

Chapter 8: Alternatives for River Management

This chapter presents the five alternatives proposed in the Tuolumne Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement (Final Tuolumne River Plan/EIS). These alternatives represent a range of reasonable alternatives as required by the National Environmental Policy Act (NEPA), including a “no action” alternative in accordance with Council on Environmental Quality regulations (40 CFR 1502.14). The no-action alternative represents a continuation of current management practices and provides a basis for comparing differences among the alternatives. This chapter addresses the following topics:

- How the alternatives are organized (page 8-2)
- A description of each alternative (pages 8-3 to 8-115)
- A summary comparison of the alternatives (pages 8-115 to 8-133)
- The environmentally preferable alternative (page 8-133)
- Alternatives dismissed from further consideration (pages 8-134 to 8-139)

The alternatives presented in this chapter differ primarily in the kinds of visitor experiences that might be available at Tuolumne Meadows and Glen Aulin High Sierra Camp in the future, including different levels of services and facilities at those locations, and associated implications for user capacity. General guidance for user capacity and facility development is provided in chapters 6, “Visitor Use and Capacity,” and 7, “Development of Lands and Facilities,” respectively. Once a decision is made in the record of decision for the final *Tuolumne River Plan*, the approved actions will be incorporated into chapters 6 and 7 of the final plan.

In earlier stages of planning, five distinctive action alternatives were developed based on public comments submitted during scoping for this *Final Tuolumne River Plan/EIS*. Based on further analysis and review, some of the elements that had differed among the original five action alternatives were determined to be so important for protecting river values that they were included in all the action alternatives. Other elements were determined to be infeasible or inappropriate and were dismissed from further consideration (see “Alternatives Dismissed from Further Consideration” at the end of this chapter). The remaining elements of the original five action alternatives were consolidated into four action alternatives. A more complete description of the “Process Used to Develop the Alternatives” for the *Final Tuolumne River Plan/EIS* is provided in appendix K.

The four action alternatives are compared in this chapter, and are contrasted with a fifth alternative (the no-action alternative), which retains current conditions with no change in management, use, or development. These five alternatives constitute a reasonable range of alternatives that reflects the consideration and integration of (1) applicable laws and policies, including the WSRRA, the Secretarial Guidelines implementing WSRRA, the National Park Service (NPS) Organic Act, the Wilderness Act, the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA); (2) the various, sometimes contradictory interests and concerns raised during internal and public scoping; (3) scientific and scholarly data and analyses; and (4) an evaluation of the current facilities and infrastructure in the river corridor.

The five alternatives are characterized as follows:

- no- action alternative
- alternative 1: Emphasizing a Self-Reliant Experience
- alternative 2: Expanding Recreational Opportunities
- alternative 3: Celebrating the Tuolumne Cultural Heritage
- alternative 4 (Preferred): Improving the Traditional Tuolumne Experience

Actions necessary to protect river values are common to all the action alternatives. Additional actions to enhance some river values are included in some, but not all, alternatives. A comprehensive evaluation of how river values would be protected and enhanced under each alternative is provided at the end of each alternative description. This evaluation, which addresses a management requirement under WSRA, is provided in addition to the evaluations required by NEPA and NHPA. The NEPA and NHPA evaluations are included in volume 2, chapter 9, “Affected Environment and Environmental Consequences.” Based on the evaluations required by NEPA, the preferred alternative is the environmentally preferable alternative (see “Environmentally Preferable Alternative,” near the end of this chapter).

How the Alternatives Are Organized

By River Segment and Classification

The management actions are organized by river segment and classification (see table 3-1 and figure 3-1 in chapter 3, “Wild and Scenic River Corridor Boundaries and Segment Classifications”) because the management guidance under the WSRA differs for wild segments and scenic segments. (No recreational segments were designated).

Wild Segments

The discussion of the wild segments (segments 1, 2, 5, and 7; see table 3-1) encompasses the Lyell Fork, Upper Dana Fork, Grand Canyon, and Poopenaut Valley segments. Almost all lands and waters in these segments are also designated Wilderness. The one exception is the Glen Aulin High Sierra Camp in the Grand Canyon segment, which is a potential wilderness addition and is addressed in its own subsection.

Scenic Segments

The discussion of the scenic segments (segments 3, 4, and 6; see table 3-1) includes the Tioga Road corridor in the Lower Dana Fork segment, Tuolumne Meadows in the Tuolumne Meadows segment, and the dam administrative site in the Below O’Shaughnessy Dam segment. All these segments contain some lands that are included in designated Wilderness, and those areas will be managed the same as the wild segments.

By Type of Action

The management actions for wild segments and scenic segments are further subdivided into the following categories:

- *resource management actions* to protect and enhance river values, organized by value
- actions to protect and enhance river values by *managing visitor use and user capacity*
- *site plans* (including site restoration) for the Glen Aulin High Sierra Camp (under “Wild Segments” subheadings) and for the Tuolumne Meadows area (under “Scenic Segments” subheadings)

Actions Common to Alternatives 1–4

Many of the actions intended to protect and enhance river values are common to all the action alternatives. These actions are presented first, before alternative 1, and are referenced, but not repeated, in the descriptions of the action alternatives.

No-Action Alternative

The no-action alternative is required by NEPA to provide the baseline from which to compare the action alternatives. This alternative assumes that current trends in the conditions of natural and cultural resources and visitor experiences would continue, consistent with the management activities that are ongoing under currently approved plans. Future actions that would require additional planning and environmental compliance could still occur, independent of the *Final Tuolumne River Plan/EIS*, but they are not considered part of the no-action alternative for the purposes of conducting environmental compliance for the *Tuolumne River Plan*.

The description of the no-action alternative does not attempt to list the many activities that are ongoing in the river corridor to manage natural and cultural resources and to provide opportunities for visitor use. These activities range from fire management to maintenance work on historic structures, from wilderness patrols to enforcing traffic regulations, from field research to interpretive talks, and everything else that contributes to the conditions that currently exist in the river corridor. Most of these activities will continue, regardless of which alternative is eventually selected for the *Tuolumne River Plan*. Rather, the no-action alternative focuses on the main differences between the new actions that might occur under alternatives 1–4 and the management that is occurring now.

The future management actions to protect or enhance river values that might occur under alternatives 1–4 are not considered part of the no-action alternative. Therefore, the no-action alternative does *not* include the technical correction to the river corridor boundary presented in chapter 3, the section 7 determination process for evaluating water resources projects presented in chapter 4, or the management actions to protect and enhance river values presented in chapter 5.

Concept

More than 90% of the Tuolumne River corridor inside Yosemite National Park flows through congressionally designated Wilderness and is managed to protect wilderness qualities. In these areas (primarily river segments classified as wild, although scenic segments also include some lands in designated Wilderness, as shown in table 3-2), natural river-related systems are sustained by natural ecological processes, prehistoric archeological and American Indian traditional cultural resources characterize the cultural landscape, and recreational opportunities are primitive and unconfined.

Visitor services are consolidated at Tuolumne Meadows (within the scenic classification), which is easily accessible along the Tioga Road. This expansive, highly productive yet fragile subalpine meadow and riparian area has sustained American Indian traditional uses, was the location of nationally important historic events, and now supports abundant opportunities for distinctive high-country recreational experiences.

Tuolumne Meadows is a popular staging area for wilderness travelers. A segment of the Pacific Crest Trail, one of the country's 11 national scenic trails, passes through the river corridor, as does the John Muir Trail. Because the Tioga Road provides easy access (until it closes for winter), Tuolumne Meadows is also a destination for recreation that can be readily enjoyed by people of various ages and physical abilities. Visitors to Tuolumne Meadows can enjoy a wide variety of river-related outdoor recreational activities. Many visitors are through-travelers on the Tioga Road—one of only a handful of trans-Sierra highways—who enjoy motor touring and stop briefly to take advantage of the visitor services at Tuolumne Meadows. In winter, when Tioga Road is closed due to snow, a small number of visitors access the area by cross-country skiing and snowshoeing. There are no visitor services in the winter, although the campground office is available as a ski hut for the few skiers who make it all the way to the meadows area.

Visitor use patterns are changing, as more day visitors visit the park, and people with only a short time to spend in the area now comprise almost half of the visitor population at Tuolumne Meadows.

The Glen Aulin High Sierra Camp, 6 miles downriver from Tuolumne Meadows in the Grand Canyon segment, provides visitors, including those who are unable to carry a heavy pack or are mobility impaired, an opportunity to experience and enjoy the river in a remote, wilderness setting.

In summary, the no-action alternative would:

- Preserve and sustain wilderness character, including natural ecosystem function and opportunities for primitive, unconfined recreation, in the wild segments of the river.
- Retain existing opportunities for day and overnight use at Tuolumne Meadows and the Glen Aulin High Sierra Camp.
- Perpetuate the current resource conditions and concerns for river values throughout the river corridor.
- Manage for a continuing upward trend in day use.

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Management

As noted in the introduction to the no-action alternative, this section is not intended to summarize all the current management of resources in the river corridor. Rather, it focuses on the actions currently underway to address the concerns identified in chapter 5. This provides a baseline for comparing the additional actions that might be taken under the action alternatives to further protect and enhance river values.

Free Flowing Condition

Concerns about free flow in wild segments of the river relate to altered flow levels below O'Shaughnessy Dam. Under the no-action alternative, the NPS would continue to work cooperatively with the San Francisco Public Utilities Commission (SFPUC), Stanislaus National Forest, and others to inform releases from O'Shaughnessy Dam intended to more closely mimic natural flows for the benefit of river-dependent ecosystems downstream of the dam.

Water Quality

Concerns about water quality in wild segments of the river relate to wastewater disposal at the Glen Aulin High Sierra Camp and risks associated with stock use. Throughout the wild segments water quality would continue to be monitored and managed to meet NPS standards (which are higher than state water quality standards), through ongoing practices, including manure removal and other provisions outlined by the SFPUC to protect the Hetch Hetchy watershed. Water use at the Glen Aulin High Sierra Camp would continue to be restricted to 600 gallons per day to avoid saturation of the camp's leach mound (see "Glen Aulin," below).

Biological Value: Subalpine Meadow and Riparian Complex

Subalpine meadow and riparian areas would continue to be sustained by natural ecological processes. The concern about subalpine meadows in wild segments of the river relates to localized impacts on meadow/riparian areas in Lyell Canyon, associated primarily with stock use. These impacts include high levels of bare ground in meadows with stock use when compared with meadows receiving low or no stock use (NPS, Ballenger et al. 2010j). Under the no-action alternative, commercial pack stock use would continue to be allowed by the concessioner under the concessions contract and by private pack stations under the provisions of current commercial use authorizations, the latter of which are renewed annually.

The majority of concessioner pack stock use in the river corridor is associated with the supply of the High Sierra Camps (see table 8-1). The concessioner generally operates one, sometimes two, strings of mules from Tuolumne Meadows to Vogelsang and Sunrise High Sierra Camps three times a week, and to May Lake and Glen Aulin High Sierra Camps two times a week (Boyers 2012). These concessioner stock trips do not involve

any grazing because the packers return to Tuolumne Meadows on the same day on supply runs and keep their stock in the corrals at Glen Aulin during camp set-up and take-down.

Currently three different pack stations operate in the river corridor under commercial use authorizations for overnight guided pack trips. Free-range grazing is allowed in designated Wilderness where stock travel is permitted, with the exception of no-camping zones and areas near the High Sierra Camps. Between 2004 and 2010, commercial overnight stock use from these pack stations in Lyell Canyon ranged from 193 (2010) to 564 (2007) grazing-nights per year (1 grazing-night equals 1 animal grazing for 1 night; 2 grazing-nights could equal 2 animals grazing for 1 night or 1 animal grazing for 2 nights, and so on). There has been little private overnight stock use in the river corridor. (Additional discussion of commercial use in designated Wilderness, including commercial stock overnight use, is included below, under “Recreational Value: Wilderness Experience along the River.”)

NPS administrative stock use occurs in wild segments in support of trail maintenance and utility operations at Glen Aulin. The level of use depends on where trail crews are working. In a busy summer, with two trail crews supplied from Tuolumne Meadows, an average of 15 head (and up to 25 head) of stock work out of the NPS corral, primarily supporting trail crew operations. Backcountry Utilities Division staff generally hike into Glen Aulin unless they have a project or need to pack compost. Their stock use averages 36 stock passes on the Glen Aulin trail over the course of an entire season (Boyers 2012); similar to the concessioner stock trips to Glen Aulin, this stock use does not involve any grazing because stock is kept in the corral at Glen Aulin.

Biological Value: Low-Elevation Riparian and Meadow Habitat

The concern about low-elevation meadow and riparian habitat is that it might be transitioning in response to unnatural changes in the river’s hydrologic regime. Disruptions to natural flows caused by O’Shaughnessy Dam would be mitigated by science-based releases intended to more closely mimic natural flows and to provide maximum ecological benefits to the low-elevation riparian and meadow habitat in Poopenaut Valley. The NPS is currently working with the SFPUC to develop recommendations for such flows.

Geologic Value: Stairstep River Morphology

No present or foreseeable concerns are associated with the condition of stairstep river morphology in the river corridor. This river value is not affected by any ongoing or foreseeable use and does not require management or monitoring. Therefore, this river value is not considered further in the action alternatives.

Cultural Value: Prehistoric Archeological Landscape

Park staff would continue to identify, document, monitor, evaluate, and protect significant prehistoric archeological sites in consultation with traditionally associated American Indian tribes and groups through monitoring for changing site conditions, developing and implementing treatment measures, implementing visitor and employee education, and conducting research.

The primary concern about prehistoric archeological sites in wilderness is the need to protect them from disturbance caused by visitor use. Under the no-action alternative, sites in the Lyell Fork, Upper Dana Fork, Grand Canyon, and Poopenaut segments would continue to be documented, monitored, and evaluated (where appropriate). Sites would continue to be protected by managing overnight use and campsites and by using natural features to conceal and divert foot traffic around sites.

Scenic Value: Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne

Natural scenery would continue to evolve in response to natural ecological processes, with no management of scenic vistas. The primary concerns are the visibility of the Glen Aulin High Sierra Camp structures from a few locations along the trail through this area, and the manure and other signs of stock use on trails, which are offensive to some hikers. Both of these localized concerns would continue under the no-action alternative.

Additional information about the amount of stock use on trails is provided under “Recreational Value: Wilderness Experience along the River,” below.

Recreational Value: Wilderness Experience along the River

The primary concerns about the wilderness experience along the river is the increasing day use on wilderness trails within the first few miles of Tuolumne Meadows trailheads and the potential for conflicts between hikers and stock users traveling the same wilderness trails. Because day use in wilderness is not covered by the existing overnight trailhead quota system, this use would remain unrestricted under the no-action alternative.

Commercial use (guided stock and hiking trips) would continue under current management, and the potential for conflict between stock users and other visitors would remain unchanged. The current use levels on the main wilderness trails inside the river corridor are shown in table 5-15 in chapter 5, in terms of the average number of encounters with other parties per hour on each trail section. The current amount of pack stock use on trail sections within the river corridor is shown in table 8-1, in terms of total passes per year.

Table 8-1.
2011 Total Stock Use per Trail, Tuolumne River Corridor

Trail	River Segment	Total Passes	Concessioner	NPS Administrative	Commercial Outfitter	Private Use
Cathedral Lakes	Tuolumne Meadows (500-foot segment in WSR corridor)	~340 passes	186 passes (~1–2 mule strings/week to service Sunrise HSC)	8 passes (sawyers and ranger patrols)	52 passes	94 passes
Glen Aulin	Tuolumne Meadows and Grand Canyon	~1,429 passes	1,101 passes (~ 969 passes to set up, take down, and service Glen Aulin HSC, 132 passes for half- and full-day rides)	50 passes (backcountry utilities, sawyers, trail crew, ranger patrols)	118 passes	160 passes
Lyell Canyon	Tuolumne Meadows and Lyell Canyon	~600 passes	208 passes (~6 mule strings/week to service Vogelsang HSC)	62 passes (backcountry utilities, sawyers, ranger patrols)	214 passes	116 passes
Parker/Mono Pass	Dana Fork	~8 passes	0 passes	8 passes (sawyers, ranger patrols)	0 passes	Few passes
Pate Valley within WSR	Grand Canyon	Unknown	0 passes	No data for 2011	0 passes	0 passes
Poopenaut (foot traffic only)	Poopenaut Valley	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Tuolumne Meadows Campground and Miscellaneous Trails	Tuolumne Meadows	Unknown (at least 44 passes)	0 passes	44 passes for ranger patrols	0 passes	Unknown number of passes dispersed throughout Tuolumne Meadows trails
Unicorn Creek/Elizabeth Lake	Trailhead in Tuolumne Meadows	Unknown (at least 10 passes)	0 passes	10 passes for ranger patrols	0 passes	Occasional passes expected as trailhead near stock campsites.
Young Lakes	Tuolumne Meadows	~2,282 passes	2,264 passes (three 2-hour trail rides per day)	18 passes (sawyers, ranger patrols)	0 passes	Unknown passes
Corridorwide totals		~ 4,713 passes	3,759 passes	200 passes	384 passes	370 passes

a This figure captures the number of passes associated with saddle trips to the Glen Aulin High Sierra Camp provided by the concessioner for guests at the camp; no other commercial trips occur on this trail.

HSC = High Sierra Camp; WSR = wild and scenic river

Source: The Glen Aulin Trail data represent a four-year average of actual counts between 2009 and 2012 for a 12-week season. Data for other trails were compiled using the best available data from Boyers 2012, the park's primary concessioner, and NPS staff.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

Wild segments would continue to provide excellent opportunities for primitive, unconfined recreation, where visitors could pursue a variety of recreational activities, including backpacking, wilderness camping, day hiking, nature study, fishing, swimming and wading, climbing, private and commercial horseback riding and pack stock use, winter skiing, and trans-Sierra treks.

Concerns about the quality of the visitor experience in wild segments relate to the increasing number of encounters with other parties on trails within a day hike of Tuolumne Meadows, and the potential for conflicts between hikers and stock users on trails.

Maximum Amounts of Visitor Use

Under the no-action alternative, visitor use capacity in wild segments would continue to be managed through an existing system of zone capacities and related overnight trailhead quotas, accommodating a total of 350 people per night in the Lyell Fork and Grand Canyon segments above Hetch Hetchy Reservoir (camping is prohibited along the Dana Fork). The zone capacity for the Poopenaut Valley segment below the reservoir would remain at 50 people per night (although this includes an area much bigger than Poopenaut Valley). The capacity for each wilderness management zone in the river corridor is listed in table 8-2.

Table 8-2.
Existing Wilderness Management Zone Capacities

Wilderness Management Zone (Tuolumne River Segment)	Maximum Overnight Use per Zone
Lyell Canyon (Lyell Fork)	125
Glen Aulin (Grand Canyon)	50
Glen Aulin to Cold Canyon/Waterwheel Falls (Grand Canyon)	75
Pate Valley (Grand Canyon)	100
Miguel Meadow (Poopenaut Valley)	50
Total	400

The only restrictions on day use in wilderness would be restrictions on group size (8 people per group off trail and 35 people per group on trail). The current encounter rates on the most popular wilderness trails in the corridor are shown in table 5-15 in chapter 5. As shown in that table, the trail to Glen Aulin has the highest encounter rate (an average of 9 encounters per hour). Based on past trends, the current levels of use would be expected to continue or increase. Concessioner stock day rides into wilderness would continue at current levels of service (3 two-hour rides per day, 2 four-hour rides, and occasional all-day rides). Generally, the two-hour rides quickly exit the river corridor from the stable at the north edge of the Tuolumne Meadows segment and follow the Dog Lake/Young Lakes trail. A maximum of 12 visitors and 2 wranglers per ride take the two-hour rides, and all three rides are often booked during July and August, which is when most of this use occurs. The four-hour rides, which can accommodate 10 visitors per ride, follow the Glen Aulin Trail through the Tuolumne Meadows and Grand Canyon segments; these rides are less popular. The full-day rides, which can accommodate six visitors, follow the Glen Aulin trail beyond Glen Aulin to Waterwheel Falls; these rides are rare. The maximum daily capacity of all rides is 62 people per day.

Overnight commercial use in the wilderness portions of the Tuolumne River corridor averaged approximately 451 person-nights per year from 2005 to 2009. Of those nights, 263 (58%) were on stock trips and 188 (42%) were on hiking trips. Commercial day use was negligible, averaging only 65 use days for the whole season, most of which occurred on the Mono/Parker Pass trail. Commercial use in 2009 (475 person-nights) was slightly higher than the five-year average, while the percentage of stock use (240 person-nights or 51%) was slightly lower than the five-year average (NPS, Fincher 2009n).

Administrative Use

Administrative users in wild segments of the river corridor include NPS and concessioner staff, park partners, and volunteers. These individuals engage in a variety of functions, including resource protection and stewardship; trail and bridge maintenance; visitor protection; maintaining the utilities and foodservice at the Glen Aulin High Sierra Camp; and providing visitor recreation, interpretive, and educational opportunities. Administrative users engage in a variety of travel modes, including stock, helicopter, or foot travel to carry out their work. Nine concessioner employees are housed at the Glen Aulin High Sierra Camp.

Glen Aulin (Potential Wilderness Addition)

Glen Aulin High Sierra Camp

The Glen Aulin High Sierra Camp is a concessioner-operated camp that provides rustic lodging and meal service for up to 32 overnight guests. The High Sierra Camp was designated a potential wilderness addition within the Yosemite Wilderness by the 1984 California Wilderness Act. Under the no-action alternative, the Glen Aulin High Sierra Camp would be retained at the current capacity of 32 guests. Day use at Glen Aulin would remain at current levels of approximately 45 people per day, and limited meal service would remain available for hikers and backpackers who are not staying at the camp.

Concerns about river values at Glen Aulin focus on a risk to water quality associated with wastewater treatment at the camp, a risk to water quality associated with the use of stock to transport guests and supplies to the camp, localized impacts on scenic quality associated with the visibility of camp structures and signs of stock use along the Glen Aulin trail, an impact on the wilderness experience of some visitors caused by conflicts between hikers and stock users, and a risk to prehistoric archeological sites associated with potential future development or maintenance of camp facilities.

To mitigate the risk of leach-mound failure, water use is restricted to 600 gallons per day. A number of water conservation measures have already been implemented to achieve this reduction in water use, including installation of low-flow toilets, elimination of guest showers, elimination of towel and linen service, conversion to disposable tableware, and menu revisions to conserve water.

Measures have also been taken to reduce stock trips, including menu revisions to reduce required supplies. These measures would continue under the no-action alternative.

The risk to individual sites contributing to the outstandingly remarkable prehistoric archeological value of the Tuolumne River would be reduced by evaluating the sites to determine their eligibility for the National Register of Historic Places (NRHP); reducing, minimizing, or mitigating ongoing site impacts; and avoiding new impacts to the greatest extent possible. Where it is not feasible to avoid, minimize, or eliminate impacts, the NPS would conduct data recovery excavations and perform other mitigative actions in consultation with traditionally associated American Indian tribes.

