8, and evaluates and compares the potential effects of the alternatives. This chapter looks comprehensively at the components of the human environment that might be affected by the plan and assesses how they might be affected by actions intended to protect and enhance river values.

Chapter 10. Consultation and Coordination summarizes all consultation and coordination efforts undertaken for the *Final Tuolumne River Plan/EIS* to date. It outlines the project scoping history and the much broader public involvement history that extended through every step of the development of the plan alternatives. It describes specific consultations with the culturally associated American Indian tribes and the federal, state, and local agencies having jurisdiction or particular interests in the Tuolumne River corridor, and summarizes the comments received on the draft plan and EIS.

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