The historic character of the Glen Aulin High Sierra Camp would be retained with no change in the layout or design of facilities. Utilities would remain limited to water and wastewater systems powered by solar energy and gas-powered generators; propane would continue to be used for cooking. Guest tent cabins have wood stoves, and wood would continue to be packed in by the concessioner; however, there is no electric power to the guest tent cabins. The following facilities would be retained (see figure 8-1):

- three permanent structures (cookhouse, toilet building with flush toilets, and storage shed)
- dining tent with concrete and stone foundation and footings
- storage tent with concrete and stone foundation and footings
- shower tent (for employees only) with concrete foundation
- guest tent cabins (eight units) with concrete foundations

- employee tent cabins (four units) with concrete foundations
- water and wastewater treatment facilities (including a water storage tank, a chlorinator located in a small permanent building, a filter tank, surge tanks, a belowground septic tank, a wastewater leach mound, and solar panels), many with concrete foundations

Backpacker Campground

The backpacker campground would be retained. The aging composting toilet at the campground would not be replaced under the no-action alternative. Overnight use at the backpacker camp would continue to be managed through the wilderness zone capacity for Glen Aulin, which is currently set at 50 people per night. Dispersed backpack camping is not allowed in the Glen Aulin vicinity, to mitigate impacts of overnight use at this popular destination.

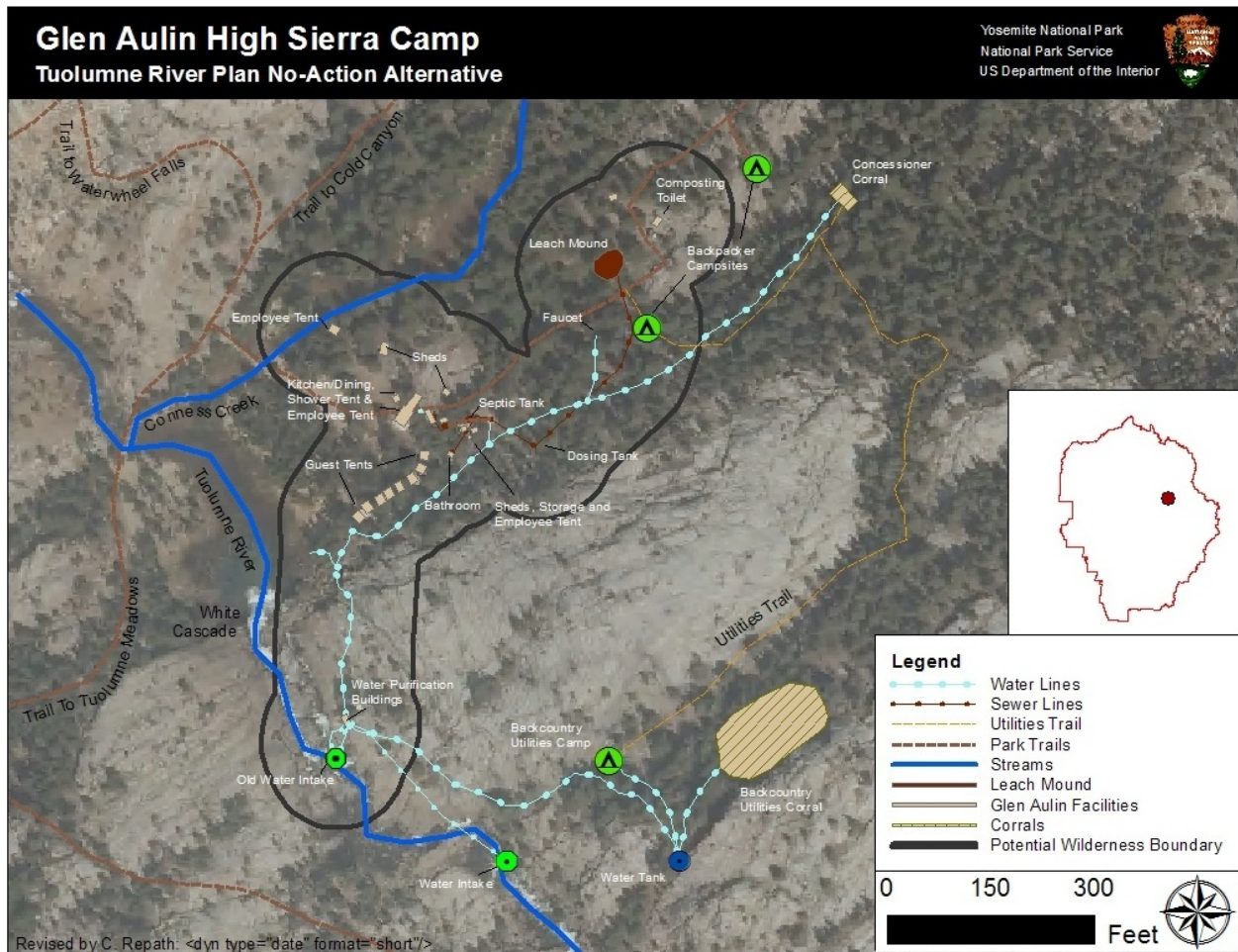


Figure 8-1. Glen Aulin Site Plan, No-Action Alternative.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

This discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. Portions of these segments within designated Wilderness would be managed the same as the wild segments. The discussion focuses on the actions currently underway to address the management and localized concerns identified in chapter 5.

Resource Management

Free Flowing Condition

Concerns about free flow in the Tuolumne Meadows/Tioga Road area relate to water withdrawals to support visitor and administrative use; an aging water intake, treatment, and distribution system; and interference with river flow caused by the short section (approximately 150 feet) of riprap placed to protect the campground A-loop road.

The no-action alternative would continue existing management regarding these issues, as follows:

- Continue withdrawals averaging approximately 46,000 gallons per day, with a rare spike exceeding 67,000 gallons per day, to support visitor and administrative use (see a detailed discussion of these calculations in chapter 5 under the section titled “Free-Flowing Condition,” subsection “Current Condition”).
- Maintain existing domestic water and wastewater systems.
- Retain the boulder riprap along an approximately 150-foot-long section of riverbank, installed to protect the campground A-loop road.

The no-action alternative would also retain the Tioga Road bridge with no action to mitigate potential impacts on river hydrology during high flow periods. Although this is not a direct effect on free flow as defined by WSRM, the *Tuolumne River Plan* addresses this condition as a localized concern.

Water Quality

Concerns about water quality in the Tuolumne Meadows/Tioga Road area relate to an unstable road cut (the “little blue slide”) along Tioga Road near the Dana Fork; an aging wastewater treatment and disposal system; stock use impacts; and underground fuel storage tanks. The no-action alternative would continue existing management regarding these issues, as follows:

- Maintain existing utilities, including the wastewater treatment plant, the wastewater containment ponds and sprayfield, and two force mains, one of which crosses the Tuolumne River beneath the Tioga Road bridge and the other which crosses beneath the river and meadow to deliver treated wastewater from the treatment plant to the containment ponds.
- Take no action to stabilize the road cut along Tioga Road near the Dana Fork.
- Continue best management practices, including daily removal of manure from corrals and water courses within the first 0.25 mile of trails leading from stable operations, to mitigate the potential for impacts on water quality associated with stock use.
- Mitigate risks associated with aging utilities, stock use, and fuel tanks through water quality monitoring and continued compliance with state water quality regulations.

Biological Value: Subalpine Meadow and Riparian Complex

Management concerns for the subalpine meadow and riparian complex in the Tuolumne Meadows/Tioga Road area relate to

- informal trails across meadows, along riverbanks, and at popular attractions, associated primarily with undesignated roadside parking and facilities sited in meadow and riparian areas

- disruptions to sheet flow across meadows, associated with inadequate Tioga Road culverts and the historic beds of the Great Sierra Wagon Road
- diminishing riparian vegetation along riverbanks
- changes in meadow vegetation, suspected of being associated with historical sheep grazing, past and current visitor use and development, and climate change

The mechanical removal of lodgepole pine seedlings to inhibit their encroachment into open meadows was practiced from at least as early as 1933 (Cooper et al. 2006) through 2010. No management to mechanically remove lodgepole from the meadows has occurred since 2010, and it would not be resumed unless ongoing research indicated that it should be part of a comprehensive ecological restoration program for the meadows.

By definition, the no-action alternative would not include any new management actions to address concerns about changing meadow and riparian vegetation. However, actions to address these issues might still be taken as part of other planning and management projects, independent of the *Tuolumne River Plan*. The NPS continuously responds to resource management issues and has already initiated some projects that directly respond to the current issues summarized above. For example, trampled areas and informal trails at Tuolumne Meadows were being restored to natural conditions during the summer of 2012. Because these actions are being conducted independently of the *Tuolumne River Plan*, they are not considered part of the no-action alternative for the *Final Tuolumne River Plan/EIS*, and they require separate compliance (such as NEPA analysis or consultations with other federal or state agencies or tribes).

For purposes of providing a baseline for comparison of action alternatives, the no-action alternative would continue the following ongoing management:

- Continue to allow undesignated roadside parking along Tioga Road and the road to the Tuolumne Meadows Lodge, which would continue to encourage informal trailing across meadows.
- Retain the following facilities in meadow and riparian areas: concessioner employee housing behind the store and grill, all concessioner employee and 3 visitor tent cabins at Tuolumne Meadows Lodge, the dining hall/kitchen at Tuolumne Meadows Lodge (which is within 100 feet of the river), and 21 campsites within 100 feet of the river.
- Take no action to improve the Tioga Road culverts to mitigate effects on surface flow into Tuolumne Meadows.
- Continue to protect the remaining segments of the historic Great Sierra Wagon Road and use them for trails, with no management action to mitigate impacts on meadow hydrology.
- Take no action to reestablish riparian vegetation along riverbanks.
- Take no action to modify the Tioga Road bridge to mitigate adverse impacts on river hydrology during periods of high flows.
- Continue research to determine the conditions necessary for the ecological recovery and long-term integrity of river-related habitats in Tuolumne Meadows.

Cultural Value: Prehistoric Archeological Landscape

Although the park staff would continue to identify, document, monitor, and evaluate significant prehistoric archeological sites in consultation with traditionally associated American Indian tribes, no new actions to protect sites would be initiated as part of the *Tuolumne River Plan*.

The primary concern about prehistoric archeological sites is ongoing disturbance associated with visitor use, primarily informal trails. Action to resolve this issue will require a comprehensive approach to address the

causes of impacts on prehistoric archeological sites. The no-action alternative would not include any new management actions to address these issues (although they might be addressed through other resource planning and management). For purposes of providing a baseline for comparison with action alternatives, management under the no-action alternative would strive to mitigate the impacts of informal trails through placement of logs or other natural objects to disguise the sites and divert foot traffic.

No new development is proposed under the no-action alternative. Effects on prehistoric archeological sites from potential future actions (independent of the *Tuolumne River Plan*) would be addressed through procedures outlined in the park's programmatic agreement for section 106 of NHPA, potential new agreement(s), or by following the implementing regulations for NHPA section 106.

Cultural Value: Parsons Memorial Lodge

Parsons Memorial Lodge would continue to be preserved through periodic assessments and appropriate treatments. No management or localized concerns have been identified for this value.

Scenic Value: Scenery through Dana and Tuolumne Meadows

The concerns identified for outstandingly remarkable scenic values in the Tuolumne Meadows/Tioga Road area are associated with the encroachment of undesignated roadside parking and conifers. These concerns would be addressed under the no-action alternative by continuing ongoing actions:

- Continue to allow the mechanical removal of conifers for scenic vista management.
- Take no action to manage scenic vista points.
- Take no action to eliminate undesignated roadside parking and the associated impact on scenic views.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

The concern regarding this outstandingly remarkable recreational value is the potential for crowding and congestion—particularly vehicle congestion—to change the quality of the experience for visitors accessing the Tuolumne River through Tuolumne and Dana Meadows by way of Tioga Road. Under the no-action alternative, parking would not be restricted by any additional barriers to protect sensitive resources; however, no additional designated parking would be provided to reduce vehicle congestion and competition for parking spaces. It is estimated that the designated parking at Tuolumne Meadows currently can accommodate only about 60% of the maximum demand for day and overnight parking, so that almost 40% of all visitors must park along roadsides or squeeze into other undesignated spaces. Although most visitors who were recently surveyed responded that they were satisfied with their ability to find parking (White 2010), some were dissatisfied with the traffic congestion, the pedestrian/vehicle conflicts, and the intrusions into scenic views caused by undesignated roadside parking.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

Visitors would continue to enjoy a traditional Tuolumne Meadows experience, where activities would range from scenic driving to staging for extended trips into the wilderness, all focused on the spectacular backdrop of the High Sierra and the meadows extending along the Tuolumne River through these segments. Visitors could sightsee, study nature, take day hikes, fish, swim and wade, ride horses, picnic, climb, camp in the campground, or stay overnight in a rustic lodge. A full range of orientation, interpretation, and education programs would continue to be conducted at the existing visitor center, wilderness center, and Parsons Memorial Lodge, as well as in the field. These programs would continue to help visitors understand, appreciate, and connect with the Tuolumne River and encourage visitor behaviors that are protective of resources.

Current commercial services (store/grill, public fuel station, mountaineering shop and school, concessioner stock day rides) would be retained. The U.S. Postal Service (USPS) would continue to contract with the park

concessioner to provide incoming and outgoing mail service, including packages for through-hikers on the Pacific Crest and John Muir Trails. (This service would remain subject to future USPS level-of-service decisions beyond NPS control.)

Opportunities for overnight use would include camping and lodging at current capacities (2,184 people at the campground and 276 people at Tuolumne Meadows Lodge).

Shuttle bus service between destinations within the Tuolumne Meadows area would continue to operate at the current level of service (see “Tuolumne Meadows Shuttle Bus Service” under “Transportation” in chapter 9; existing shuttle bus stops are shown on the site plan map, figure 8-2). The Tuolumne Meadows shuttle bus currently runs from the Tuolumne Meadows Lodge west to Olmsted Point and back, making 12 stops and with departures every 30 minutes during the day. The Tioga Pass shuttle runs from the lodge east to Tioga Pass and back, with four departures in each direction daily).

Maximum Amounts of Visitor Use

Day Use

Current maximum day use in the Tuolumne Meadows area and adjacent wilderness is estimated at 1,762 people at one time. This number is reached only during peak periods (e.g., some weekends in July and August); at other times day use is less. This estimate of maximum day use is the sum of two factors:

- (1) the most current (2011) observed maximum number of parked cars counted on a peak day, presumed to belong to day visitors (530 total vehicles parked at the peak of the summer season) multiplied by an average of 2.9¹ persons per car, for 1,537 maximum people at one time, plus
- (2) the maximum number of day visitors who can arrive at the Tuolumne Meadows area by way of the in-park hiker bus from Yosemite Valley, tour bus, and regional public transportation, which is currently 225 people per day (Ridership on the two internal shuttle bus systems that circulate in the Tuolumne Meadows area is not included in this calculation.)

Because only 340 designated parking spaces were available for day visitors in 2011, more than a third of these day visitors (an estimated 551 people in 190 vehicles on the day in 2011 with the highest parking counts) were parking along roadsides and crowding into the existing parking areas. A comparison of designated and undesignated parking is provided under “Site Development,” below.)

Overnight Use

The overnight capacity at Tuolumne Meadows is 2,460 people per night: Up to 2,184 people can be accommodated in the campground (304 car/ORV sites, 4 horse sites, and 21 backpacker sites, all with a maximum capacity of 6 people per site, plus 7 group sites with a maximum capacity of up to 30 people per site). An additional 276 people can be accommodated in the 69 guest tent cabins at Tuolumne Meadows Lodge. Actual overnight use levels are lower than these capacities because individual campsites and lodging units are not always occupied by the maximum number of people allowable. Some campsites are available through a reservation system, while the rest of the campsites are available on a first-come/first-served basis.

Administrative Use

Administrative uses are most concentrated in the river corridor at Tuolumne Meadows. Administrative activities in these segments include scientific study and resource monitoring, maintenance and facility

¹ The vehicle occupancy rate is 2.9 persons per vehicle, based on visitor studies conducted over the past 20 years that found an average vehicle occupancy ranging from 2.6 to 3.4 (Van Wagten donk and Coho 1980, FHWA 1982, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

operations functions, food service and hospitality, education and interpretation, and visitor protection, including emergency services. Staffing levels in the Tuolumne River corridor change annually, depending on operational needs.

Currently, housing is provided for 104 NPS employees at Tuolumne Meadows. However, up to 150 NPS employees currently work at Tuolumne Meadows in the summer, including NPS research and restoration crews, trail crews, and volunteers who work out of Tuolumne Meadows on an intermittent basis. The actual number of employees at Tuolumne Meadows at any one time fluctuates due to the different nature and duration of employee assignments. However, even allowing for this fluctuation, the amount of housing is never sufficient to accommodate all of the NPS employees who are working in the area at any one time, resulting in some employees having to commute, double up, or camp in the campground.

Approximately 103 concessioner employees are housed at Tuolumne Meadows to support visitor services such as the store and grill, lodge, concessioner stable, and the mountaineering shop/school. Most employees (both concessioner and NPS) park their personal vehicles near their residences, or occasionally, at the wilderness lot near Bug Camp or at Tuolumne Meadows Lodge.

During the construction of the new Tioga Road, a borrow pit and quarry for road material was built at Gaylor Pit, about 3 miles east of the Tuolumne Meadows Lodge along Tioga Road. Beginning in the 1950s the pit and surrounding area were used by the NPS for various administrative uses, including storage, dumping, a temporary native plant nursery, wood yard, staging area, and shooting range. In deference to the nearby designated Wilderness the entire Gaylor Pit area was decommissioned in 2003 and the area has been restored to a more natural condition. Currently the area is used for a helipad and a minimal amount of undesignated day parking.

Site Development at Tuolumne Meadows

Most development in the river corridor is situated south of Tioga Road at the edge of the lodgepole pine forest that surrounds Tuolumne Meadows. Most of the development at Tuolumne Meadows is inside the wild and scenic river corridor, with the exception of the western half of the campground, which is outside the corridor boundary. The development pattern is the result of a plan that was completed by the NPS in 1929 (NPS 2007t). Its purpose was to minimize impacts on the natural and scenic resources of Tuolumne Meadows by confining physical development to well-defined, dispersed clusters along the meadow's southern margins in a way that avoided the need for cross-meadow traffic by vehicles, stock, and pedestrians. Circulation patterns were aligned according to similar principles. Much of the construction was implemented by the Civilian Conservation Corps (CCC), and the site retains some excellent examples of CCC design and handcraft. The Tuolumne Meadows Historic District, a locally significant district determined eligible for listing in the National Register of Historic Places in 2007, includes all of the historic development dating from 1885 to 1961 within Tuolumne Meadows; the Soda Springs Historic District is a smaller district encompassed by the Tuolumne Meadows district that contains the Parsons Memorial Lodge and several nearby structures (see chapter 9 for details about these historic districts).

In the 1930s the Tioga Road was reconstructed to mitigate its impact on the meadow and to take greater advantage of the panoramic views available to motorists traveling along the meadow's edge. Attention to views and vistas was identified as an important guiding principle, with vantage points carefully selected to maximize the aesthetic effect of varying views of broad open meadows, dark forests, and surrounding peaks. The Tioga Road Historic District, a nationally significant district determined eligible for listing in 2012, encompasses the 47 miles of the road within Yosemite National Park, including the portions that traverse the Tuolumne River corridor.

Although the principles guiding the 1929 plan have clearly characterized ongoing development throughout the Tuolumne Meadows Historic District, the plan was never fully realized, and vestiges of earlier development patterns still exist. These include a cluster of structures that once formed the core of the Sierra Club's inholding at Soda Springs; the original NPS administrative area at Ranger Camp, which was supposed to be demolished when the development plan was fully realized; and the old Insect Research Station (Bug Camp), which was designed to be temporary but has remained a center for resource management and employee housing to the present (NPS 2007t). Furthermore, over the past decades aging utilities and increasing demand for parking and other facilities have resulted in a piecing together of historic and nonhistoric elements and localized impacts on the meadows.

Under the no-action alternative, all the existing facilities would be retained and the Tuolumne Meadows area would generally retain the character of a rustic, temporary outpost at the edge of the Sierra wilderness. The structures, mostly tent cabins that are taken down each fall and erected each spring, and their dispersed (rather than consolidated) placement would continue to reinforce a sense of minimal amenities and deference to the natural setting. Table 8-3 contains a summary of existing facilities for comparison with the facilities included in alternative site plans. Because parking is a critical component of the day user capacity and therefore of high interest to many visitors, and because the calculation of existing parking is a calculation containing several variables, parking is discussed as a separate topic, below. Table 8-4 contains a summary of existing parking for comparison with the parking included in the alternative site plans.

A comprehensive site plan to guide the future repair or replacement of aging utilities and infrastructure and the provision of appropriate visitor and administrative facilities is proposed and addressed as part of this *Final Tuolumne River Plan/EIS*, but it is not included in this no-action alternative.

Table 8-3.
Current Facilities, Tuolumne Meadows

Facility Type	Description
Visitor Services	<ul style="list-style-type: none"> ▪ visitor center, restrooms ▪ wilderness center ▪ store and grill ▪ lodge (69 guest tent cabins [276 guests], hard-sided kitchen, hard-sided shower house, canvas-sided dining hall) ▪ public fuel station ▪ mountaineering shop/school ▪ post office ▪ recreational vehicle dump station
Campground	<ul style="list-style-type: none"> ▪ 304 car/RV campsites, 4 horse campsites, and 21 backpacker sites (all at 6 people per site, for a total of 1,974 people), plus 7 group campsites (at 30 people per site, for a total of 210 people) ▪ campground office
Picnic Areas	<ul style="list-style-type: none"> ▪ picnic area near Lembert Dome
Trails	<ul style="list-style-type: none"> ▪ Pothole Dome trail (hiking) ▪ Cathedral Lakes trail (hiking and stock use) ▪ Segments of the historic Great Sierra Wagon Road bed through the Tuolumne Meadows area (Now part of the Pacific Crest Trail): <ul style="list-style-type: none"> ▫ Segment from Tioga Road to Parsons Memorial Lodge and on to Glen Aulin (hiking and stock use) ▫ Segment from Parsons Memorial Lodge to Lembert Dome (hiking and stock use and administrative road) ▫ Segment from Lembert Dome to Tuolumne Meadows Lodge (hiking and stock use) ▪ Elizabeth Lakes trail (hiking) ▪ Lembert Dome trail (hiking) ▪ Dog Lake trail (hiking and stock use) ▪ John Muir Trail (merges with the Pacific Crest Trail through Lyell Canyon; hiking and stock use)
Stables	<ul style="list-style-type: none"> ▪ NPS stable (up to 25 head of stock; varies widely) ▪ concessioner stable (capacity up to 100 head of stock, including up to 25 animals used for the Glen Aulin, Vogelsang, and Sunrise High Sierra Camp resupply trips and camp setup and take down)
Park Operations	<ul style="list-style-type: none"> ▪ ranger station ▪ maintenance yard and offices ▪ aboveground diesel fuel tank for administrative use (currently used only by the concessioner) ▪ search-and-rescue cache ▪ helipad at Gaylor Pit
Housing (NPS Employees)	<ul style="list-style-type: none"> ▪ Road Camp (17 employees), restrooms, shower house, laundry room ▪ Ranger Camp (54 employees), restrooms, shower house, laundry room ▪ Bug Camp (33 employees), restrooms, shower house
Housing (Concessioner Employees)	<ul style="list-style-type: none"> ▪ Tuolumne Meadows Lodge (48 employees) ▪ behind the store/grill and fuel station (42 employees) ▪ concessioner stable (13 employees)
Utility Systems	<ul style="list-style-type: none"> ▪ wastewater treatment plant and recreational vehicle dump station ▪ wastewater containment ponds and sprayfields ▪ domestic water intake, treatment, and storage tanks ▪ water and wastewater lines, including two wastewater lines that cross the river

Existing Visitor Parking at Tuolumne Meadows

Table 8-4 shows the most current estimate of visitor parking at Tuolumne Meadows.

Two parking studies have been conducted in support of this planning effort, (1) a parking study conducted from August 11–13, 2006 and (2) a parking study conducted from July 24–August 20, 2011 (DEA 2007 and DEA 2012). Among other data collected, the 2006 study established the location and type of parking facilities along Tioga Road within the Tuolumne Meadows area. Both the 2006 and the 2011 studies also counted the number of parked vehicles in the corridor, from Pothole Dome to Tioga Pass, at various times of day. The parking areas counted in 2006 and 2011 were similar; the primary difference was that some of the roadside pullouts that had been separate from one another in 2006 had become merged into larger pullouts by 2011 due to increased use. During the 2011 study the highest number of parked vehicles, excluding the campgrounds, was 870 at noon on August 13. The two-way daily traffic volume on August 13 was 4,161. There were only two days in 2011 with

two-way traffic volumes higher than 4,161: 4,202 on August 5 and 4,277 on August 7. Parking counts were not conducted on those days, but it is likely that 870 vehicles or more were parked during the peak hours on those two days. A comparison of the number of designated parking spaces (533) and the estimated parking demand (based on the actual parking counts in 2011) suggests that about 39% of the parking in the Tuolumne Meadows area (337 vehicles at peak times) is in undesignated or user-created locations.

Table 8-4.
Existing Day and Overnight Parking, Tuolumne Meadows (excluding Overnight Parking at the Tuolumne Meadows Campground)

Facility Type	Number of spaces	Description
Day Parking (Number of designated parking spaces in the Tuolumne Meadows area allotted to day visitors)	16	parking area at Pothole Dome
	50	parking area at the visitor center
	11	parking area at the campground office
	11	parking in the campground for the Elizabeth Lakes trailhead
	15	parking at the fuel station
	51	parking area at the store and grill
	58	parking area at the concessioner stable
	29	parking area at the base of Lembert Dome
	7	parking area at the ranger station
	25	parking area at the Dog Lake/John Muir Trail trailhead
	67	parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	total designated day parking spaces
Overnight Parking	+190	additional cars parked in undesignated spots during peak demand
	102	Tuolumne Meadows Lodge
	58	parking area at the wilderness office
	33	parking area at the Dog Lakes/John Muir Trail trailhead
	0	parking at the Cathedral Lakes trailhead
	0	parking along the road to the concessioner stable
	193	total designated overnight parking spaces
	+147	additional cars parked in undesignated spots during peak demand

Based on the overnight capacity in the corridor above the Hetch Hetchy Reservoir, it has been calculated that the guests at the Tuolumne Meadows Lodge and Glen Aulin High Sierra Camp and the wilderness permit holders who leave their cars at Tuolumne Meadows require 340 overnight parking spaces; this is in addition to the overnight parking that is available to campers staying at the individual campsites in the Tuolumne Meadows campground (two cars per car/RV and horse campsite and 10 cars per group site). This amount of overnight parking is required to accommodate people who leave their cars for multiple days while backpacking in the wilderness and often staying in the backpacker area of the campground on the night before and after their wilderness trip (hence some wilderness permit holders, as well as people moving in and out of lodge accommodations, overlap in their need for overnight parking). Because only 193 designated overnight spaces are currently available, it is estimated that 147 of the cars parked in undesignated spaces belonged to overnight users (bringing the combined total of designated and undesignated overnight spaces to 340). The remaining 190 cars parked in undesignated spaces presumably belonged to day users. These are the figures shown in table 8-4.

Parking for people who might ride the Tioga Pass shuttle to access Tuolumne Meadows from one of the parking areas to the east along Tioga Road is included in the parking figures for Tuolumne Meadows (67 spaces accommodating 194 people). Parking for people who might ride the Tuolumne Meadows shuttle from one of the parking areas west of Tuolumne Meadows (notably Tenaya Lake and Olmsted Point) is not included in the parking figures for Tuolumne Meadows, primarily because most of the parking in these areas is used by Tenaya

Lake and Olmsted Point visitors who do not ride the shuttle. Only a small number of visitors ride the shuttle between Tenaya Lake and Tuolumne Meadows.

Parking for two tour buses is provided at the visitor center. This is the only location within the river corridor where buses are allowed to park.

Winter Facilities

The only visitor facilities available during winter are the campground office, which remains open as a shelter, and a pit toilet behind the office, which is difficult to access when snow levels are high. Two rangers maintain a presence in Tuolumne Meadows all winter, housed in a winterized cabin at Ranger Camp. At times up to six people can temporarily be staying in Tuolumne Meadows to collect scientific data; they are accommodated in two additional cabins that have electricity and heat but no water or toilets open during winter. The winter water supply comes from a 250-foot-deep well, and wastewater is collected in a septic tank and dispersed into a leachfield; the water and septic system is sized for six people. Winter operations are powered by commercial electricity and solar panels, but emergency backup generators are maintained to cover outages.

Scenic Segment (Below O'Shaughnessy Dam)

The Below O'Shaughnessy Dam segment is a 1-mile-long segment that begins approximately 500 feet downstream of the dam and ends where the wilderness boundary crosses the river (see figure 3-1). It includes a portion of an administrative road and some structures associated with the operation of the dam. There are no public facilities, and visitor use is not encouraged for reasons of public safety and dam security. There is no employee housing in this segment. Beyond the road and developed site, the remainder of the segment is in designated Wilderness. There would be no change in management or use of this segment under the no-action alternative.

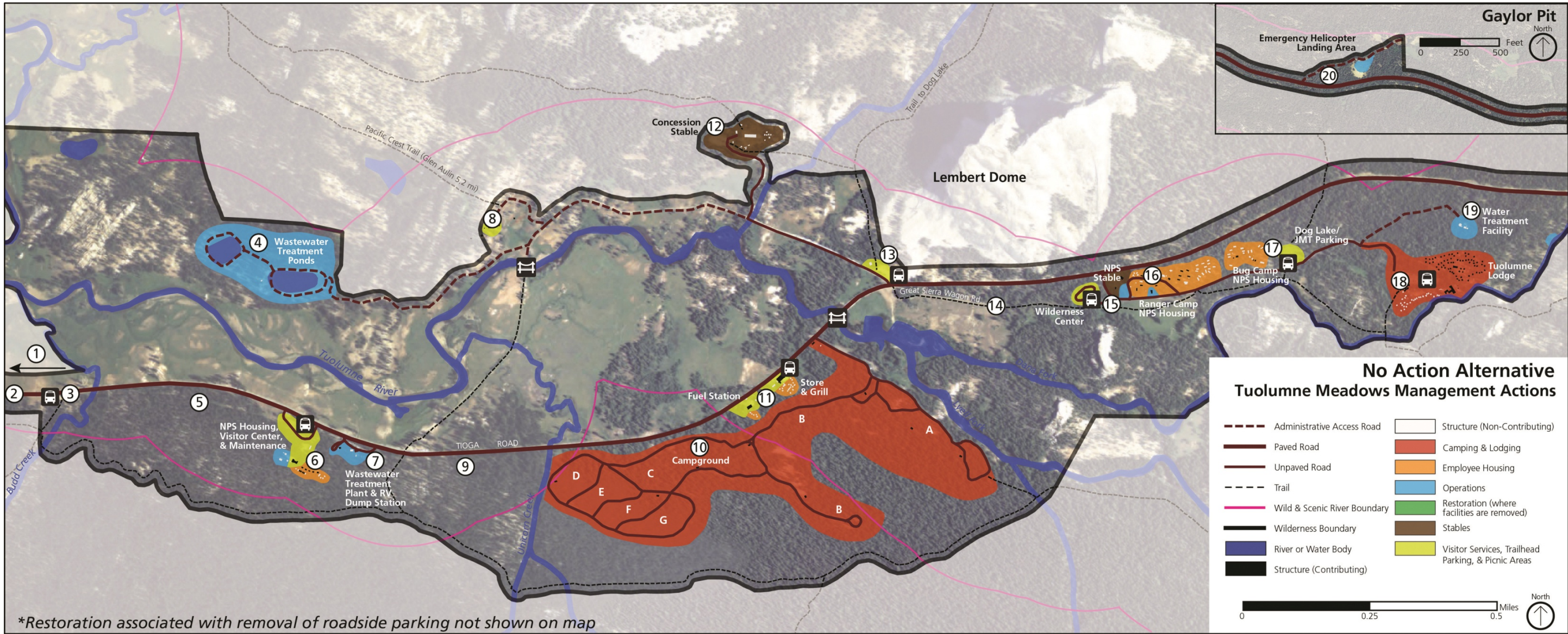


Figure 8-2. Tuolumne Meadows Site Plan, No-Action Alternative.

Key to figure 8-2 and List of Facilities Management Actions:

1. Pothole Dome scenic pullout/ parking areas	<ul style="list-style-type: none">Retain roadside pullout/day parking and trailhead on north side of road.Retain roadside pullout/day parking on south side of road.Retain trail to Pothole Dome.	6. Existing visitor center and Road Camp	<ul style="list-style-type: none">Retain visitor center and day parking.Retain NPS employee housing.Retain maintenance yard and office.	11. Existing commercial services core	<ul style="list-style-type: none">Retain store, grill, mountaineering shop/school, public fuel station, and day parking.Retain concessioner employee housing.	16. Existing ranger station and Ranger Camp	<ul style="list-style-type: none">Retain ranger station and day parking.Retain aboveground diesel fuel tank.Retain NPS employee housing
2. Tioga Road through the Tuolumne Meadows area	<ul style="list-style-type: none">Retain Tioga Road in its current alignment.Allow undesignated roadside parking.Retain vehicle bridge.	7. Wastewater treatment plant	<ul style="list-style-type: none">Retain wastewater treatment plant.Retain recreational vehicle dump station.	12. Existing concessioner stable	<ul style="list-style-type: none">Retain concessioner stable and day parkingRetain day and overnight parking along access road.Retain concessioner employee housing.	17. Bug Camp, Dog Lake/John Muir Trail parking	<ul style="list-style-type: none">Retain NPS employee housing.Retain day and overnight parking.
3. Existing Cathedral Lakes trailhead	<ul style="list-style-type: none">Allow undesignated roadside parking; retain trailhead.	8. Parsons Memorial Lodge	<ul style="list-style-type: none">Preserve Parsons Memorial Lodge and retain vehicle access and foot bridge.	13. Lumbert Dome	<ul style="list-style-type: none">Retain day parking and trailheads for Lumbert Dome and Parsons Memorial Lodge.Retain picnic area.	18. Tuolumne Meadows Lodge	<ul style="list-style-type: none">Retain lodge and overnight parking.Retain roadside parking along access road.Retain concessioner employee housing.
4. Existing wastewater ponds and sprayfields	<ul style="list-style-type: none">Retain ponds, sprayfields, and service road.	9. Area west of Unicorn Creek	<ul style="list-style-type: none">Retain as undeveloped natural area.	14. Great Sierra Wagon Road	<ul style="list-style-type: none">Preserve as trails.	19. Water treatment facility	<ul style="list-style-type: none">Retain water treatment facility.
5. Area east of Budd Creek and west of existing visitor center	<ul style="list-style-type: none">Retain as undeveloped natural area.	10. Tuolumne Meadows campground	<ul style="list-style-type: none">Retain campground in current loop configuration (304 sites, 21 backpacker sites, plus 7 group sites).Retain campground office and day parking.Retain Elizabeth Lakes trailhead and day parking.	15. Existing wilderness center and NPS stable	<ul style="list-style-type: none">Retain wilderness center and overnight parking.Retain NPS stable.	20. Gaylor Pit	<ul style="list-style-type: none">Retain helipad.Allow undesignated day parking.

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Actions Common to Alternatives 1–4

Many of the actions for protecting and enhancing river values are common to all the action alternatives. These actions respond to the concerns about river values described in chapter 5. Since these actions would be common to all of the action alternatives, they are already incorporated into the body of the *Tuolumne River Plan* and described in detail in chapter 5. They are also summarized here to emphasize that these actions would be integral parts of *any* of the action alternatives, although they are not repeated under each alternative description in this chapter.

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Protection and Enhancement

Free Flowing Condition

- Continue to work cooperatively with the SFPUC and others to inform releases from O'Shaughnessy Dam intended to more closely mimic natural flows.

Water Quality

- Replace the composting toilet at the backpacker campground at Glen Aulin with a new composting toilet slightly upslope and out of the area that has a potential to flood.

Biological Value: Subalpine Meadow and Riparian Complex

- Reduce the potential for stock-related impacts in Lyell Canyon by regulating stock use as follows:
 - Establish an opening date for stock to enter the high country, based on hydrologic conditions and range readiness, to protect meadow and riparian areas during the wettest portions of the spring and early summer.
 - Manage stock use to not exceed 167– 249 grazing-nights per season, depending on the year and its snowfall and rainfall patterns. This target grazing capacity for meadows in the Lyell Fork was based on recent meadow condition assessments and past research (Cole et al. 2004) to estimate the grazing levels that can be sustained without undesirable effects on meadow habitat (NPS, Abbe and Ballenger 2012c). Meadows receiving high use would be monitored annually to ensure that the target grazing capacity was protective of river values (NPS, Ballenger et al. 2010j). This management action would apply only to stock grazing-nights; additional stock use nights could be accommodated and still be protective of river values if users packed in their own feed. (Additional limitations on commercial use in wilderness, including commercial overnight stock use, are described under “Management of Visitor Use and User Capacity,” below.)
 - Allow camping with stock only in two designated campsites that are located away from sensitive resources.
 - Restrict campsite access to only approved routes found suitable to protect natural and cultural resources.
 - Restrict grazing to certain locations found suitable to protect natural and cultural resources.
- Restore localized areas previously disturbed by human and pack stock use in Lyell Canyon, using techniques that meet the minimum-requirement criteria established under the Wilderness Act.

Biological Value: Low-Elevation Riparian and Meadow Habitat

- Make informed recommendations for water releases from O'Shaughnessy Dam that would provide maximum ecological benefits to the river-dependent ecosystems downstream of the dam.

Cultural Value: Prehistoric Archeological Landscape

- Protect prehistoric archeological sites by diverting use away from sensitive areas.

- Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.

Scenic Value: Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne

- Continue to allow the natural scenery to evolve in response to natural ecological processes, with no management of scenic vistas.

Recreational Value: Wilderness Experience along the River

- Continue to manage overnight use in designated Wilderness through an overnight trailhead quota system (see “Maximum Amounts of Use,” below) to protect opportunities for solitude.
- Continue to maintain the formal trails through Lyell Canyon, the Grand Canyon of the Tuolumne, and Poopenaut Valley.

Management of Visitor Use and User Capacity

User capacity for the wild and scenic river corridor has two components: visitor use and administrative use. The corridor must be able to accommodate both capacities within the management standards for river values presented in chapter 5. In the discussion that follows, visitor use and associated visitor capacity is described first, followed by administrative use and associated employee capacity.

Kinds of Visitor Use

Individuals would continue to have opportunities for all the kinds of recreational activities that currently occur in wild segments of the river 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. (Commercial support for these recreational activities, including guided day hikes, overnight hikes, and overnight stock trips, and concessioner stock day rides would vary among the alternatives.) Some alternatives would add a new opportunity for limited recreational whitewater boating, which is currently prohibited on the Tuolumne River.

Maximum Amounts of Visitor Use and Management of Visitor Use Capacity

The day use capacity in wild segments of the river corridor would vary among the alternatives. Day visitors in the wild segments above Hetch Hetchy Reservoir access these segments from parking in the Tuolumne Meadows area; therefore, changes in use levels in the Tuolumne Meadows and Lower Dana Fork segments have the potential to affect use levels in the wild segments. Under all alternatives, the amount of day use in wild segments would be managed to stay within a management standard established to protect a wilderness experience along the river; the suite of potential management actions could include additional management of day parking or implementation of a day trailhead quota system (see chapter 5). Additional compliance with public involvement would be required before implementing a day trailhead quota system.

Overnight user capacity would continue to be managed through a system of zone capacities and related overnight trailhead quotas that currently accommodate a maximum of 350 backpackers per night above Hetch Hetchy Reservoir and a maximum of 50 backpackers per night below the reservoir (see table 8-2). Under any of the action alternatives, the zone capacities might be reduced in the future if it was determined that reductions were needed to protect wilderness character; however, they would not be increased above the current levels, which protect river values. The kinds and amounts of overnight use associated with the Glen Aulin High Sierra Camp would vary among the alternatives.

Administrative Use

Administrative use is a separate user capacity issue that primarily relates to employee housing and associated implications for water consumption and wastewater treatment within the corridor. The only employee housing in wild segments would be at the Glen Aulin High Sierra Camp. The number of employees housed at Glen Aulin would vary by alternative, depending on the levels of visitor use and water consumption prescribed by each alternative.

Glen Aulin (Potential Wilderness Addition)

The Glen Aulin High Sierra Camp would be managed differently under alternatives 1–4; however, whether the camp remained, was reduced in size, was converted to a temporary outfitter camp, or was completely demolished and removed (these are the management options considered in the alternatives), ecological restoration would be undertaken to mitigate current impacts on wetlands and riverbanks. Although the habitats at Glen Aulin have not been identified as an outstandingly remarkable value of the river, all federal land managers are directed to protect wetlands under Executive Order 11990 (“Protection of Wetlands”). In addition, riverbank restoration would help to enhance the free-flowing character of the river. Detailed direction for this work is provided in the *Ecological Restoration Planning Report*, which is summarized in chapter 5 and appended to this document as appendix H. The actions that would occur under any of the action alternatives are summarized below:

- Remove any impacts on wetlands and restore currently affected areas to natural conditions.
- Reroute the heavily used trail out of the fragmented wetland to a less-sensitive upland area.
- Revegetate the historic corral on the granite bench that once was an extension of a delineated wetland.
- Revegetate, stabilize, and protect denuded riverbanks on the Tuolumne River.

The following management of the backpacker campground would be common to all the action alternatives:

- Retain the backpacker campground to accommodate no more than 50 people per night (based on the capacity of the Glen Aulin wilderness zone).¹ This zone capacity, which would be protective of river values, would be managed through the trailhead quota system. The capacity might be reduced (but not increased) in the future if it was determined that a reduction was needed to protect wilderness character.
- Replace the aging composting toilet at the campground to adequately handle waste loads and reduce the risk to water quality.

¹ Because Yosemite restricts backcountry use by trailhead, not by site, it is difficult to estimate the capacity of this campground. However, because the majority of Glen Aulin zone users stay at the campground, while few who enter the river corridor from other trailheads pass through the Glen Aulin area, the Glen Aulin zone capacity suffices for a reasonable estimate of this campground’s capacity.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

Note that this discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. The portions of these segments within designated Wilderness would be managed the same as the wild segments.

Resource Protection and Enhancement

Free Flowing Condition

- Limit water withdrawals from the Dana Fork to 65,000 gallons per day, or 10% of the river's flow, whichever is less. (Under some alternatives, water use would be further reduced by reductions in the visitor use and administrative use capacities.)
- Upgrade the water distribution system to eliminate leaks and conserve water (see discussion of Tuolumne Meadows Site Plan," below).
- Continue to improve water conservation and sustainability practices, including installation of water meters, use of low-flow fixtures (including low-flow toilets and waterless urinals) throughout Tuolumne Meadows, and visitor and employee education, and identify and implement additional long-term water conservation measures. Long-term measures could include systems to reuse gray water and/or to catch and use rain water where feasible in new construction and major renovation of existing facilities. Gray water systems might require the replacement of flush toilets with composting toilets. These conservation practices are not reflected in the estimates of water consumption under each of the alternatives and would further reduce consumption upon implementation.
- Improve the storage capacity of the water storage system and implement best management practices to avoid any exceptionally high spikes in water withdrawals from the river to accommodate maximum water demand on peak days.
- Remove approximately 150 feet of boulder riprap from the riverbank near the campground A-loop road to allow the river to flow more freely.

Although it does not have a direct effect on free flow as defined by WSRA, the Tioga Road bridge at Tuolumne Meadows might cause the river to back up during periods of high flows and might contribute to accelerated flows downstream, as documented in chapter 5. Therefore, the bridge would be modified under all the action alternatives to improve its ability to accommodate peak flows. Any modifications to the bridge would be consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Secretary's Standards for Historic Properties) and in conformity with the *Yosemite Design Guidelines* (NPS 2011a). Safe pedestrian walkways would continue to be provided, as well as vehicle lanes. Modification of the bridge would require additional site-specific planning and compliance and would be subject to a section 7 determination as part of future planning and assessment.

Water Quality

- Upgrade utility systems to conserve water and protect water quality.
- Stabilize the road cut east of Tuolumne Meadows along Tioga Road to reduce erosion into the Dana Fork.
- Design and construct new and enlarged parking lots in ways that minimize stormwater runoff and impacts associated with the introduction of petroleum hydrocarbons into waterways.
- Continue best management practices to mitigate the potential for impacts on water quality associated with administrative and private stock use.
- Convert the pit toilet for winter skiers (behind the campground office in Tuolumne Meadows) to a vault toilet.

Biological Value: Subalpine Meadow and Riparian Complex

Alternatives 1–4 would protect subalpine meadow and riparian areas from visitor-related impacts by removing informal trails; mitigating the hydrologic impacts caused by historic trail segments; and eliminating all facilities except roads, trails, and some underground utilities from meadow and riparian areas. Detailed direction for this work is provided in the *Ecological Restoration Planning Report*, which is summarized in chapter 5 and included as appendix H. Referenced locations are shown on the Ecological Restoration map (figure 5-10) in chapter 5. Meadow and riparian areas would be further enhanced by ecological restoration projects designed to restore riparian vegetation to riverbanks; direction for this work is also provided in the *Ecological Restoration Planning Report*. Research would continue to identify and protect or reestablish the conditions necessary for the ecological recovery and long-term integrity of river-related habitats suspected of disruption by historic and contemporary human use, climate change, and other disturbances. Actions common to alternatives 1–4 are summarized below and described in greater detail in chapter 5 and appendix H:

- Eliminate undesignated roadside parking and associated informal trails at Tuolumne Meadows; continue to educate visitors about the importance of avoiding inadvertent impacts caused by foot traffic through sensitive meadow and riparian habitats, and enforce compliance with posted trail regulations.
- Remove nonhistoric structures inappropriately sited near the riverbank or in wet areas.
- Restore riparian vegetation along riverbanks.
- Mitigate effects of Tioga Road culverts.
- Mitigate effects of the Great Sierra Wagon Road.
- Conduct additional research to determine causes of altered riparian and meadow condition in Tuolumne Meadows. After research is conducted, conduct appropriate ecological restoration to restore meadow and riparian habitat. Techniques could include restoring meadow topography, planting, seeding, removal of sapling conifers, and exclusion of foot traffic as vegetation establishes.

Cultural Value: Prehistoric Archeological Landscape

- Protect prehistoric archeological sites by removing informal trails and managing visitor use to avoid sensitive areas.
- Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.

Cultural Value: Parsons Memorial Lodge

- Preserve Parsons Memorial Lodge through periodic assessments and appropriate treatments directed by the guidance for properties included in the NPS Facility Management Software System (FMSS).

Scenic Value: Scenery through Dana and Tuolumne Meadows

- Continue to allow the natural scenery to evolve in response to natural ecological processes. Vegetation removal for scenic vista management at specific vista points (see appendix I) would occur under some, but not all, of the action alternatives. However, the general mechanical removal of conifers to enhance meadow scenery would not occur under any alternative. (Mechanical removal of conifers to protect the meadows has recently been suspended and would not be resumed unless called for in ongoing studies in support of ecological restoration.)
- Mitigate human intrusions into views by eliminating undesignated roadside parking, removing informal trails, and restoring more natural conditions to many currently disturbed sites.
- Incorporate design elements, including material selection and landscaping, to minimize visual intrusions associated with all new or rehabilitated facilities.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

- Retain seasonal (generally late May or early June through October) recreational access to the river through Tuolumne and Dana Meadows by way of Tioga Road. Recreational opportunities afforded by this access include both scenic driving along the river and the opportunity to park and get out of cars to enjoy recreational experiences in a river-related landscape.
- Retain Tioga Road on its current alignment.
- Enhance the scenic driving experience by eliminating undesignated roadside parking.

(The alternatives of maintaining Tioga Road for year-round access and/or realigning Tioga Road through the Tuolumne Meadows area were considered but dismissed. See “Alternatives Dismissed from Further Consideration” at the end of this chapter for a discussion of these decisions.)

Management of Visitor Use and User Capacity

The following paragraphs discuss the management of visitor use and user capacity, which were introduced in chapter 5 (as part of the discussion of management standards for river values) and chapter 6 (as part of the discussion of visitor use and user capacity).

Kinds of Visitor Use

The primary differences among the alternatives involve the kinds and amounts of visitor use. These are discussed for each alternative and followed by a discussion of how that particular alternative would protect each river value.

Under all the alternatives, visitors would continue to have 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 under some, but not all, the alternatives.

Facilities and services are integral components of different kinds of visitor use and critical to managing user capacities because they can influence the way that public access to the river affects river values. The following examples illustrate how the character of visitor use is shaped by facilities and services, and how facilities and services in turn affect the protection of river values: Domestic water is a basic campground and lodging service; however, withdrawing too much water from the river to support these visitor services has the potential to adversely affect river flows. Providing designated parking lots and prohibiting undesignated roadside parking can protect subalpine meadows from damage associated with indiscriminate parking and informal trails; however, the ability to provide designated parking spaces is constrained by the limited land area outside the boundary of the Yosemite Wilderness and the requirement to avoid adversely affecting natural, prehistoric archeological, and scenic values through site development. Providing boardwalks can prevent visitors from creating informal trails in riparian areas; however, such facilities may change the character of the visitor experience. The availability of concessioner stock day rides may enhance the recreational experience for some visitors but detract from the experience of others.

The alternatives under consideration for the *Tuolumne River Plan* explore a reasonable range of services and facilities and associated visitor capacities for the Tuolumne Meadows and Lower Dana Fork segments, related primarily to balancing the following considerations in ways that would be protective of river values:

- amount of water withdrawal from the Dana Fork
- number of day parking spaces
- number of campsites at the Tuolumne Meadows campground
- number of tent lodging units at Tuolumne Meadows Lodge

- number of concessioner stock day rides

Winter Use

Regardless of which alternative is selected, visitor use of the river corridor during the winter will remain unchanged. It is Yosemite National Park policy to close the Tioga Road each winter after the first major snowfall and to manage the Tuolumne Meadows area and Glen Aulin as de facto wilderness. The alternative of keeping the Tioga Road open during the winter, or of extending the use season, has been dismissed as infeasible (see “Alternatives Dismissed from Further Consideration,” at the end of this chapter). In the winter, the recreational value of the Tuolumne Meadows and Lower Dana Forks segments shifts from river access via Tioga Road to a wilderness experience along the river. The snow season, which in the Yosemite high country usually extends from November to late May or early June, is a quiet time to enjoy solitude in the raw elements of winter. Visitor access to the high country in the winter is limited to cross-country skiing and snowshoeing. Snowmobiling as a mode of visitor access is not consistent with wilderness management and is prohibited by Yosemite National Park policy. Winter camping is regulated according to the wilderness overnight permit system.

Maximum Amounts of Visitor Use

The maximum number of people at one time in the river corridor would depend largely on the number of people entering the corridor in the Tuolumne Meadows and Lower Dana Fork segments via Tioga Road. As noted above, day visitors in the wild segments above Hetch Hetchy Reservoir access these segments from parking in the Tuolumne Meadows area. The number of visitors below (down river of) O’Shaughnessy Dam is minimal compared to the number of visitors above the reservoir. This section addresses the elements of user capacity that are common to alternatives 1–4 as they relate to the Tuolumne Meadows and Lower Dana Fork segments. A corridorwide user capacity for each alternative, which combines both the maximum day use and the maximum overnight use for both the scenic and the wild segments, is presented as part of the detailed description of each alternative (see tables 8-6, 8-9, 8-12, and 8-15 later in this chapter). A comparison summary of all the alternative user capacities is presented at the end of this chapter (table 8-19).

The maximum number of people at one time in the river corridor would vary among the alternatives. However, the method for calculating the maximum number of people at one time would be the same under all the alternatives and is summarized below.

Maximum Visitor Day Use

As a baseline for comparison with the action alternatives, the NPS estimated the maximum day use for the no-action alternative by starting with an actual vehicle count on a peak day during the peak season in 2011 and multiplying the number of parked cars attributed to day visitors by 2.9 persons per vehicle (additional information about this calculation is provided in appendix J). The maximum number of visitors who currently arrive by public transportation (tour bus, in-park shuttle, or regional transit) was added to this number to reflect the current maximum day use.

The NPS then used this current maximum day use as a baseline for assessing the maximum amount of use that could be accommodated while being protective of river values. The maximum day use under each alternative had to be protective of river values, with the primary constraints being limits on water consumption to protect streamflow and limits on facilities and foot and stock traffic to protect sensitive meadow and riparian habitats and water quality. These constraints provided the upper limits for each alternative. Working within these limits, NPS planners further adjusted the day use capacities for consistency with decisions about the character of the visitor experience under each alternative and the degree to which visitors might be self-sufficient and independent, as opposed to being assisted by services and facilities and more tolerant of higher use levels. When they had estimated the maximum day use capacities for each alternative, NPS planners could make more precise calculations of the number of day parking spaces and the public transportation service that would

support each level of use. The NPS adopted these facility capacities as the way to measure and manage the visitor use capacity (see “Management of Visitor Use Capacity,” below). If the NPS decided in the future to increase the use of public transit to reduce the park’s carbon footprint, it could increase the number of people arriving at Tuolumne Meadows by public transit, so long as the number of people arriving by private vehicle decreased. “Arriving” in this context would mean people finding designated parking spaces where they could leave their private vehicles and spend some time in the Tuolumne Meadows area; people driving through Tuolumne Meadows on the Tioga Road who do not park and leave their vehicles are not included in the user capacity calculations for the Tuolumne River corridor. The *Tuolumne River Plan* will not affect the amount of through-traffic on Tioga Road, and the amount of traffic on this highway might increase in the future, independent of the actions in this plan.

The maximum visitor day use is a capacity figure; the actual day use levels at any one time could be lower, depending on other factors, including time of day or day of the week.

Maximum Visitor Overnight Use

The overnight capacity of the Tuolumne Meadows and Lower Dana Fork segments is based on the combined capacities of the campground and the Tuolumne Meadows Lodge. These capacities would vary among the alternatives. Actual overnight use levels would be lower than these capacities because not all individual campsites and lodging units would be occupied by the maximum number of people allowable.

Management of Visitor Use Capacity

Management of Day Visitor Capacity

Under all the action alternatives, maximum day use capacity would be managed by restricting day parking to designated parking spaces and by managing the service levels of public transportation that delivers day visitors to the river corridor. The number of day parking spaces and the levels of public transportation service would differ among the alternatives, consistent with the differences in the proposed user capacity among the alternatives. In the future, more visitors could arrive by public transportation and fewer people could arrive by private vehicle, so long as the user capacity established through this plan was not exceeded.

The NPS selected a vehicle-based measure of the maximum number of people at one time who could be parked and out of their vehicles to express the standard for the maximum number of day visitors in the Tuolumne River corridor. Vehicle-based measures are widely accepted in scientific literature as an efficient and effective method for documenting and managing visitor use levels (Gramman 1992, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). They are particularly applicable to the Tuolumne Meadows area because (1) the primary means of access is by automobile and (2) the vast majority of visitors arrive in personal vehicles.

Maximum day use for alternatives 1–4 would be measured and managed by multiplying the number of day parking spaces that would be provided under each alternative by 90%, then multiplying that number of spaces by 2.9 persons per vehicle. The 90% factor is applied to account for the vacancy of a percentage of parking spaces after visitors leave and before new visitors find the empty spaces. The numbers of visitors who arrive by tour bus, in-park shuttle, or regional transit are also included in the total maximum day use for each alternative.

General information about parking and traffic conditions would be provided to visitors via the forthcoming parkwide traffic management and information system (see appendix L, “Cumulative Plans and Projects”). Parking areas would be designed to separate day and overnight visitors (either in separate or shared lots). Signs, discussions with staff at entrance stations and visitor contact stations, and notices in park literature would explain the rationale for changes in visitor use management and direct day and overnight visitors to appropriate parking. If no day parking spots were available, day visitors would be directed to another day use location outside the corridor.

If park visitation continued to increase, a parking reservation system would likely be needed in the future. However, because such a system would have to be implemented on a parkwide basis, planning and compliance for this management action would be deferred until comprehensive management planning has been completed for the Tuolumne and Merced Wild and Scenic Rivers. If a reservation system was needed, more detailed planning for the system would occur after the capacities had been established for the Tuolumne and Merced Rivers corridors and the park staff had gained some experience with managing for the user capacities established through those plans. In the meantime, park staff would monitor how well the designated parking at Tuolumne Meadows was serving to manage the day visitor capacity in the Tuolumne River corridor.

In enforcing the visitor use capacities established under the *Tuolumne River Plan*, tactics that were least intrusive on the visitor experience (site design, orientation, education) would be implemented first; however, more intrusive tactics, including issuing and checking parking permits and ticketing illegally parked vehicles, would be implemented if determined necessary to ensure that visitor use remained within the established capacity.

Service levels of public transportation systems serving the Tuolumne Meadows area (the regional transit bus [YARTS], the hiker bus operated by the concessioner, and other transit services) would remain under NPS control, with the number of visitors delivered into the river corridor by such services managed according to the user capacity limits established for each alternative. The NPS may use any combination of limits on the numbers of buses, the stops they make, the number of passengers they accept, and/or the numbers of routes they run per day. Ridership on the two internal shuttle bus systems that circulate in the Tuolumne Meadows area (between the Tuolumne Meadows Lodge and Tioga Pass to the east and between the lodge and Olmstead Point to the west) is not included in the user capacity figures because these visitors are included in the day parking figures.

Management of Overnight Visitor Capacity

Overnight user capacity in the Tuolumne Meadows area would be managed by controlling the number of campsites/people per site in the campground and the number of lodge units at Tuolumne Meadows Lodge. Consequently, the amount of parking made available for overnight users would not be needed as a mechanism for enforcing overnight user capacity. Instead, the number of spaces related to the number of overnight visitors would be computed using a different set of criteria and assumptions from those used to compute the number of day parking spaces (see “Existing Visitor Parking at Tuolumne Meadows” under the no-action alternative for a discussion of overnight parking needs).

Kinds and Maximum Amounts of Administrative Use

Total maximum administrative use is expressed in terms of the number of employees (and related administrative personnel, such as partners and volunteers) who would be housed in the Tuolumne River corridor. Housing would vary by alternative, based on the level of visitor services to be provided and on-site development constraints. Before constructing new housing, park managers would examine the efficiency of using existing housing stock. Employees with temporary assignments at Tuolumne Meadows, but who had permanent housing assigned at White Wolf, Crane Flat, or Hodgdon Meadow, would be required to commute or be assigned to the Tuolumne Meadows housing designed for temporary, high-turnover occupancy. In some alternatives, campsites would meet the need for incidental “housing” for employees on temporary duty in the Tuolumne Meadows area.

The amount of employee parking for each alternative would be directly proportionate to the amount of housing provided, with about one parking space provided for each employee. Employees would be expected to park in their designated locations, within the housing areas shown for each alternative. Whenever employees were recreational visitors to the Tuolumne corridor, they and their vehicles would be subject to the overall visitor user capacity and parking restrictions.

Tuolumne Meadows Site Plan

The *Tuolumne River Plan* addresses site planning for Tuolumne Meadows by (1) identifying what facilities would be necessary to provide for public use or to protect river values under each alternative; (2) determining the feasibility of locating those facilities outside the river corridor; (3) for those facilities that must be located inside the corridor, identifying suitable locations that would be protective of river values; (4) establishing the allowable facility capacities (for example, the number of parking spaces, number of employee beds, or amount of water or wastewater to be treated); and (5) providing direction for site design based on protection of river values and desired visitor experiences.

The feasibility of locating the facilities necessary for visitor use and resource protection of the Tuolumne River in areas outside the river corridor boundary is severely constrained by the boundaries of the Yosemite Wilderness, which generally overlaps into the scenic segments of the river corridor. The only locations within the Tuolumne Meadows area that are outside both the river corridor and the designated Wilderness are shown on the Site Analysis map (see figure 8-3); the most suitable (for development) of these sites is currently occupied by the B–G loops of the campground.

All visitor facilities would comply with NPS and Yosemite policies and design guidelines governing protection of natural and cultural resources, functionality, energy and water efficiency, and accessibility. Consistent with this guidance, all new construction and rehabilitation of existing facilities would incorporate technologies for conserving energy and water and minimizing environmental impacts to the extent possible within logistical and fiscal constraints. The following additional general direction about facilities and site design would be common to all the action alternatives.

Visitor Facilities

The following visitor facilities have been determined to be necessary under all the alternatives (except as noted):

- Visitor contact facilities are necessary to help visitors plan their visit and to educate visitors about resource protection.
- A wilderness center is necessary to more specifically support wilderness use and protection.
- A campground is necessary because Tuolumne Meadows is a major visitor destination that is far enough from most visitors' homes to necessitate an overnight stay in the vicinity. Camping is an integral part of a national park experience for many visitors, and the Tuolumne Meadows campground is an integral part of the campground system of Yosemite National Park.
- A campground office near the entrance to the campground is necessary to support campground management (camper check-in, fee collection, basic orientation).
- The Tuolumne Meadows Lodge is necessary to provide affordable accommodations for visitors who choose not to camp or who are unable to camp (for lack of equipment or experience). (As an exception to this determination, the lodge would be demolished and removed under alternative 1 to allow for a particular kind of visitor experience characterized by self-reliance and solitude. User capacities under alternative 1 would be substantially lower than the other alternatives, and no commercial services would be available.)
- The Glen Aulin High Sierra Camp is necessary to allow visitors with a broader range of physical abilities to enjoy a wilderness experience along the river. (As an exception to this determination, the camp would be demolished and removed under alternative 1 to allow for a particular kind of visitor experience characterized by self-reliance and solitude.)

Campground

The campground would be rehabilitated under all the action alternatives. All sites would be better delineated; roads in the campground would be resurfaced and improved; restrooms would be rehabilitated, with several new restrooms added to meet demand; and picnic tables and fire pits would be replaced as needed. Also, the adequacy of the campground wastewater collection system would be assessed and upgraded if necessary; leaking water and wastewater lines would be repaired or replaced; and low-flow fixtures would be installed in both new and existing restrooms. Such improvements would occur regardless of which alternative for campground capacity or general configuration was selected.

This action would require additional site-specific planning and compliance, tiering off the broad direction provided by this plan and the Campground Design Guidelines (included in appendix M) that have been developed to guide campground improvements. The first two desired conditions established by the guidelines are that (1) the campground's original rustic setting is restored and maintained and (2) the campground is dominated by natural sounds and scenery. The guidelines further specify that when replacing or adding comfort stations, the architectural scale, style, construction techniques, and building materials would be compatible with those used in the original CCC-era Tuolumne Meadows campground comfort stations.

Trails and Trailheads

Trails and trailheads are necessary to provide access while protecting resources. The following management of trails and trailheads would be common to alternatives 1–4:

- Retain Pothole Dome parking and trailhead on north side of Tioga Road, with no overnight parking at the trailhead. Designate a trail from the trailhead to the top of the cascade (where the river leaves the meadow); restrict trail use to foot traffic by small groups. Eliminate informal trails in this area, using barricades and signs as necessary until new use patterns are established.
- Restore the Cathedral Lakes trailhead to natural conditions and reroute the trail to a new trailhead near the parking at the location of the existing visitor center.
- Maintain the following sections of the Great Sierra Wagon Road beds through the Tuolumne Meadows area for trail use (now part of the Pacific Crest Trail); manage the trails to restore more natural meadow hydrology while protecting the historic character of the road bed:
 - section from Tioga Road to Parsons Memorial Lodge
 - section between Parsons Memorial Lodge and Lembert Dome
 - section from Lembert Dome to Tuolumne Meadows Lodge
- Maintain the trailhead at the base of Lembert Dome, which provides access to both the Lembert Dome trail and the trail to Parsons Memorial Lodge (as well as to the picnic area and restrooms there).
- Retain the trailhead for the Dog Lake and John Muir Trail and expand parking.
- Retain the Elizabeth Lakes trailhead.
- Provide a new trail connecting the campground with the area currently occupied by the store and grill (although the use of this location varies among the alternatives, it remains a visitor service area warranting trail access from the campground).
- Formalize the trail connecting the campground with the John Muir Trail.
- Maintain the formal trails radiating from Tuolumne Meadows trailheads through the Tuolumne Meadows, Upper and Lower Dana Forks, Lyell Fork, and Grand Canyon segments.

- Design or reconstruct trails in very wet sections to promote sheet flow, protect vegetation, and discourage multiple trail ruts. Some design guidelines are included in “Ecological Restoration Planning” in appendix H.

Fencing

Fencing would sometimes be necessary to protect resources, either temporarily (for example, during restoration work) or permanently (for example, to direct visitor use in heavily used areas). It might also be necessary for facility security (for example, to keep people away from wastewater containment ponds). Such fencing would be consistent with the *Yosemite Design Guidelines* (NPS 2011a), which provide specific guidance for minimizing impacts on resources and the visitor experience.

Parking

Day Parking

Day parking is necessary to provide access to trailheads and visitor facilities.

All day parking in the Tuolumne Meadows area would be confined to designated parking areas under alternatives 1–4. Curbing or other physical barriers that are consistent with the historic landscape would be installed along the shoulders of Tioga Road through Tuolumne Meadows to prevent undesignated roadside parking and associated informal trails across the meadows (large boulders are already in place along some sections of Tioga Road through Tuolumne Meadows).

Designated parking would be expanded to replace some or all of the eliminated undesignated roadside parking, depending on the alternative. Designated parking would be consolidated in locations determined to be protective of river values, primarily in upland areas away from the river and meadows, out of primary viewsheds, and without known archeological sites.

In addition to formal parking areas, four additional parking pullouts would be delineated along Tioga Road within the Tuolumne Meadows area to accommodate scenic viewing and traffic safety operations. The pullouts would be well-delineated to prevent encroachment of vehicles or foot traffic into the adjacent meadows. These pullouts would be posted for brief stops only, and the prohibition on parked vehicles would be enforced in these locations; therefore, the pullouts would not be counted as part of the day parking for Tuolumne Meadows. The pullouts would be on both the north and south sides of Tioga Road at locations west of the existing visitor center and near the campground D-loop road in locations that have historically been used for this purpose.

Undesignated roadside parking would continue to be allowed along Tioga Road west and east of Tuolumne Meadows.

Parking for two buses would be provided near the visitor center/visitor contact station under all the alternatives (although the location of this visitor facility and associated parking would vary among the alternatives). This would be the only location where buses would be allowed to park in the river corridor (although they would be allowed to use the temporary viewing pullouts).

Overnight Parking

Overnight parking is necessary to support overnight camping, lodging, and wilderness permit holders. Parking for people staying in the Tuolumne Meadows campground would be provided at the campsites; parking for guests at the Tuolumne Meadows Lodge would be provided at the lodge. Overnight parking for the Glen Aulin High Sierra Camp and for wilderness backpackers with overnight permits for trailheads above Hetch Hetchy Reservoir would be provided in designated parking areas at various locations in the Tuolumne Meadows area. Under all the action alternatives, the calculations of needed overnight parking would accommodate people

moving into and out of lodging on the same day and people who leave their cars for multiple days while backpacking in the wilderness and who often stay in the backpacker area of the campground on the night before and/or after their wilderness trip. (Hence some wilderness permit holders, as well as people moving into and out of lodge accommodations, overlap in their need for overnight parking).

Employee Parking

Employee parking is necessary to support visitor and administrative use. Under all alternatives, employee parking would be restricted to spaces designated for employees in housing and administrative/maintenance areas, and these spaces would be counted and managed separately from visitor parking. Employee parking would be sized to accommodate the employees stationed in Tuolumne Meadows for the full season, plus the small number of employees on temporary duty in the area.

Stables

An NPS stable is necessary to support wilderness patrol and trail maintenance. A concessioner stable is necessary to support the High Sierra Camps. Even if the Glen Aulin High Sierra Camp was closed (as proposed in alternative 1), other High Sierra Camps outside the corridor would continue to be supplied from the Tuolumne Meadows stable.

Park Operations

At this relatively remote location, administrative offices and maintenance facilities are necessary to support basic park operations, and the helipad at Gaylor Pit is necessary to support visitor protection operations.

Employee Housing

NPS employee housing is necessary to provide essential personnel for visitor and resource protection, interpretive and educational services, administration, and maintenance. Concessioner employee housing is necessary to support commercial services. The amount of housing needed would vary among the alternatives, depending upon the management of visitor use and user capacity.

For reasons described earlier, it would not be feasible to place the housing determined to be necessary in the Tuolumne Meadows area in a location outside the river corridor; however, housing retained would be limited to no more than the amounts specified in each alternative. Any additional housing for employees working in the Tuolumne Meadows area would have to be located elsewhere, either inside or outside the park. Decisions about any additional housing would require separate planning and NEPA/NHPA compliance.

To be consistent with the scenic river segment classification, new housing in the river corridor would be modest in scale and consistent with the Tuolumne Meadows Employee Housing Design Guidelines (see appendix M). New employee housing units would meet Occupational Safety and Health Administration (OSHA) codes and NPS standards for being “safe, sanitary, sited to avoid natural hazards, integrated into the park environment, and, to the best extent possible, energy efficient and cost-effective to maintain.”

Utility Systems

Domestic water and wastewater treatment systems are necessary to support visitor use at Tuolumne Meadows. The required capacity of the systems would vary, depending upon the management of visitor use and user capacity. The domestic water collection and treatment system is being upgraded independent of the *Tuolumne River Plan*, which includes upgrades to the water distribution lines and to the wastewater collection lines, wastewater treatment plant, and wastewater disposal system. Future site-specific planning and compliance would be required for these utilities and would be a high priority after approval of the *Tuolumne River Plan*. Facility design and capacity would adhere to the land use assignments and capacity decisions outlined in the *Tuolumne River Plan*. The following actions would be common to alternatives 1–4.

Tuolumne Meadows Wastewater Collection, Treatment, and Disposal

- Upgrade the wastewater treatment plant, while employing tertiary treatment technologies in compliance with current California wastewater treatment codes, on the south side of Tioga Road in the area currently used for wastewater collection and treatment, which has been determined to be protective of river values. Even though the location is not within the 100-year floodplain, design the plant to resist damage from flooding.
- Replace the aging wastewater lines as needed.

Tuolumne Meadows Water Collection, Treatment, and Distribution

- Upgrade the water distribution system to eliminate leaks and conserve water.
- If a suitable alternate source of water were to be determined in the future, remove the Dana Fork collection diversion and restore the river to natural conditions at that location.

Site Restoration

Under all alternatives, all facilities except roads, trails, and some underground utilities would be removed from meadow and riparian areas, and the sites would be restored to natural conditions following the applicable recommendations in the *Ecological Restoration Planning Report* (described in greater detail in chapter 5 and appendix H). Specific sites that would be restored under all the action alternatives are listed below:

- sites disturbed by undesignated roadside parking and informal trails
- the site of the nonhistoric concessioner employee housing behind the store and grill
- the site of the nonhistoric concessioner employee housing near the river at Tuolumne Meadows Lodge
- the sites of three nonhistoric visitor tent cabins closest to the river at the Tuolumne Meadows Lodge

Site Suitability: Tuolumne Meadows

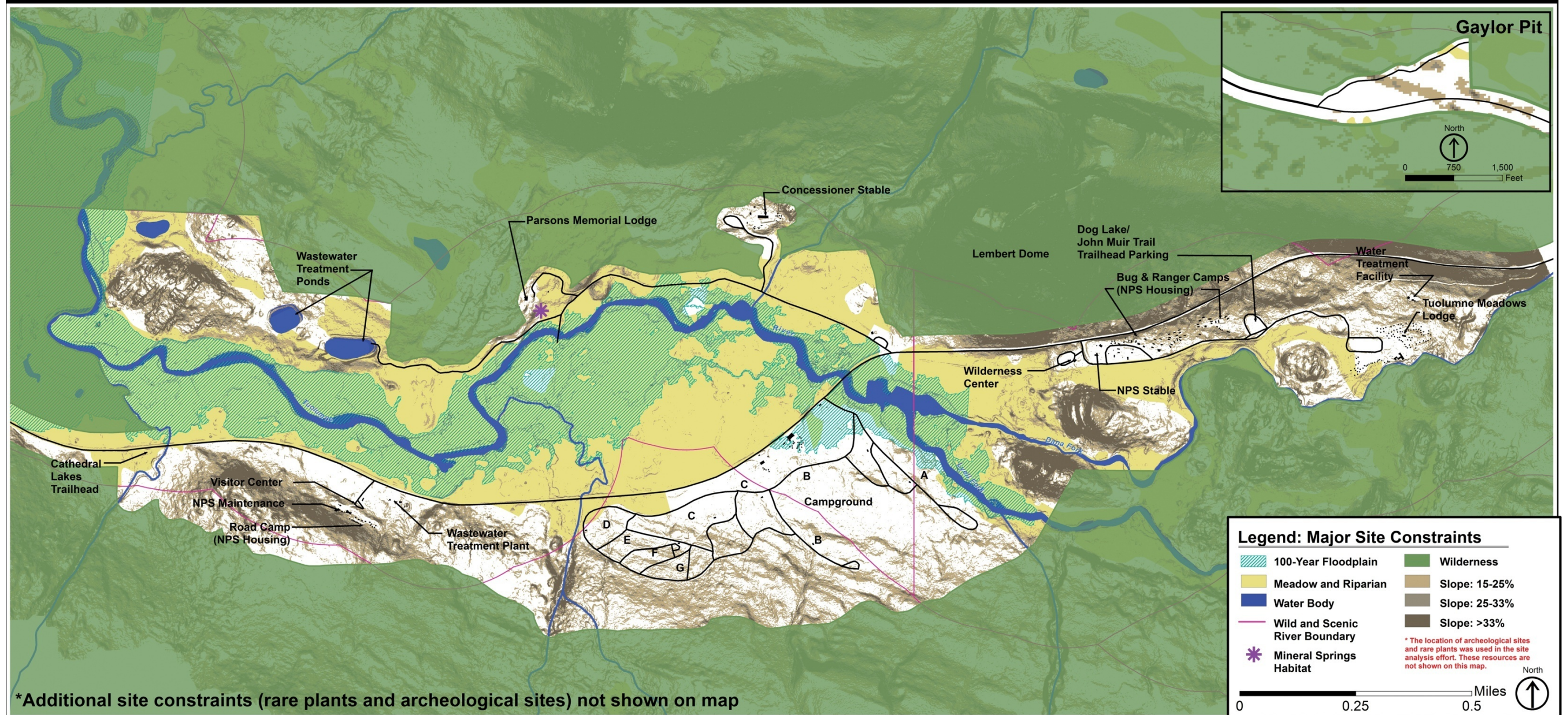


Figure 8-3. Site Analysis: Tuolumne Meadows.

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Scenic Segment (Below O’Shaughnessy Dam)

Except for the effect of O’Shaughnessy Dam on the river’s free flowing condition, no concerns related to river values have been identified for this segment of the river. The effect of the dam is addressed under the Poopenaut Valley segment as it relates to the outstandingly remarkable biological values downstream of the dam. No outstandingly remarkable biological, geologic, scenic, or recreational values have been identified in the Below O’Shaughnessy Dam segment. One prehistoric archeological site that might contribute to outstandingly remarkable cultural values of the river corridor is within the segment boundary. The site has been affected by road construction and is potentially at risk from impacts related to construction or maintenance projects, which would be subject to compliance with the 1999 programmatic agreement between Yosemite National Park, the Advisory Council on Historic Preservation (ACHP), and the California state historic preservation officer (SHPO) (included in appendix D) or other consultation procedures consistent with NHPA section 106, as agreed to through consultation with the SHPO and other interested parties. Because no change in the management of this segment is anticipated, it is not included in any further discussion of the alternatives.

Summary of Protection and Enhancement of River Values under All Action Alternatives

Section 10(a) of WSRA requires managers to “protect and enhance the values which caused [the river] to be included in [the wild and scenic rivers] system.” The 1982 Secretarial Guidelines (USDI and USDA 1982) indicate that the nondegradation and enhancement standard for the outstandingly remarkable values of a wild and scenic river is initiated at time of designation. If the value was protected at the time of designation and the trend associated with the impacts of the alternative would maintain or improve a high-quality condition, the value would be protected or enhanced. If the condition at the time of designation was threatened, then the value would be protected or enhanced if the alternative would result in an upward trend in quality that would eventually result in a high-quality condition being achieved.

Consistent with section 10(a) of the Wild and Scenic Rivers Act, the alternatives give primary emphasis to protecting the river’s “aesthetic, scenic, historic, archeological and scientific [biological, geologic, and hydrologic] features” by proposing actions that would be taken to address the management and localized concerns identified for these values and to meet the management objectives established for them. Such actions would include both management of natural and cultural resources and management of visitor use and development to protect river values. Generally, the resource management actions are common to all alternatives, while the management of visitor use and development differs among the alternatives.

Major constraints on kinds and amounts of visitor use in the Tuolumne River corridor are (1) the protection of the free-flowing condition of the river, which constrains the amount of water that can be withdrawn for domestic use at Tuolumne Meadows; (2) protection of water quality, which constrains the disposal of wastewater and other risks to water quality at Tuolumne Meadows and Glen Aulin; (3) protection of subalpine meadow and riparian habitat, which constrains facility development, foot traffic, and stock use in these sensitive habitats; (4) protection of prehistoric archeological sites, which constrains facility development and foot traffic in areas where sites are located; and (5) protection of river-related recreational experiences, which constrains the character of services and facilities and the amount of use that can be accommodated before crowding is perceived.

Resource management actions that would be taken under all of the action alternatives to protect or enhance river values are summarized below and in table 8-5 at the end of this section. See also table 8-18 at the end of this chapter, which compares and contrasts all of the actions that would be taken under each alternative to protect and enhance river values.

Free-Flowing Condition of the River

Tuolumne River flows below O'Shaughnessy Dam were altered by the dam at the time of designation and would remain altered by dam operations under all the alternatives. However, the NPS is working with the SPPUC and others to make informed recommendations for water releases from the dam that would more closely mimic natural flows while meeting the City of San Francisco's mandates for water supply and power generation. Draft recommendations for water releases from the dam have been reviewed by stakeholders, but the final recommendations have not yet been completed, nor have they been adopted by the SFPUC. When recommendations are approved, this action is expected to result in an upward trend in, and enhancement of, the currently altered free-flowing condition of the river below O'Shaughnessy Dam. Monitoring of river and groundwater levels and river-associated habitats would continue to inform this management.

The recent study of the effect of water withdrawals in the Tuolumne Meadows area on low flows and downstream habitat concludes that withdrawals of no more than 10% of low flow would have only a minimal impact on downstream habitat (Waddle and Holmquist 2013). Based on the conclusions of this study, the standard for protecting river flows has been set at withdrawals of no more than 10% of minimum flows or 65,000 gallons per day, whichever is less. Withdrawals of 65,000 gallons per day would approximate 10% of flow at 1 cubic foot per second (see chapter 5). All the action alternatives would be required to meet this management standard. Long-term monitoring of river flows would identify whether flows were declining from current levels as a result of natural cycles or climate change, in which case water withdrawals would be adjusted as necessary, with associated adjustments in visitor services, to ensure that they stayed below 10% of minimum flows.

The boulder riprap would be removed from an approximately 150-foot length of riverbank near the campground A-loop road to allow the river to flow more freely.

Water Quality

Risks to water quality in the Tuolumne Meadows area would be reduced under all the action alternatives by upgrading the utility systems, including upgrading the wastewater treatment plant to modern treatment codes; the amount of wastewater treated and the associated facility design would vary by alternative. The pit toilet for winter skiers (behind the campground office in Tuolumne Meadows) would be converted to a vault toilet. The road cut east of Tuolumne Meadows along Tioga Road would be stabilized to reduce erosion into the river, which creates high levels of turbidity at the Dana Fork intake. Best management practices to mitigate the potential for impacts on water quality associated with stock use, including manure removal, would be continued under each alternative; the kinds and levels of stock use would vary by alternative. Long-term monitoring would continue to test for nutrients, *E. coli*, and petroleum hydrocarbons, and any decrease in water quality associated with any of these indicators would trigger action to address the concern before an adverse impact occurred.

Biological Value: Subalpine Meadow and Riparian Complex

The subalpine meadow and riparian complex was undergoing changes in ecological integrity at the time of designation that continue today. As described in chapter 5, the impacts of historical sheep grazing coupled with the emerging stress of global climate change and more frequent periods of low precipitation, and exacerbated by foot traffic and pack stock use in sensitive meadow habitats, appear to be resulting in diminished ecosystem function in the subalpine meadow and riparian habitats in the Tuolumne Meadows area.

Resource management activities in the subalpine meadow and riparian complex under all the action alternatives would focus on improving the ecological resistance and adaptive capacity of the meadows by mitigating past and ongoing disturbances to hydrology, vegetation, geomorphology, and soils:

- Establishing willows along the riverbanks would help stabilize the banks and reduce unnatural shoreline erosion, which is likely causing widening of the river channel. A more natural, narrower, and deeper channel would maintain a higher river stage for any given flow volume and sustain the relatively high water table critical to meadow vegetation.
- Improving Tioga Road culverts and restoring more natural contours to the trails that follow the roadbed of the historic Great Sierra Wagon Road would allow more natural sheet flows across the meadows, thereby improving the distribution of nutrients and increasing soil moisture and groundwater levels.
- Removing, crushing, or filling old, unused underground utility lines would mitigate or eliminate their potential impact on subsurface water flow beneath the meadows.
- Research would explore new techniques to restore belowground biomass, soil-forming processes, and stability of the prehistoric meadow vegetation.

The intent of this management would be to facilitate the recovery of more natural hydrologic and biological processes needed to sustain the subalpine meadow and riparian complex within the river corridor. These actions would result in an upward trend in, and enhancement of, the meadow and riparian habitats in the Tuolumne Meadows area.

In addition to the above resource management actions, visitor use would be managed under all the action alternatives to reduce the stress on the meadow and riparian complex. Visitor use accommodated in portions of the Tuolumne River corridor that have subalpine meadow and riparian habitats currently reaches a maximum of about 4,000 people at one time during the peak use period. This use is concentrated in the Tuolumne Meadows area, from which visitors disperse to the Lyell Fork, the Dana Fork, and the Grand Canyon segments. Subalpine habitats in less heavily used portions of the corridor, principally along the Lyell and Dana Forks, are experiencing some localized, minor impacts associated with foot traffic and stock use in Lyell Canyon. In the Tuolumne Meadows area, the current kinds and amounts of use are causing numerous informal trails, which result in vegetation trampling, soil compaction, and fragmentation of subalpine meadow and riparian habitat. These impacts likely contribute to the unusually high levels of bare ground, changes in vegetation, and loss of willows along riverbanks.

Foot traffic in sensitive meadow and riparian areas would be greatly reduced under all the action alternatives by prohibiting undesignated roadside parking, removing informal trails and restoring disturbed areas to natural conditions, directing visitors to formal trailheads and trails adjacent to designated parking areas, and prohibiting high-impact activities in meadows and along riverbanks. All facilities except roads, trails, and some underground utilities would be removed from sensitive meadow/riparian areas, and all retained or new facilities would be located in upland areas to reduce the trampling pressure on sensitive wet soils and associated vegetation.

Reducing informal trails and achieving and maintaining a protective standard for unfragmented expanses of meadow habitat (as measured through a *largest patches index*) is considered critical to achieving the management objectives for the subalpine meadow and riparian complex. Therefore, this measure has been chosen as a key indicator of whether user capacity is protective of this river value (see chapter 5).

In Lyell Canyon, the amount and locations of stock use would be regulated under all the action alternatives to protect meadow and riparian vegetation. Resource managers have used meadow condition assessments and past research to identify a grazing capacity for meadows along the Lyell Fork of no more than 167–249 grazing-nights per season, depending on the year and its snowfall and rainfall patterns. Meadows receiving high stock use would continue to be monitored, and the capacity would be adjusted if necessary to ensure meadow protection.

These actions would be expected to reduce the stresses on the subalpine meadow and riparian system and, in conjunction with the resource management activities that would be common to all the action alternatives, to mitigate most of the ongoing disturbances to the subalpine meadow and riparian habitats at Tuolumne Meadows, thereby increasing their ecological resistance to the kinds and levels of use that would continue.

Monitoring would be ongoing to ensure that the protective standards for meadow and riparian habitat would be achieved and maintained over time. A suite of three indicators would be used to monitor the health and potential for impact on this complex river value. If conditions were declining for any one of these indicators, additional actions would be taken, including management of visitor use, as described in chapter 5.

Biological Value: Low-Elevation Riparian and Meadow Habitat

At the time of designation, river-dependent riparian and meadow habitat in Poopenaut Valley had been largely spared the severe impacts seen downstream of other dams because of several factors unique to this setting, and they remain some of the most diverse and productive communities in the park. These high-quality communities would be protected over the long term by mitigating ongoing disturbance to hydrology caused by O'Shaughnessy Dam. The intent of this management would be to provide maximum ecological benefits to the river-dependent ecosystems downstream of the dam, within the bounds of the Raker Act and NPS authority. Long-term monitoring of river and groundwater levels and river-associated habitats would continue to inform this management.

Cultural Value: Prehistoric Archeological Landscape

More comprehensive information is now available about the current condition of prehistoric archeological sites than was available at the time of designation. Because the condition of archeological sites cannot be enhanced, they would have been in the same or better condition at the time of designation compared to the current condition. As described in chapter 5, prehistoric archeological sites in developed areas continue to be at high risk for ongoing visitor- and construction-related impacts (including impacts from facility maintenance and repair). Almost all the sites in the meadows and along the river are affected by informal trails, many of which emanate from undesignated roadside parking and bring visitors close to sensitive prehistoric archeological sites. Several sites have evidence of camping and campfires. Many sites in Dana and Tuolumne Meadows are at risk of losing some of their integrity from ongoing visitor use impacts associated with nearby informal trails.

Under all the action alternatives, the potential for impacts related to informal trails would be reduced by eliminating undesignated roadside parking in the Tuolumne Meadows area and directing use to designated trailheads and trails. These actions would be expected to result in the protection of prehistoric archeological sites at their current levels of integrity, which for most sites has been evaluated as being in good or fair condition. As stated above, the condition of an archeological site cannot be enhanced (an upward trend in condition is not possible; only an upward trend in the level of protection). Periodic site condition assessments would be conducted as part of long-term monitoring and protective management. Any future downward trend in site conditions associated with human use would trigger a required management response to counteract or minimize the effect before an adverse impact occurred, as described in chapter 5.

Any sites that would be disturbed by construction activities would undergo archeological survey, data recovery, and/or mitigations (see the discussions of the prehistoric archeological landscape in chapter 5 and impacts on archeological resources in chapter 9).

Cultural Value: Parsons Memorial Lodge

Parsons Memorial Lodge had a high level of historic integrity at the time of designation, as it continues to have today. This national historic landmark would continue to be managed through periodic assessments and

appropriate treatments directed by the FMSS. This management would protect its high-quality condition. If future monitoring under the FMSS assessment program detected deterioration or damage, repairs would be undertaken to correct the deficiency while the structure was still in an overall good condition.

Scenic Values

Scenic views were of high quality at the time of designation, and they retain a high quality today, although some views in the Tuolumne Meadows and Lower Dana Fork scenic segments are being intruded upon by cars parked along Tioga Road and by encroaching vegetation. The outstandingly remarkable scenic values of the river corridor would be protected under all alternatives by protecting or enhancing the natural processes that have created them and by ensuring that development and undesignated roadside parking would not intrude into highly visible areas. The NPS would conduct a contrast analysis for all new structures and/or modifications of existing structures proposed for the Tuolumne River corridor to ensure that they remained within the established standards for protecting scenic values, as described in chapter 5.

Recreational Value: Wilderness Experience along the River

The wilderness overnight trailhead quota system would continue to help protect this outstandingly remarkable value, particularly on trail segments out of reach of day hikers entering the wilderness from Tuolumne Meadows. Encounter rates would be monitored over the life of the plan, and trailhead quotas would be modified or expanded to cover day use if necessary to protect the wilderness experience on popular day hiking and backpacking trails in wild river segments.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

Opportunities for scenic driving along Tioga Road would be enhanced by eliminating undesignated roadside parking and the congestion currently caused by vehicles slowing to park and pedestrians crossing the road. The effectiveness of using the day parking supply at Tuolumne Meadows to manage the day use capacity in all the river segments above Hetch Hetchy Reservoir would be monitored over time, and additional management action would be triggered if needed to enforce designated parking, as described in chapter 5.

Table 8-5.
Summary of Actions to Protect and Enhance River Values Common to Alternatives 1–4

WILD SEGMENTS	
Value	Action
Free Flowing Condition	<ul style="list-style-type: none"> Continue to work cooperatively with the SFPUC and others to inform releases from O'Shaughnessy Dam intended to more closely mimic natural flows.
Water Quality	<ul style="list-style-type: none"> Eliminate or mitigate the risk associated with wastewater disposal at the Glen Aulin High Sierra Camp. Replace the composting toilet at the backpacker campground at Glen Aulin.
Biological Values	Subalpine Meadow and Riparian Complex: <ul style="list-style-type: none"> Discontinue or reduce commercial pack stock use to reduce impacts on subalpine meadow/riparian areas. Restore localized areas previously disturbed by human use in Lyell Canyon using techniques that meet the minimum-requirement criteria established under the Wilderness Act.
	Low-Elevation Riparian and Meadow Habitat: <ul style="list-style-type: none"> Make informed recommendations for water releases from O'Shaughnessy Dam that would provide maximum ecological benefits to the river-dependent ecosystems downstream of the dam.
Cultural Values	Prehistoric Archeological Landscape: <ul style="list-style-type: none"> Protect prehistoric archeological sites by diverting use away from sensitive areas. Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.
Scenic Values	Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne: <ul style="list-style-type: none"> Continue to allow the natural scenery to evolve in response to natural ecological processes, with no management of scenic vistas.
Recreational Value	Wilderness Experience Along the River: <ul style="list-style-type: none"> Continue to manage overnight use in wilderness through an overnight trailhead quota system (see "Maximum Amounts of Use," below) to protect opportunities for solitude. Manage day use levels along wilderness trails within reach of day hikes from Tioga Road to achieve an encounter rate that is protective of a wilderness experience along the river (the maximum encounter rates for individual trail sections would vary among the alternatives).
SCENIC SEGMENTS	
Value	Action
Free Flowing Condition	<ul style="list-style-type: none"> Limit withdrawals from the Dana Fork to no more than 65,000 gallons per day or 10% of low flow, whichever is less. Continue to improve water conservation and sustainability practices, including installation of water meters, use of low-flow fixtures, and visitor and employee education, and identify and implement additional long-term water conservation measures. Remove the boulder riprap from approximately 150 feet of riverbank near the campground A-loop road to allow the river to flow more freely.
Water Quality	<ul style="list-style-type: none"> Upgrade the wastewater treatment plant to protect water quality. Repair, replace, or remove underground utility lines to conserve water and protect water quality. Stabilize the road cut east of Tuolumne Meadows along Tioga Road to reduce erosion into the Dana Fork. Continue best management practices to mitigate the potential for impacts on water quality associated with stock use.
Biological Values	Subalpine Meadow and Riparian Complex: <ul style="list-style-type: none"> Eliminate undesignated roadside parking and associated informal trails. Remove nonhistoric structures inappropriately sited near the riverbank or in wet areas. Restore riparian vegetation along riverbanks. Mitigate effects of Tioga Road culverts on surface flows into Tuolumne Meadows. Mitigate the effects of the Great Sierra Wagon Road bed on sheet flow across Tuolumne Meadows and on streamflow where the road approaches the Parsons Memorial Lodge footbridge. Conduct additional research to determine causes of altered riparian and meadow condition in Tuolumne Meadows. Increase interpretive programming to educate visitors about the fragility of meadow/riparian areas.
Cultural Values	Prehistoric Archeological Landscape: <ul style="list-style-type: none"> Protect prehistoric archeological sites by removing informal trails and managing visitor use to avoid sensitive areas. Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.
	Parsons Memorial Lodge: <ul style="list-style-type: none"> Continue to preserve Parsons Memorial Lodge through periodic assessments and appropriate treatments directed by the List of Classified Structures.
Scenic Value	Scenery through Dana and Tuolumne Meadows: <ul style="list-style-type: none"> Mitigate human intrusions into views by eliminating undesignated roadside parking, removing informal trails, and restoring more natural conditions to many currently disturbed sites.
Recreational Value	Rare and Easy Access to the River through Tuolumne and Dana Meadows: <ul style="list-style-type: none"> Retain seasonal (generally late May or early June through October) recreational access to the river through Tuolumne and Dana Meadows by way of Tioga Road. Recreational opportunities afforded by this access include both scenic driving along the river and the opportunity to park and get out of cars to enjoy recreational experiences in a river-related landscape. Retain Tioga Road on its current alignment. Enhance the scenic driving experiences by eliminating undesignated roadside parking.

Alternative 1: Emphasizing a Self-Reliant Experience

Alternative 1 builds upon all the major elements included in the *Tuolumne River Plan* to identify a set of management actions that would work together to protect river values while providing for a self-reliant visitor experience in a more natural setting.

Alternative 1 includes the technical correction to the river corridor boundary (presented in chapter 3), the section 7 determination process for evaluating water resources projects (presented in chapter 4), the management standards and actions for protecting and enhancing river values (presented in chapter 5), and the guidance for identifying an appropriate visitor experience and associated user capacity (presented in chapter 6). The site plan for Tuolumne Meadows reflects the facilities analysis in chapter 7.

Concept

Alternative 1 responds to those members of the public who expressed a desire for more wilderness-like management throughout the river corridor. It would restore conditions for primitive, unconfined recreation in an undeveloped natural area to much of Tuolumne Meadows and Glen Aulin.

The Tuolumne Meadows area would be the largely undeveloped gateway to a diversity of wilderness experiences characterized by self-reliance and unconfined exploration. Visitors could enjoy the unspoiled scenery from the roadside; participate in an interpretive program; go for a stroll along the river; have an informal picnic on a granite slab; go rock climbing, fishing, wading, or swimming; enjoy a day hike to a subalpine lake; camp in the campground; or embark on a multiday backpacking or stock packing trip. Parking, trailheads for staging wilderness trips, and the facilities needed to support a variety of interpretive and educational programs would be provided in upland areas beyond the periphery of the meadows; however, most commercial services, including the Tuolumne Meadows Lodge, grill, mountaineering shop, and public fuel station, would no longer be available, thus requiring visitors to be self-reliant and prepared in advance for a trip to Tuolumne Meadows. The meadows themselves would remain wild, providing opportunities for primitive, unconfined enjoyment of the river and its surroundings.

The Glen Aulin High Sierra Camp (a potential wilderness addition) would be demolished; the area would be restored to natural conditions and would be eligible for inclusion in the Yosemite Wilderness. The backpacker camp would remain.

River values would be protected and enhanced by greatly reducing the footprint of development, by restoring ecological conditions to meadow and riparian areas at Tuolumne Meadows, by greatly reducing demands for water supply and wastewater treatment, and by eliminating most risks to water quality (see “Summary of Protection and Enhancement of River Values under Alternative 1” at the end of this alternative section).

The visitor use capacity under alternative 1 would be reduced to a maximum of 3,215 people at one time, as shown in table 8-6. Actual day use levels would be lower during nonpeak periods, and actual overnight use levels would be lower even during peak periods because not all individual campsites would be occupied by the maximum number of people allowable. Administrative use capacity under alternative 1 would be reduced to a maximum of 102 employees at one time (table 8-6).

In comparison to no action, alternative 1 would include the following actions:

- Restore previously disturbed ecological conditions to subalpine meadow and riparian areas.
- Reduce risks to stream flow and water quality.
- Increase protection of archeological sites and resources important to American Indians.
- Retain all current recreation opportunities except concessioner day rides and commercial use.
- Eliminate all lodging and commercial services, demolishing and removing the structures, and reduce the size of the Tuolumne Meadows campground.
- Demolish the Glen Aulin High Sierra Camp.

Table 8-6.
Corridorwide Visitor and Administrative Use Capacity, Alternative 1

Visitor Overnight Capacity					
River Segment	Existing Use Calculation	Current Maximum Overnight Visitors	Proposed Action	Units	Maximum Overnight Visitors, Alternative 1
Scenic Segments					
Tuolumne Meadows Lodge	# of lodging units (69) × max of 4 people per unit	276	Eliminate lodge (minus 69 guest tent cabins).	0 guest cabins	0
Tuolumne Meadows Campground	# of campsites (329 sites × max of 6 people per site, plus 7 group sites × max 30 people per site)	2,184	Eliminate 67 A-loop campsites.	262 sites plus 7 group sites	1,782
Wild Segments					
Glen Aulin HSC	# of lodging units (8) × max of 4 people per unit	32	Eliminate Glen Aulin HSC (minus 8 guest tent cabins).	0 guest cabins	0
Wilderness	Maximum capacity of wilderness zones (400)	400	Retain current wilderness zone capacities.	–	400
Subtotal, Visitor Overnight Capacity		2,892			2,182
Visitor Day Use Capacity					
River Segment	Existing Use Calculation	Maximum Observed People At One Time, 2011^a	Proposed Action	Proposed Units	Maximum People At One Time, Alt. 1
Scenic Segments					
Access from Tuolumne Meadows	# of cars parking in designated parking spaces (340) × 2.9 ^b	986	Reduce designated day parking (minus 35 spaces).	305 spaces at 90% occupancy × 2.9 ^b	796
	# cars parking in undesignated spaces (190) × 2.9 ^b	551	Eliminate undesignated roadside parking.	–	0
	Maximum people arriving by in-park hiker bus, tour buses, and regional public transit	225	Maintain current level of arrivals via tour bus and regional public transit.	–	225
Access from Below O'Shaughnessy Dam	# of cars parking in designated spaces (4) × 2.9 ^b	12	Retain existing parking.	4 spaces × 2.9 ^b	12
Subtotal, Visitor Day Use Capacity		1,774			1,033
Total Visitor People At One Time		4,666			3,215
Administrative Capacity					
River Segment	Existing Use Calculation	Maximum Employees (existing)	Proposed Action	Units	Maximum Employees, Alt. 1
Wild Segments					
Concessioner	Approximately 9 employees at Glen Aulin HSC	9	Eliminate employee housing at Glen Aulin HSC.	0	0
Scenic Segments					
NPS	Approximately 150 employees based at Tuolumne Meadows	150	Meet staffing need with 100 employees at Tuolumne Meadows.	100 employees	100
Concessioner	Approximately 103 employees based at Tuolumne Meadows	103	Meet staffing need with 2 employees at Tuolumne Meadows.	2 employees	2
Total Administrative People At One Time		262			102
Total People at One Time		4,928 (existing)			3,317 (proposed)

a The peak number of vehicles observed during vehicle counts in 2011 (observed on August 13, 2011).

b The vehicle occupancy rate is 2.9 people per vehicle, based on visitor studies conducted over the past 20 years that found an average vehicle occupancy ranging from 2.6 to 3.4 (Van Wagtenonk and Coho 1980, FHWA 1982, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

Abbreviations: HSC = High Sierra Camp; max = maximum; # = number.

Virtual Tour

Under alternative 1, the majority of facilities in Tuolumne Meadows would be removed, and many of the previously developed areas would be restored to natural conditions, creating opportunities for a more self-reliant visitor experience. Considerably fewer visitors would be present away from the highway. This section provides an overview of how visitors would experience Tuolumne Meadows and how administrative and visitor services would function.

Visitors entering Tuolumne Meadows from the west would be introduced to views of the meadows largely unobstructed by vehicles along Tioga Road because the majority of roadside parking would have been eliminated (with new subdued curbing or boulder placement preventing continued roadside parking). The partially gravel pullout on the north side of Tioga Road at Pothole Dome would be paved with designated parking for 20 vehicles and a formal trailhead to Pothole Dome. Four additional viewing pullouts would be located further east, on the north side of Tioga Road, so that visitors passing through could stop for photographs. The multiple informal social trails in the meadows would be restored to natural conditions, and the primary trail to Pothole Dome and the river would be delineated with rustic fencing and signs at the trailhead.

The large number of visitors coming to hike the Cathedral Lakes trail would no longer park along the road shoulder, but would instead be directed to a designated trailhead parking lot and picnic area near the existing visitor center. A new ½-mile trail segment would be constructed to connect the parking area with the Cathedral Lakes trail to the west. The NPS maintenance yard would remain at this location, and the CCC mess hall building, which currently houses the visitor center, would be repurposed to provide needed office space for NPS employees, while the visitor center would be relocated and combined with the wilderness center. NPS employee housing at Road Camp would be increased. The wastewater treatment plant, located to the east of the maintenance yard, would be upgraded in its present location to meet current treatment standards. Because the wastewater load would be reduced, all treatment could be consolidated at this site, and wastewater would no longer be pumped beneath the river to treatment ponds. The recreational vehicle dump station would remain near the wastewater treatment plant.

The store/grill, public fuel station/mountaineering shop, and nearby concessioner employee housing would all be demolished and removed, and the site would be converted to a day parking area with 50 spaces, a picnic area, and new restroom.

The campground would be upgraded but reduced in size. The A loop would be removed, and the total number of sites would be reduced to 262 sites (including 237 tent/RV sites, 4 horse campsites, and 21 backpacker sites), plus 7 group sites. Primary improvements would include upgrading and adding restrooms, relocating the entrance road and kiosk out of the floodplain, repairing the campground roads, formalizing camping spots to reduce resource damage, relocating campsites away from the river, and overhauling the water and wastewater lines as needed. A self-serve vending machine would be added for the purchase of firewood and ice. The campground office and trailhead parking for Elizabeth Lakes would remain.

The Lembert Dome parking area would be slightly reduced in size, with an improved picnic area and vault toilets. The concessioner stable would be reconfigured to also incorporate the NPS stable function, an action made possible by the elimination of concessioner stock day rides. Parking at Lembert Dome would continue to serve as a primary access point for the Glen Aulin, Young Lakes, and Dog Lake trails. Roadside parking from Lembert Dome to the concessioner stables would no longer be allowed. All of the facilities at the Glen Aulin High Sierra Camp would be demolished and removed, and the site would be restored to natural conditions. The backpacker campground at Glen Aulin would be retained.

Visitors seeking backcountry permits and information would continue to be served at a combined wilderness center and visitor contact station, where the parking would be expanded modestly to 89 spaces. The NPS employee housing at Ranger Camp would be expanded with modest new cabins, and the current health code issues associated with the proximity of some employee housing to the stable operation would be eliminated by moving the NPS stable to co-locate with the concessioner stable. The ranger station would remain in its current location. Employees would no longer be housed at Bug Camp, and the facilities would be removed. The parking for Dog Lake and the John Muir Trail, just to the east of Bug Camp, would be expanded.

The Tuolumne Meadows Lodge, parking, and employee housing would be demolished and removed, and the site restored to natural conditions.

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Protection and Enhancement

Free Flowing Condition

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Water Quality

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Close the Glen Aulin High Sierra Camp and restore the site to natural conditions, thereby eliminating the risk to water quality associated with the wastewater leach mound (see “Glen Aulin,” below).

Biological Value: Subalpine Meadow and Riparian Complex

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Discontinue all commercial use (except as needed for the concessioner to supply the High Sierra Camps outside the river corridor, see table 8-1) to reduce impacts on subalpine meadow/riparian areas. (Additional limitations on commercial use in wilderness are described under “Management of Visitor Use and User Capacity,” below).

Biological Value: Low-Elevation Riparian and Meadow Habitat

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Protect the prehistoric archeological site at Glen Aulin from impacts associated with the removal of the High Sierra Camp by conducting an NRHP site evaluation and data recovery if deemed necessary.

Scenic Value: Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Greatly reduce the signs of stock use on trails in wild segments by removing Glen Aulin High Sierra Camp (which would eliminate the need for stock to set up, take down, transport visitors to, and resupply the camp), eliminating concessioner stock day rides, and eliminating commercial outfitter stock trips in the river corridor. The concessioner would still be able to use stock on the Cathedral Lakes and Lyell Canyon trails to supply the High Sierra Camps outside the river corridor (see table 8-1).

Recreational Value: Wilderness Experience along the River

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Reduce the day use levels along the most popular wilderness trails within reach of day hikes from Tioga Road so that visitors encounter an average of no more than four other parties per hour on the two Lyell

Canyon trail sections (below and above the Ireland Lake junction) and on the Glen Aulin trail, and an average of no more than two other parties per hour on the Grand Canyon trail. This action would increase opportunities for solitude on those trails. The encounter rate for the Lyell Canyon and Glen Aulin trails would be more protective of solitude than the standards adopted for this river value in alternatives 2, 3, and 4 (8-12 encounters, depending on the trail section, as described in chapter 5) in keeping with the greater emphasis on solitude and self-reliance under this alternative. If monitoring determined that this level of use was being exceeded on some trails, day use wilderness trailhead quotas would be implemented for major trail segments, using a mixed first-come/first-served and advanced reservation system.

- Discontinue all commercial use in wilderness. Under this alternative, all concessioner stock day rides and all commercial outfitter day hikes, overnight hikes, and overnight stock trips would be eliminated to enhance opportunities for self-reliance and solitude in a wilderness setting and to reduce the rate of contacts between parties and with stock on trails.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

All commercial use would be discontinued in wild segments of the river corridor. This would include the Glen Aulin High Sierra Camp (see below), all concessioner stock day rides, and all commercial day hikes, overnight hikes, and overnight stock trips provided by guides or outfitters. All other existing activities would continue.

Maximum Amounts of Visitor Use

Maximum day use along the most popular wilderness trails would be limited as necessary to achieve an average of no more than four encounters with other parties per hour; on the trail through the Grand Canyon of the Tuolumne, the standard would be an average encounter rate of no more than two parties per hour.

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 reservoir). This capacity would be reduced if determined necessary to protect wilderness values; however, it would not be increased above this amount, which has been determined to be protective of river values. Overnight use at the Glen Aulin High Sierra Camp would be eliminated.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- The current overnight trailhead quota system would be retained to regulate overnight use in wild segments. If monitoring determined that encounters with other parties were exceeding an average of four per hour on the most popular trails and two per hour on the trail through the Grand Canyon, the NPS would increase monitoring, inform visitors about alternative trails within the corridor, and encourage visitors to hike during days and times of day at which lower encounter rates occur. If encounter rates increased despite these efforts, the NPS would establish a day use permitting system and make necessary changes in the backcountry quota system to better manage for opportunities for solitude.

Administrative Use

There would be no employees housed at Glen Aulin High Sierra Camp because the camp would be eliminated.

Glen Aulin (Potential Wilderness Addition)

The Glen Aulin High Sierra Camp and all infrastructure associated with it would be demolished, and its site would be restored to natural conditions, following the direction for removal of facilities provided in the *Ecological Restoration Planning Report* (see figure 8-4 and appendix H). Water would no longer be diverted from the Tuolumne River to support the camp, and no wastewater treatment or disposal facilities would be needed. The NPS would recommend to the Secretary of the Interior that the Glen Aulin potential wilderness

addition be declared part of the Yosemite Wilderness, as provided for in section 108 of the 1984 California Wilderness Act.

The wilderness character of the area would be protected as required by the Wilderness Act. The visitor experience in the Glen Aulin area would be like that in the rest of the Yosemite Wilderness, characterized by self-reliance and primitive and unconfined recreation. Day use would be expected to decrease commensurate with an overall reduction in day use in the Tuolumne Meadows area. Overnight use would be limited to camping in the backpacker campground and managed through the wilderness trailhead quota system, as described under “Actions Common to Alternatives 1-4.”

The estimated net construction costs for Glen Aulin under alternative 1 (including camp removal and replacement of the composting toilet at the backpacker campground) would be approximately \$0.9 million (see appendix N).

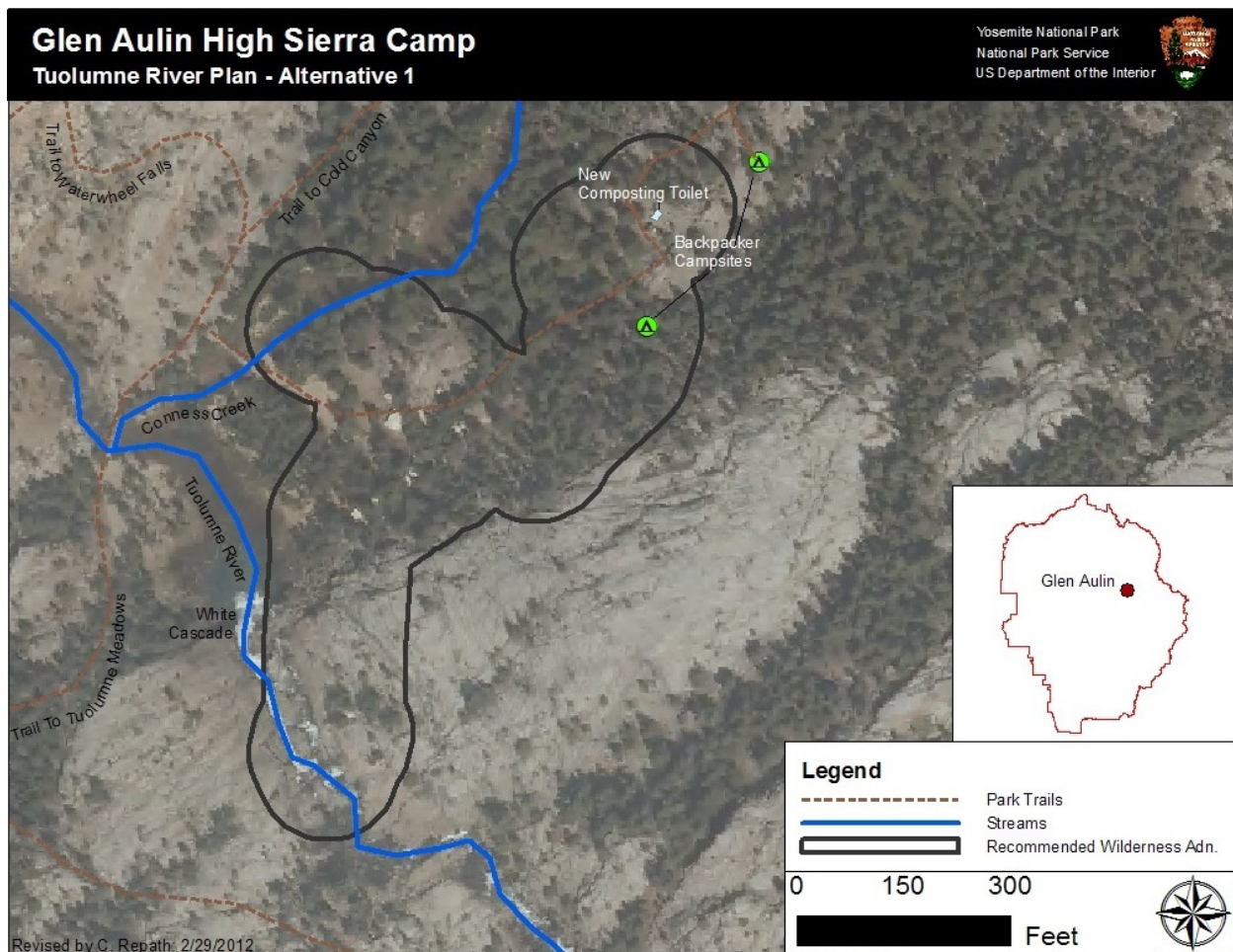


Figure 8-4. Glen Aulin Site Plan, Alternative 1.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

Note that this discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. The portions of these segments within designated Wilderness would be managed the same as the wild segments.

Resource Protection and Enhancement

Free Flowing Condition

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Reduce the average water demand to approximately 30,000 gallons per day, with rare spikes to about 44,000 gallons per day (see table 8-7).

Water demand figures for alternative 1 are based on a 34% decrease in visitor use compared to current use. No data have been collected that would distinguish between visitor and administrative use; therefore, visitor use data have been adopted as a proxy to estimate water consumption for both types of use.

Table 8-7.
Summary of Average Estimated Water Demand, Alternative 1

Month	No Action (current use)		Alternative 1 (34% reduction in use)	
	Average Daily use	Maximum Daily use	Average Daily use	Maximum Daily use
July	46,015	66,818	30,429	44,100
August	44,715	65,640	29,512	43,322
September	34,581	62,060	22,823	40,960

This level of water withdrawal would be expected to remain well within the standard of no more than 10% of low flow, even if climate change led to longer low-flow durations occurring earlier in the summer.

Water Quality

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Remove the wastewater containment ponds and sprayfields and replace them with new facilities (for serving the campground and the reduced employee housing) on the south side of Tioga Road to eliminate risk to water quality posed by these facilities. Eliminate the need to pump wastewater beneath the meadow from the treatment plant to the ponds and sprayfields.
- Discontinue concessioner stock day rides to reduce risks to water quality associated with stock use. Compared to current service levels, the amount of stock use on trails could be reduced by 3 two-hour and 2 four-hour rides per day, which might otherwise involve up to 14 head of stock per ride on the trails. Full-day rides, which occur only occasionally, would also be eliminated.
- Demolish and remove the public fuel station to eliminate the risk to water quality posed by this facility.

Biological Value: Subalpine Meadow and Riparian Complex

In addition to ‘Actions Common to Alternatives 1–4,’ beginning on page 8-21:

- Implement a riparian buffer to protect water quality and riparian habitat. All development within 100 feet of the river would be removed, and no new development would be allowed within 150 feet of the river, with the exception of boardwalks or similar facilities designed to minimize the effects of visitor use. The buffer would affect existing facilities at the Tuolumne Meadows campground, where campsites closer than 100 feet from the river would be eliminated, and at the Tuolumne Meadows Lodge, which would be demolished and removed (see “Tuolumne Meadows Site Plan,” below).
- Crush or remove the existing wastewater line that runs beneath the meadow from the treatment plant to the containment ponds.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Cultural Value: Parsons Memorial Lodge

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Scenic Value: Scenery through Dana and Tuolumne Meadows

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

Most ongoing recreational uses would continue. However, activities dependent on commercial services (rustic lodging and concessioner stock day rides), would be discontinued. The level of use would be reduced to enhance opportunities for solitude and to allow for unconfined travel in meadow and riparian areas that are easily accessible from Tioga Road, while being protective of river values. Educational messages would focus on the importance of protecting river values and Leave-No-Trace practices.

Visitor services would be managed as follows:

- Conduct orientation, interpretation, and education programs, with increased emphasis on education about the need to protect river values, at a combined visitor contact station/wilderness center and at Parsons Memorial Lodge, as well as in the field.
- Eliminate commercial services (lodge, store, grill, public fuel station, mountaineering shop and school, concessioner stock day rides) to enhance a visitor experience characterized by self-reliance. The post office function would be discontinued. Vending machines for ice and firewood would be provided at the campground office.
- Limit opportunities for overnight use to camping only (no lodging). Eliminate the A-loop of the campground and reduce the size of the campground to 237 car/RV sites, plus 4 horse campsites, 7 group campsites and 21 backpacker sites, to allow for the restoration of the area near the river and to reduce demands for water supply and wastewater disposal.
- Discontinue shuttle bus service between destinations within the Tuolumne Meadows area to enhance an experience characterized by self-reliance.

Maximum Amounts of Visitor Use

- Reduce maximum day use above the Hetch Hetchy Reservoir 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 prehistoric archeological sites, and to avoid perceptions of crowding along wilderness trails close to Tioga Road trailheads (see table 8-6; in this table, the total maximum day use number includes the maximum day use below O'Shaughnessy Dam, which would remain at 12 people at one time).
- Reduce the overnight capacity from 2,460 people per night to a maximum of 1,782 people per night (the reduced capacity of the campground) to allow for the restoration of the campground A-loop road nearest the river and to reduce demands for water supply and wastewater disposal (see table 8-6). Actual overnight use levels would be lower than these capacities because individual campsites would not always be occupied by the maximum number of people allowable.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

Day Use

Day use levels would be managed by controlling day parking, which would be restricted to paved or otherwise authorized spaces. The amount of designated day parking in the Tuolumne Meadows area would be reduced from 340 to 305 spaces. No undesignated roadside parking would be allowed through the Tuolumne Meadows area. Undesignated roadside parking would continue to be allowed along Tioga Road west and east of Tuolumne Meadows. (See parking details under “Site Planning,” below.)

Overnight Use

Overnight use levels would be managed by the facility capacity of the campground. Some campsites would continue to be available through a reservation system and some on a first-come, first-served basis.

Administrative Use

Commensurate with the discontinuation of commercial services, the number of NPS employees in the Tuolumne Meadows area would be reduced to a maximum of 100 people at one time, and the number of concessioner employees would be reduced to 2 people at one time (see table 8-6).

Tuolumne Meadows Site Plan

The locations identified below are illustrated on the site plan map (figure 8-5) at the end of this section. The estimated net construction costs for Tuolumne Meadows under alternative 1 would be approximately \$47 million, based on calculations included in appendix N.

Visitor Facilities

- Combine a new visitor contact station (to replace the existing visitor center) with the existing wilderness center. The facility analysis conducted for this plan (see chapter 7) determined that there is no feasible location for the wilderness center outside the river corridor. Consolidating a small visitor contact station with the wilderness center would make it possible for visitors to access NPS services at a single location and provide better separation between visitor services and operational functions.
- Eliminate all commercial facilities.
- Retain only those shuttle stops needed to serve passengers arriving on the regional transit bus [YARTS], the hiker bus operated by the concessioner, and other transit services.

Campground

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Design for a capacity of 237 car/RV sites, 4 horse sites, and 21 backpacker sites (all with a maximum capacity of 6 people per site), plus 7 group sites (with a maximum capacity of 30 people per site), for a maximum of 1,782 people.
- Demolish and remove the campground A-loop road and restore the area to natural conditions for day use.
- Retain the campground office and add vending machines for ice and firewood. Vending machines would not operate during quiet hours.
- Relocate the existing campground entrance road and kiosk out of the floodplain.
- Formalize a trail connection between the campground and the John Muir Trail.

Trails and Trailheads

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Eliminate vehicle access to Parsons Memorial Lodge, and convert the administrative access road to a trail for stock and hiking use only, to enhance the recreational experience characterized by self-reliance and to enhance meadow conditions.

Picnic Areas

- Retain the picnic area at Lembert Dome.
- Provide a small picnic area in association with the day parking at the site of the former store and grill.

Parking

The total number of designated parking spaces in the Tuolumne Meadows area (day and overnight) would be decreased from 533 to 481 spaces as shown in table 8-8.

Table 8-8.
Number of Parking Spaces in Designated Parking Areas, Alternative 1

Type of Parking	Current	Alternative 1	Description
Day Parking	16	20	existing parking area at Pothole Dome
	50	50	existing parking area at the current visitor center (new Cathedral Lakes trailhead)
	11	13	existing parking area at the campground office
	0	10	A-loop day use parking
	11	11	existing parking in the campground for the Elizabeth Lakes trailhead
	15	0	existing parking area at the fuel station
	51	50	existing parking area at the store and grill
	58	0	existing parking area at the concessioner stable
	29	25	existing parking area at the base of Lembert Dome
	7	7	existing parking area at the ranger station
	25	52	existing parking area at the Dog Lake/John Muir Trail trailhead
	67	67	existing parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	305	Total day parking
Overnight Parking (excluding cars parked in the Tuolumne Meadows campground)	58	89	existing parking area at the wilderness office
	33	68	existing parking area at the Dog Lakes/John Muir Trail trailhead
	0	19	relocated parking area for the Cathedral Lakes trailhead
	102	0	Tuolumne Meadows Lodge
	193	176	Total overnight parking
	533	481	Total day and overnight parking

NPS and Concessioner Stables

- Co-locate the NPS and concessioner stables at the current site of the concessioner stable. Because day rides would be discontinued, concessioner use of the facilities would be limited to pack stock needed to supply the Vogelsang, May Lake, and Sunrise High Sierra Camps. Although the amount of concessioner stock would be greatly reduced, concessioner use of the stable would remain necessary to avoid a safety hazard associated with frequently trucking the animals. Housing for all but two stable employees would be eliminated under this alternative.
- Reserve the current site of the NPS stable for NPS employee housing.

Park Operations

In addition to "Actions Common to Alternatives 1–4," beginning on page 8-21:

- Retain the ranger station.
- Retain the search-and-rescue cache at Ranger Camp.
- Retain the aboveground diesel fuel tank at the ranger station for concessioner and NPS use.
- Adapt the CCC mess hall building (current site of the visitor center) for park operations, to provide the administrative facilities determined to be necessary to support visitor use and resource protection, but which would be infeasible to locate outside the river corridor.
- Adapt the current site of the NPS stable for expansion of NPS employee housing at Ranger Camp.

Employee Housing

- Reduce NPS employee housing to accommodate 100 employees, which is the number determined to be necessary in the Tuolumne Meadows area to support the kinds and levels of visitor use included in this alternative. It would be infeasible to locate this housing outside the river corridor due to site constraints; therefore, it must be inside the corridor. To protect river values, the housing would be provided at the following locations determined not to contain river-related or sensitive resources:
 - Road Camp (30 employees)
 - Ranger Camp (70 employees)
- Eliminate all concessioner services and most concessioner employee housing; provide hard-sided cabin for two concessioner stable employees at the stable.

Utility Systems

The general direction for site-specific planning for utility systems under alternative 1, intended to protect and enhance the river's free-flowing condition, water quality, and outstandingly remarkable values, is outlined below. Pending additional site-specific planning, it is currently projected that with known technology, the amount of wastewater to be treated under this alternative could be treated and disposed through new facilities on the south side of Tioga Road, thereby allowing the removal of the ponds and sprayfields on the north side of the road. This would eliminate the need to pump wastewater beneath the river and meadow to treatment and disposal facilities on the north side of Tioga Road.

Tuolumne Meadows Wastewater Collection, Treatment, and Disposal

- Upgrade wastewater treatment plant; design for a maximum water demand of 44,000 gallons per day.
- Remove the wastewater containment ponds and sprayfields from the north side of Tioga Road and replace with facilities on the south side of the road, to be designed in conjunction with the new wastewater treatment plant. If additional space was needed, site analysis of the location east of the existing facility has determined that this would be a suitable location.

- Remove the administrative access road to the containment ponds and restore the site to natural conditions.
- Crush or remove the wastewater line that runs beneath the river and meadow between the existing wastewater treatment plant and the containment ponds.

Site Restoration

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21, restore the following additional sites to natural conditions:

- the site of the entire Tuolumne Meadows Lodge, including the entrance road
- the sites of all eliminated or relocated concessioner employee housing
- A portion of Bug Camp not needed for parking expansion
- the site of the public fuel station and mountaineering shop
- the sites of the wastewater containment ponds, sprayfields, and access road

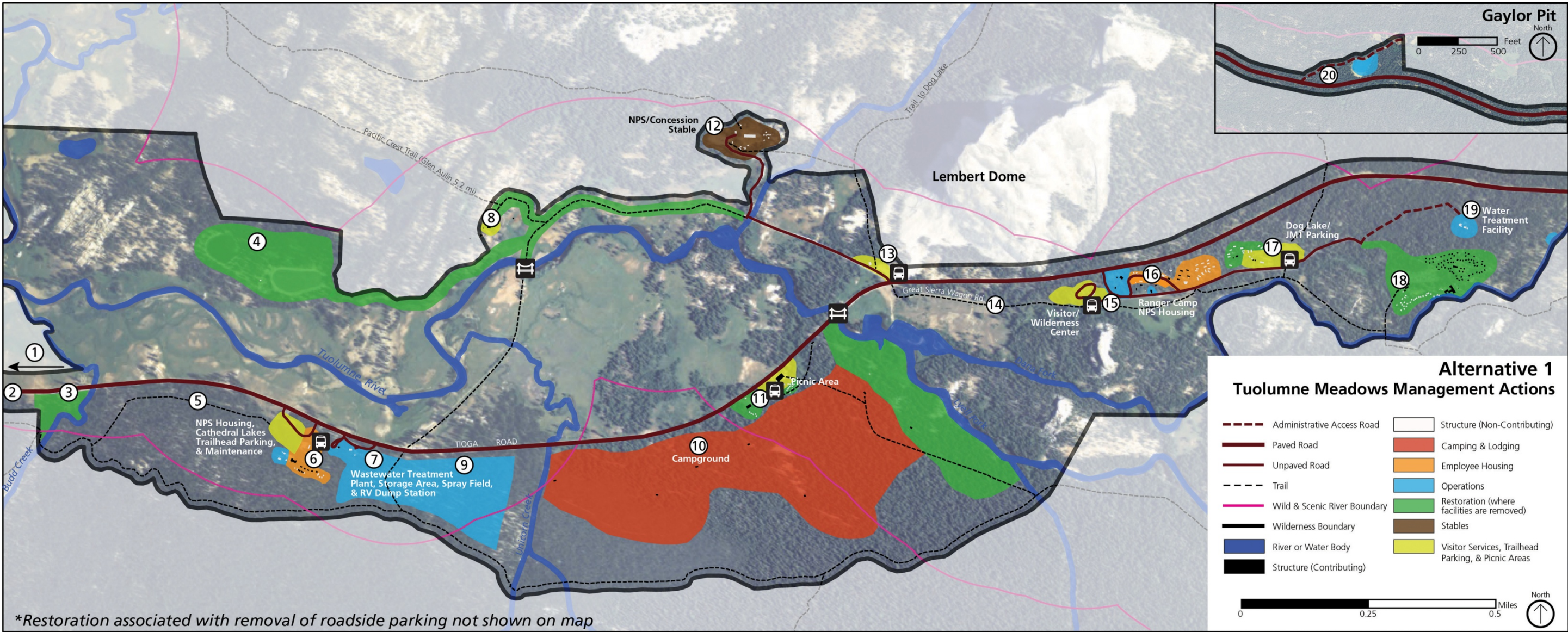


Figure 8-5. Tuolumne Meadows Site Plan, Alternative 1.

Key to figure 8-5 and List of Facilities Management Actions (actions marked with an asterisk (*) are specific to this alternative. All other actions are common to alternatives 1–4):

1. Pothole Dome scenic pullout/ parking areas	■ Designate day parking with trailhead on north side of road. ■ Improve trail to Pothole Dome.	6. Existing visitor center and Road Camp	* Relocate visitor contact station to location #15; convert building to park operations. ■ Construct new Cathedral Lakes trailhead with day and overnight parking. * Retain maintenance yard and office. * Increase NPS employee housing.	11. Existing commercial services core	* Eliminate the store, grill, mountaineering shop/school, public fuel station, and post office; demolish and remove the structures. * Convert area to day use parking and picnic area. * Add new public restroom. ■ Add trail connector to campground. * Eliminate concessioner employee housing.	15. Existing wilderness center and NPS stable	* Combine new, small visitor contact station with existing wilderness center; expand parking. * Relocate NPS stable to location #12; use site for expansion of NPS employee housing.
2. Tioga Road through the Tuolumne Meadows area	■ Retain the Tioga Road in its current alignment. ■ Add roadside curbing to eliminate undesig-nated roadside parking and associated informal trails. ■ Add approximately four viewing turnouts (four vehicles each; no parking). ■ Modify Tioga Road bridge to improve its ability to accommodate peak flows.	7. Wastewater treatment plant	■ Upgrade wastewater treatment plant. ■ Retain recreational vehicle dump station.	12. Existing concessioner stable	* Co-locate NPS stable with existing concessioner stable (for administrative use only). * Eliminate most concessioner employee housing, except for one hard-sided cabin for two stable employees; restore to natural conditions. ■ Eliminate parking along access road.	16. Existing ranger station and Ranger Camp	* Retain ranger station, SAR cache, and day parking. * Retain diesel fuel tank. * Replace NPS employee housing with hard-sided cabins.
3. Existing Cathedral Lakes trailhead	■ Relocate trailhead and parking to location #6; restore to natural conditions.	8. Parsons Memorial Lodge	* Preserve lodge; eliminate vehicle access; retain the footbridge.	13. Lumbert Dome	■ Retain picnic area. ■ Retain day parking and trailheads for Lumbert Dome and Parsons Memorial Lodge. ■ Add shuttle stop.	17. Bug Camp, Dog Lake/John Muir Trail parking	■ Increase day and overnight parking. * Eliminate NPS housing.
4. Existing wastewater ponds and sprayfields	* Pending additional planning, replace with upgraded wastewater treatment plant at locations #7 and #9; restore to natural conditions.	9. Area west of Unicorn Creek	* Retain as undeveloped natural area; if needed, use area for future wastewater treatment facilities.	14. Great Sierra Wagon Road	■ Preserve as trails; mitigate impacts of historic roads to meadow hydrology while protecting historic character.	18. Tuolumne Meadows Lodge	* Demolish and remove Tuolumne Meadows Lodge, parking, and employee housing; restore area to natural conditions.
5. Area east of Budd Creek and west of existing visitor center	■ Construct new Cathedral Lakes trailhead connector. * Retain as undeveloped natural area except for trail segment.	10. Tuolumne Meadows campground	* Rehabilitate campground at a reduced capacity (eliminate 67 campsites); demolish and remove the A-loop road and restore this area. ■ Retain campground office and day parking. * Add vending machine for ice and firewood. * Relocate entrance road and kiosk outside of floodplain. ■ Formalize John Muir Trail connection. ■ Retain Elizabeth Lakes trailhead and day parking. ■ Remove riprap from riverbank.			19. Water treatment facility	■ Retain water treatment facility.
						20. Gaylor Pit	■ Retain helipad.

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Summary of Protection and Enhancement of River Values under Alternative 1

The *Tuolumne River Plan* will be evaluated in terms of four primary legal requirements: (1) the WSR requirement that it protect and enhance river values; (2) the NEPA requirement that it fully consider the effects on the human environment; (3) the NHPA requirement that it consider effects on historic properties; and (4) the requirement of the Wilderness Act that it preserve wilderness character in designated Wilderness. (The NEPA process coordinates compliance with the body of additional federal laws and regulations applicable to the plan.) Guidelines for each of these requirements describe the criteria to be used in determining the effects of the plan. This section focuses directly on how the plan would meet the WSR requirement to protect and enhance river values if alternative 1 was selected. The NEPA, NHPA, and Wilderness Act analyses are presented in chapter 9.

All the action alternatives, including alternative 1, would protect and enhance river values as described in detail in chapter 5 and summarized in this chapter under “Summary of Protection and Enhancement of River Values under All Action Alternatives,” earlier in this chapter. In addition, alternative 1 would take the following additional actions, primarily related to management of visitor use, user capacity, and development, to further protect or enhance river values.

Free-Flowing Condition of the River

Provided that river low flows remained around or above 1 cubic foot per second, maximum daily water withdrawals of 65,000 gallons per day would ensure that no more than 10% of flow was consumed. The average daily water demand for alternative 1 would be reduced by about 34%, to about 30,000 gallons per day, with rare spikes to about 44,000 gallons per day. Based on these estimates, alternative 1 would be protective of river flow and downstream habitat under the current flow conditions. Even if climate change led to longer low-flow durations starting earlier in the summer, withdrawal levels would be expected to remain well within the limits of no more than 10% of low flows.

Management to Protect Water Quality

Risks to water quality in the Tuolumne Meadows area would be reduced by reducing the amount of wastewater to be treated and disposed by about a third, which would allow for the elimination of the wastewater ponds and sprayfields on the north side of Tioga Road and the crushing or removing of the wastewater line that runs beneath the river and the meadow. The risk to water quality from fuel storage at the public fuel station would be eliminated. A further reduction in risks to water quality would be achieved by greatly reducing the size of the concessioner stable operation. Monitoring would be ongoing to ensure that water quality remained excellent. Risks to water quality at Glen Aulin would be eliminated by eliminating the High Sierra Camp and commercial stock use.

Management to Protect the Subalpine Meadow and Riparian Complex

Most of the actions to protect and enhance the subalpine meadow and riparian complex would be common to all the action alternatives. Alternative 1 would additionally reduce the maximum people at one time in the river corridor (almost all of whom would access through the Tuolumne Meadows area) by an estimated 34% (from a current estimated maximum user capacity of 4,928 people, including both visitors and employees, to a maximum capacity of 3,317 people). Most of this reduction would be attributed to a reduction in visitor use to allow for relatively unconfined access to the meadows and the river, while keeping meadow fragmentation associated with foot traffic within the protective standard discussed in chapter 5.

Subalpine meadows in Lyell Canyon would be further protected by eliminating commercial stock use (grazing and camping).

These actions would be expected to reduce the stresses on the subalpine meadow and riparian system and, in conjunction with the resource management activities that would be common to all the action alternatives, to mitigate most of the ongoing disturbances to the subalpine meadow and riparian habitats at Tuolumne Meadows, thereby increasing their ecological resistance to the kinds and levels of use that would continue. Monitoring would be ongoing to ensure that the protective standards for meadow and riparian habitat would be achieved and maintained over time. If conditions were not being maintained within the protective standards, additional actions would be taken to further manage or reduce visitor use, as identified in chapter 5.

Management to Protect Prehistoric Archeological Sites

The same management of visitor use described above would also reduce impacts on prehistoric archeological sites in the Tuolumne Meadows and Lower Dana Fork segments. Monitoring would be ongoing to ensure that site disturbance did not exceed the protective standard established for these sites. If conditions were not being maintained within the protective standards, additional actions would be taken to further manage or reduce visitor use, as described in chapter 5.

Management to Protect and Enhance Scenic Values

Scenic views and viewpoints in the Tuolumne Meadows area and along the Tioga Road corridor would be protected and enhanced by managing unnatural features, such as facilities and parked cars, to minimize their intrusion into remarkable views.

Scenic values in wilderness would be enhanced by removing the Glen Aulin High Sierra Camp and by eliminating commercial stock use in wilderness, both of which currently caused localized adverse effects on scenic values along the Glen Aulin trail.

Management to Protect and Enhance Rare and Easy Access to the River through Tuolumne and Dana Meadows

Opportunities for scenic driving along Tioga Road would be enhanced by eliminating roadside parking and the resulting congestion currently caused by vehicles slowing to park and pedestrians crossing the road.

Management to Protect and Enhance the Wilderness Experience along the River

The wilderness experience for hikers along most trails in wild segments within reach of a day hike from Tuolumne Meadows would be enhanced by restricting use to levels that resulted in encounters with no more than four other parties per hour; on the trail through the Grand Canyon of the Tuolumne the standard would be encounters with no more than two other parties per hour. If required to achieve these encounter rates, a day use trailhead quota system would be implemented for some trails. This management would protect the opportunity to experience solitude throughout the wild segments of the river corridor, even on a day hike from Tuolumne Meadows.

The wilderness experience for some hikers would be enhanced by eliminating commercial stock use in the corridor.

Alternative 2: Expanding Recreational Opportunities

Alternative 2 builds upon all the major elements included in the *Tuolumne River Plan* to identify a set of management actions that would work together to protect river values while expanding opportunities for day and overnight visitors.

Alternative 2 includes the technical correction to the river corridor boundary (presented in chapter 3), the section 7 determination process for evaluating water resources projects (presented in chapter 4), the management standards and actions for protecting and enhancing river values (presented in chapter 5), and the guidance for identifying an appropriate visitor experience and associated user capacity (presented in chapter 6). The site plan for Tuolumne Meadows reflects the facilities analysis in chapter 7.

Concept

Alternative 2 would respond to those members of the public who expressed a desire for more recreational opportunities. It would facilitate resource enjoyment and stewardship by a broad spectrum of visitors.

As in all alternatives, most of the river corridor would be managed as wilderness. In these areas, natural river-related systems would be sustained by natural ecological processes, prehistoric archeological and American Indian traditional cultural resources would characterize the cultural landscape, and recreational opportunities would be primitive and unconfined. Consistent with the concept of expanding recreational opportunities to connect with the river, a limited portion of the river (west of Tuolumne Meadows and into the Grand Canyon of the Tuolumne) would be opened to recreational whitewater boating.

In comparison to no action, alternative 2 would include the following actions:

- Restore previously disturbed ecological conditions to subalpine meadow and riparian areas.
- Reduce risks to stream flow and water quality.
- Increase protection of archeological sites and resources important to American Indians.
- Allow a moderate increase in overall use levels.
- Allow whitewater boating on limited portions of the river.
- Increase opportunities for camping at Tuolumne Meadows.

At Tuolumne Meadows, visitors would be encouraged to get out of their cars and take walks or short hikes to sites of natural and cultural interest or to places along the river, where they could enjoy activities such as sightseeing and participation in interpretive and educational programs, fishing, swimming, and picnicking. Such opportunities would encourage people to forge connections with the Tuolumne River and to appreciate the importance of protecting its natural, cultural, and recreational values. Potential parking locations would be fully used to maximize opportunities for day use. Opportunities for overnight camping would be slightly increased, and the current lodging at Tuolumne Meadows Lodge would be retained at its current capacity, along with modest commercial services. Although this alternative would provide the greatest range of recreational opportunities, Tuolumne Meadows would still retain its distinctive character as a threshold to the wilderness, and staging for wilderness trips would remain a major visitor activity at Tuolumne Meadows.

The Glen Aulin High Sierra Camp would remain open at its current capacity but would be converted to a seasonal outfitter camp with no permanent structures. Managed in this way, the Glen Aulin High Sierra Camp would be eligible for inclusion in the Yosemite Wilderness.

River values would be protected and enhanced by restoring ecological conditions to meadow and riparian areas, by directing use in scenic segments to resilient areas, and by restricting access to meadows and the river in the Tuolumne Meadows area to formally maintained trails (see “Summary of Protection and Enhancement of River Values under Alternative 2” at the end of this section).

The visitor use capacity under alternative 2 would be increased to a maximum of 5,051 people at one time, as shown in table 8-9. Actual day use levels would be lower than this capacity during nonpeak periods, and actual

overnight use levels would be lower even during peak periods because not all individual campsites and lodging units would be occupied by the maximum number of people allowable. Administrative use capacity under alternative 1 would be increased to a maximum of 286 employees at one time (table 8-9).

Virtual Tour

Under alternative 2, the majority of facilities in Tuolumne Meadows would remain, with key improvements made to protect river values and the visitor experience. There would be slightly more visitors than at present, with more defined services and developed areas. This section provides an overview of how visitors would experience Tuolumne Meadows and how administrative and visitor services would function.

Visitors entering Tuolumne Meadows from the west would be introduced to views of the meadows largely unobstructed by vehicles along Tioga Road because the majority of roadside parking would have been eliminated (with new subdued curbing or boulder placement preventing continued roadside parking). The partially gravel pullout on the north side of Tioga Road at Pothole Dome would be paved with designated parking for 20 vehicles and a new picnic area and formal trailhead to Pothole Dome. In addition, a new parking/viewing area for 22 vehicles would be provided east of Pothole Dome. Four additional viewing pullouts would be located farther east, on the north side of Tioga Road, so that visitors passing through could stop for photographs. The multiple informal social trails in the meadows would be restored to natural conditions, and the primary trail to Pothole Dome and the river would be delineated with rustic fencing and signs at the trailhead. Naturalistic barriers would be placed along the roadside and along trails to discourage visitors from damaging the meadow by leaving the formally designated trail to and around Pothole Dome.

The large number of visitors coming to hike the Cathedral Lakes trail would no longer park along the road shoulder, but would instead be directed to a designated trailhead parking lot and picnic area near the existing visitor center. A new ½-mile trail segment would be constructed to connect the parking area with the Cathedral Lakes trail to the west. The NPS maintenance yard would remain at this location, and the CCC mess hall building, which currently houses the visitor center, would be repurposed to provide needed office space for NPS employees, while the visitor center would be relocated to a more central location near the store and grill. NPS employee housing at Road Camp would be increased.

A new stable would be built east of Budd Creek and west of the existing visitor center; it would be used by both the NPS and the concessioner. This stable would continue to support the concessioner day and overnight rides and to service the Glen Aulin High Sierra Camp, as well as providing stock for NPS trail crews and other park functions.

The wastewater treatment plant, located to the east of the maintenance yard, would be upgraded in its present location to meet current treatment standards. Wastewater would continue to be treated here and pumped beneath the river and meadow to the north side of the river, where it would continue to be evaporated in the existing wastewater containment ponds before being sprayed onto an upland area. If technology became available to evaporate the treated wastewater at the site of the existing plant on the south side of the road, the containment ponds would be removed. The recreational vehicle dump station would remain near the wastewater treatment plant.

A new day use parking lot and picnic area would be located on the south side of Tioga Road across from the existing Parsons Memorial Lodge trailhead. Visitors would park in this lot to access Parsons Memorial Lodge, Soda Springs, and the Glen Aulin trail on the north side of the river across the meadows. A new pedestrian trail would be provided along the south side of Tioga Road to connect this parking lot to the campground, store, and grill, which would remain in their current locations. A new visitor contact station, picnic area, shower facility, and restroom building would be available in the vicinity of the store and grill. The public fuel station would remain, but the mountaineering shop/school function within that structure would be eliminated. The

parking lot would be expanded slightly to provide 55 spaces, with an additional 15 spaces available near the public fuel station. The employee cabins behind the fuel station would be removed, as they are currently located in a sensitive wetland area.

The campground would be upgraded and expanded to 370 sites (including 304 car/RV sites, 41 additional walk-in sites, 4 horse sites, and 21 backpacker sites), plus 7 group sites. Primary improvements would include upgrading and adding restrooms, repairing the campground roads, formalizing camping spots to reduce resource damage, relocating campsites away from the river, and overhauling the water and wastewater lines as needed. The campground office and trailhead parking for Elizabeth Lakes would remain.

The Lembert Dome parking area would be expanded with an improved picnic area and restrooms. The stable would be removed and replaced with parking and a picnic area overlooking the meadow. Parking at Lembert Dome and on the road to the stables would continue to serve as primary access points for the Glen Aulin, Young Lakes, and Dog Lake trails. Those visitors traveling to Glen Aulin would be able to camp at the backpacker campground or stay in tents at a temporary outfitter camp that would provide full meals. All permanent structures except a composting toilet would be removed from the High Sierra Camp.

Visitors seeking backcountry permits and information would continue to be served at the wilderness center, which would also serve as the ranger station. The parking there would be expanded modestly to include 86 spaces for overnight use. The nearby NPS stable would be relocated to address health code issues associated with its current proximity to employee housing at Ranger Camp. New NPS housing would be constructed at the stable site and Ranger Camp. Employees would no longer be housed at Bug Camp, and the facilities would be removed. The parking for Dog Lake and the John Muir Trail, just to the east of Bug Camp, would be expanded.

At the Tuolumne Meadows Lodge, the capacity would remain as it is today. Three guest cabins and all of the employee cabins would be moved away from the river to protect riparian vegetation. Roadside parking on the road to the lodge would be eliminated.

New NPS employee housing for 44 employees would be constructed at Gaylor Pit. In addition, a dry camp for NPS and concessioner employees with short-term assignments in Tuolumne Meadows would be provided in this area, near the existing helipad.

Table 8-9.
Corridorwide Visitor and Administrative Use Capacity, Alternative 2

Visitor Overnight Capacity					
River Segment	Existing Use Calculation	Current Overnight Visitors	Proposed Action	Units	Maximum Overnight Visitors, Alt. 2
Scenic Segments					
Tuolumne Meadows Lodge	# of lodging units (69) × max of 4 people per unit	276	Retain lodge capacity.	69 guest tent cabins	276
Tuolumne Meadows Campground	# of campsites (329 sites × max of 6 people per site, plus 7 group sites × max 30 people per site)	2,184	Add walk-in loop (plus 41 campsites).	370 sites, plus 7 group sites	2,430
Wild Segments					
Glen Aulin HSC	# of lodging units (8) × max of 4 people per unit	32	Convert HSC to seasonal camp; no capacity change.	8 guest tent cabins	32
Wilderness	Maximum capacity of wilderness zones (400)	400	Retain current wilderness zone capacities.	–	400
Subtotal, Overnight		2,892			3,138
Visitor Day Use Capacity					
River Segment	Existing Use Calculation	Maximum Observed People At One Time, 2011^a	Proposed Action	Proposed Units	Maximum People At One Time, Alt. 2
Scenic Segments					
Access from Tuolumne Meadows	# of cars parking in designated parking spaces (340) × 2.9 ^b	986	Increase designated day parking (plus 302 spaces).	642 spaces at 90% occupancy × 2.9 ^b	1,676
	# cars parking in undesignated spaces (190) × 2.9 ^b	551	Eliminate undesignated roadside parking.	–	0
	Maximum people arriving by in-park hiker bus, tour buses, and regional public transit	225	Maintain current level of arrivals via by in-park shuttles, tour buses, and regional public transit.	–	225
Access from below O'Shaughnessy Dam	# of cars parking in designated spaces (4) × 2.9 ^b	12	Retain existing parking.	4 spaces × 2.9 ^b	12
Subtotal, Day Use		1,774			1,913
Total Visitor People At One Time		4,666			5,051
Administrative Capacity					
River Segment	Existing Use Calculation	Maximum employees (existing)	Proposed Action	Units	Maximum employees
Wild Segments					
Concessioner	Approximately 9 employees at Glen Aulin HSC	9	Retain all employees at Glen Aulin HSC.	9	9
Scenic Segments					
NPS	Approximately 150 employees based at Tuolumne Meadows	150	Meet staffing need with 174 employees at Tuolumne Meadows.	174 employees	174
Concessioner	103 employees based at Tuolumne Meadows	103	Meet staffing need with 103 employees at Tuolumne Meadows.	103 employees	103
Total Administrative People At One Time		262			286
Total Capacity Corridorwide		4,928 (existing)			5,337 (proposed)

a The peak number of vehicles observed during vehicle counts in 2011 (observed on August 13, 2011).

b The vehicle occupancy rate is 2.9 people per vehicle, based on visitor studies conducted over the past 20 years that found an average vehicle occupancy ranging from 2.6 to 3.4 (Van Wagtenonk and Coho 1980, FHWA 1982, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

Abbreviations: HSC = High Sierra Camp; max = maximum; # = number

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Protection and Enhancement

Free Flowing Condition

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Water Quality

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Greatly reduce water use at the Glen Aulin High Sierra Camp to reduce the risk to water quality posed by the potential failure of the leach mound (see “Glen Aulin,” below).

Biological Value: Subalpine Meadow and Riparian Complex

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Biological Value: Low-Elevation Riparian and Meadow Habitat

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Scenic Value: Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Recreational Value: Wilderness Experience along the River

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Manage use levels along wilderness trails to achieve the management standards established for individual trail sections. As described in chapter 5, these standards would be consistent with studies of wilderness user preferences (Broom and Hall 2010; Cole and Hall 2008) and would differ by trail as follows:
 - Lyell Canyon trail section from Rafferty Creek to Ireland Lake Junction: an average of no more than 12 encounters per hour
 - Lyell Canyon trail section from Ireland Lake Junction to Kuna Creek: an average of no more than 8 encounters per hour
 - Glen Aulin trail: an average of no more than 12 encounters per hour
 - Grand Canyon trail (Rogers Creek Crossing to Pate Valley): an average of no more than 2 encounters per hour
- Continue concessioner stock day rides into wilderness but at a lowered capacity to reduce conflicts on trails (four-hour and all-day rides eliminated; two-hour rides reduced from 3 to 2 per day, accommodating a maximum of 24 people per day).
- Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary (see appendix C) that gives priority to noncommercial use and restricts commercial use to no more than two overnight parties per zone per night and no more than two day parties per trail per day. Additional restrictions would include the following:
 - *Restrictions on types of use, Glen Aulin zone, peak months only:* During the peak use months of July and August, commercial parties having only a recreational purpose would no longer have access to the Glen Aulin zone; parties having an educational or scenic, as well as recreational, purpose (as defined in appendix C) would continue to have access consistent with limitations on total use levels, described above.

- *Restrictions on types of use, Lyell Canyon zone, peak months only:* During the peak use months of July and August, commercial use in the Lyell Canyon zone by parties having an educational purpose would be restricted to 15% of total use on weekend nights; parties with a scenic/recreational purpose would be restricted to 10% of total use on weekend nights. These restrictions would not apply on weekday nights.
- Provide a new river-dependent wilderness experience by allowing boating in the Grand Canyon of the Tuolumne, from Pothole Dome (where the Tuolumne River exits Tuolumne Meadows) to Pate Valley, with the exact put-in, take-out, portage trails, landing zones, and no-landing zones to be determined in consultation with the boating community, tribal interests, and NPS resource experts. Overnight boating would be permitted under the wilderness overnight trailhead quota system used to manage the user capacity in all wilderness zones. Wilderness users who planned to boat would have to declare their intention to boat the Grand Canyon of the Tuolumne when they obtained their wilderness permit (they would fall under the “pass-through” quota—those who are traveling through the Grand Canyon of the Tuolumne without staying at Glen Aulin, which is 15 people per day). However, actual use levels for whitewater boating 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 three miles to the put-in but would also have to carry them up 4,000 feet (over about eight miles) from Pate Valley to the White Wolf trailhead. Only noncommercial boating would be permitted. The NPS would provide for such use on a trial basis, monitoring and adjusting the provision of this opportunity as needed and adding additional restrictions during the trial period as needed. Specifically, the agency might use any combination of temporal or flow restrictions; seasonal, temporary, or permanent closures; group size and equipment restrictions; and other standard management and regulatory mechanisms (including wilderness camping regulations) it deemed necessary—with temporary or permanent closures likely if any boaters opted to violate the prohibition on boating on Hetch Hetchy Reservoir.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

All ongoing recreational activities would continue. In addition, limited recreational whitewater boating would be allowed on portions of the river from below Tuolumne Meadows to Pate Valley on a trial basis.

Maximum Amounts of Visitor Use

Maximum use along popular wilderness trails would be limited as necessary to achieve the management standards of average encounters with no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne.

The overnight capacity in wild segments would be retained at 400 persons per night (350 persons per night above the reservoir and 50 persons per night below the reservoir). This capacity would be reduced if determined necessary to protect wilderness values; however, it would not be increased above this amount, which has been determined to be protective of river values. 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. As noted above, whitewater boaters would be subject to the wilderness trailhead quota for those “pass-through” visitors who are traveling through the Grand Canyon of the Tuolumne without staying at Glen Aulin (up to 15 people per day).

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- The current overnight trailhead quota system would be retained to regulate overnight use in wild segments. If monitoring determined that the new standard for day use was not being met, the NPS would increase monitoring, inform visitors about alternative trails within the corridor, and encourage visitors to hike during days and times of day at which lower encounter rates occur. If encounter rates increased despite these efforts, the NPS would consider establishing a day use permitting system and making necessary changes in the backcountry quota system to better manage for opportunities for solitude. This action would require additional compliance and public involvement.
- Overnight boating would be permitted under the overnight wilderness trailhead quotas already in existence (that is, the existing trailhead quota for the Grand Canyon of the Tuolumne would include the boating parties, without expanding the quota), and a day-use boating permit system would be implemented as needed (if boaters chose to float all or part of this stretch in one day or less).

Administrative Use

The types and levels of administrative use in wild segments would remain the same as existing conditions. Nine concessioner employees would be housed at the Glen Aulin High Sierra Camp.

Glen Aulin (Potential Wilderness Addition)

Glen Aulin High Sierra Camp

The Glen Aulin High Sierra Camp would be converted to a seasonal outfitter camp, with a capacity accommodating 32 guests (the same number as at present) (see figure 8-6). All permanent structures and infrastructure would be demolished and removed, and all remaining structures would be temporary in nature, to be taken down and removed from the area in the fall and packed in and reassembled in the spring. Guest tents would be provided, as would cots in the tents and some services, listed below. The sole permanent structure would be a composting toilet. Trash receptacles and bear lockers would be available. Overall, the camp would look and function much like a seasonal outfitter camp allowed under commercial use authorizations for designated Wilderness areas, except that this one would remain in place at Glen Aulin for the summer season.

Specifically, the level of service at the High Sierra Camp under this alternative would be as follows:

- Eliminate all permanent structures, including three stone buildings, concrete floors in the tent cabins, all components of the water treatment system, and the wastewater treatment system. The leach mound would be abandoned and no longer used.
- Provide unheated tents (up to eight) with cots and simple camp chairs for up to 32 guests.
- Provide four unheated tents for nine concessioner employees.
- Require domestic water used for sanitation and meal preparation to be filtered and/or treated in compliance with NPS Director’s Order (DO)-83, “NPS Public Health Guidelines.” The operators would collect and screen wastewater and dispose of it in a wastewater sump.
- Construct a new composting toilet for guests between the granite slab behind the existing kitchen and septic tank. Also, improve the composting toilet in the nearby backpacker campground to adequately handle demand.
- Provide hot suppers but cold breakfasts and lunches (except for hot drinks). A separate dining tent—still temporary in nature—could be provided as desired, along with a fire pit for evening use. Camp operators would be required to submit plans to the Park Public Health Officer for review and approval.

- Discontinue meals-only service for people who are not guests of the outfitter camp.
- Discontinue overnight saddle trips and concessioner day rides to the camp.
- Require all tents and camp structures to be packed out at the end of the season in fall, with the camp area cleaned to an appearance similar to that of the nearby backpacker campground. No overwinter storage would be provided.

The NPS would recommend to the Secretary of the Interior that the Glen Aulin potential wilderness addition be declared part of the Yosemite Wilderness, as provided for in section 108 of the 1984 California Wilderness Act.

The determination of how the components of the permanent buildings would be removed to frontcountry dump areas would be based on the minimum-requirement criteria established under the Wilderness Act. The estimated net construction/demolition costs for Glen Aulin under alternative 2 would be approximately \$1.1 million (see appendix N).

Backpacker Campground

See “Actions Common to Alternatives 1–4,” earlier in this chapter.

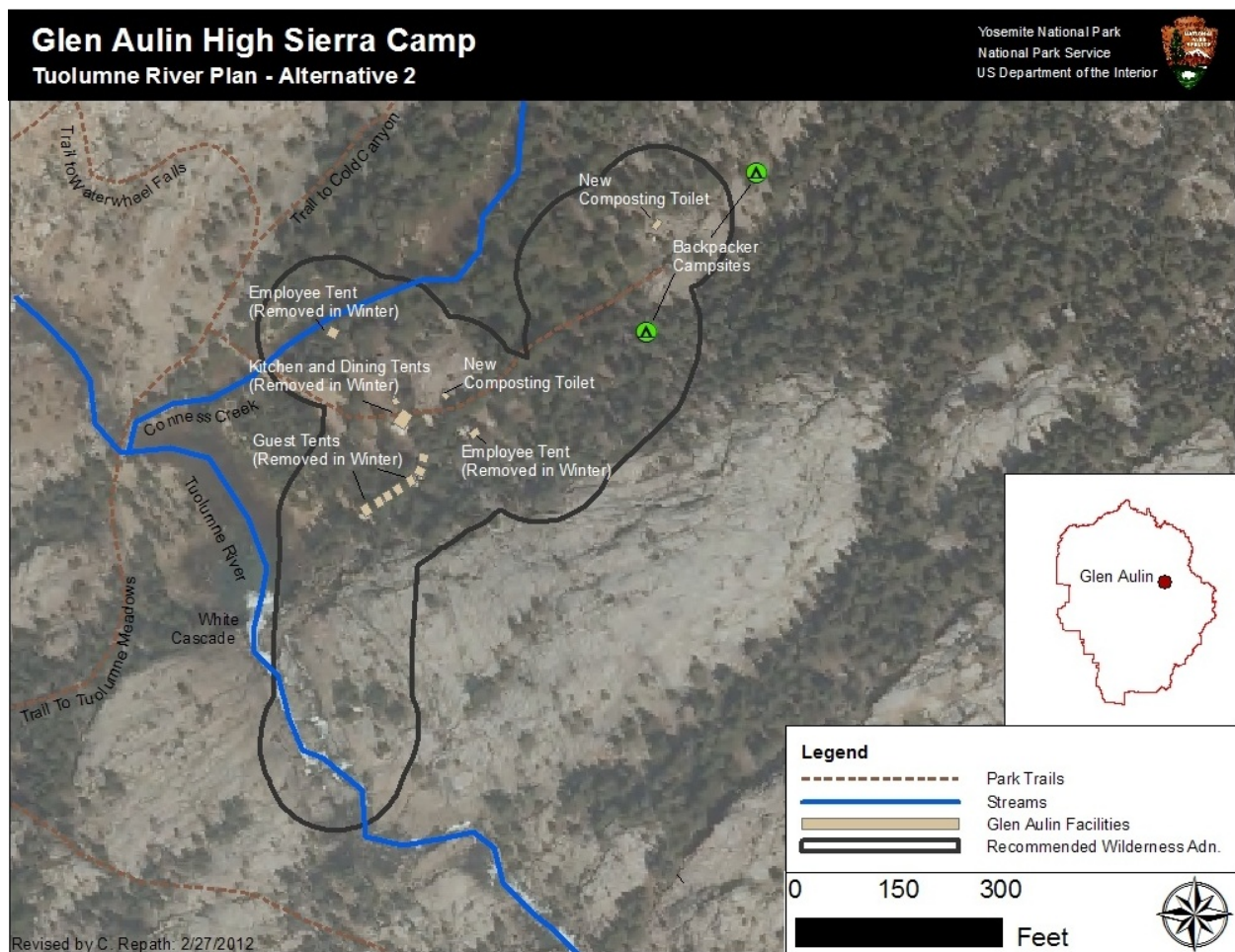


Figure 8-6. Glen Aulin Site Plan, Alternative 2.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

Note that this discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. The portions of these segments within designated Wilderness would be managed the same as the wild segments.

Resource Protection and Enhancement

Free Flowing Condition

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Allow for an increase in the average water demand to approximately 50,000 gallons per day, with spikes up to 10% of low flow or 65,000 gallons per day, whichever was less (see table 8-10). Implementation of the water conservation measures and best management practices would level out the variations in water withdrawals from the river and ensure that water use remained within the management standard.

Water demand figures for alternative 2 are based on a 9% increase in visitor use compared to current use. No data have been collected that would distinguish between visitor and administrative use; therefore, visitor use data have been adopted as a proxy to estimate water consumption for both types of use.

Table 8-10.
Summary of Average Estimated Water Demand, Alternative 2

Month	No Action (current use)		Alternative 2 (9% increase in use)	
	Average Daily use	Maximum Daily use	Average Daily use	Maximum Daily use ^a
July	46,015	66,818	50,156	65,000
August	44,715	65,640	48,739	65,000
September	34,581	62,060	37,693	65,000

^a Maximum daily use would have to remain within the management standard of no more than 10% of low flows or 65,000 gallons per day, whichever was less. Water conservation measures and best management practices for leveling out spikes in water withdrawals, which would be implemented as part of this alternative along with additional actions to reduce kinds or levels of service if necessary, would reduce maximum water withdrawals so that they did not exceed the management standard for protecting river flows.

Because water consumption would be at the upper limit of the range determined to be protective of river flow at current levels, the potential for having to reduce services if climate changes resulted in lower flow levels would be greater under this alternative than under any of the other alternatives.

Water Quality

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Upgrade utility systems to conserve water and protect water quality; retain force mains that cross the Tuolumne River beneath the Tioga Road bridge and that cross beneath the river and meadow between the wastewater treatment plant and the containment ponds (unless technology is found to allow consolidation of wastewater treatment facilities on the south side of Tioga Road, as described under “Tuolumne Meadows Site Plan,” below).
- Reduce concessioner stock day rides to reduce stock use and risks to water quality. Compared to current service levels, the amount of stock use on trails would be reduced by 1 two-hour and 2 four-hour rides per day, which might otherwise involve up to 14 head of stock per ride on the trails. Full-day rides, which occur only occasionally, would also be eliminated.

Biological Value: Subalpine Meadow and Riparian Complex

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Cultural Value: Parsons Memorial Lodge

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

Scenic Value: Scenery through Dana and Tuolumne Meadows

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Maintain views from eight scenic vista points (identified in chapter 5) by controlling the encroachment of vegetation in a manner that was protective of ecological conditions and archeological values at each vista point. Each particular vista point would be managed in accordance with an individual work plan based on evaluations of river values and other resources at that specific location. The work plans are included in appendix I. No other vegetation management would be conducted to enhance scenery or viewing opportunities.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Increase the amount of designated parking available to visitors wishing to get out of cars to enjoy recreational experiences in a river-related landscape.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

All ongoing recreational activities would continue, including rustic lodging and concessioner stock day rides. 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. Similarly, rather than picnicking informally on the banks of the river, visitors would have access to new formal picnic areas. With this management strategy, the social interaction at Tuolumne Meadows would be greater than at present; however, congestion would be mitigated with improved parking and trailhead conditions and better visitor information and orientation. 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, where visitors could connect with the river, the meadows, and the historic significance of the area during a brief visit.

Visitor services would be managed as follows:

- Conduct a full range of orientation, interpretation, and education programs, with increased emphasis on education about the need to protect river values, at the visitor contact station, wilderness center, and Parsons Memorial Lodge, as well as in the field.
- Retain most existing commercial services (store/grill, public fuel station, concessioner stock day rides) and the postal service (subject to future USPS level of service decisions beyond NPS control). Although the public fuel station was not identified as a necessary facility in the other alternatives, retaining it would be consistent with the higher level of visitor use and service that characterizes this alternative. The mountaineering shop and school function in that structure would be eliminated.
- Add a public shower/restroom facility in the commercial service area.

- Reduce concessioner stock day rides to 2 two-hour rides per day (maximum of 24 people per day); eliminate the four-hour and full-day rides.
- Expand the capacity of the campground to 370 sites, plus the 7 group campsites.
- Retain the Tuolumne Meadows Lodge at its current capacity.
- Continue the current level of shuttle bus service among destinations within the Tuolumne Meadows area.

Maximum Amounts of Visitor Use

- Increase the maximum day use capacity above the Hetch Hetchy Reservoir from an estimated 1,762 to a maximum of 1,901 people at one time (see table 8-9).
- Increase the overnight capacity at Tuolumne Meadows to 2,706 people per night: 2,430 people accommodated by the expanded campground, and 276 people accommodated by the 69 guest tent cabins at Tuolumne Meadows Lodge (see table 8-9). Actual overnight use levels would be lower than these capacities because individual campsites and lodging units would not always be occupied by the maximum number of people allowable.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

Day Use

Day use capacity would be managed by controlling day parking, which would be restricted to paved or otherwise authorized spaces. No undesignated roadside parking would be allowed through the Tuolumne Meadows area. Undesignated roadside parking would continue to be allowed along Tioga Road west and east of Tuolumne Meadows. The amount of formal, designated day parking in the Tuolumne Meadows area would be increased from 340 to 642 spaces. (See parking details under “Tuolumne Meadows Site Plan,” below.)

Overnight Use

Overnight user capacity would be managed by the facility capacities of the campground and lodge. These facilities would continue to be available through a reservation system, with some campsites also available on a first-come, first-served basis.

Administrative Use

NPS staffing would be increased to a maximum of 174 employees to provide for increased visitor and resource protection needs (including management of the user capacity program, below), additional interpretive and educational services, resource management and monitoring, and maintenance (see table 8-9). NPS Employee housing or campsites would be increased by 70 additional units to accommodate this staffing level; campsites would meet the need for incidental “housing” for employees on temporary duty in the Tuolumne Meadows area. Concessioner employee staffing and housing necessary to support commercial services would remain the same as under the no-action alternative (103 employee employees). (See “Tuolumne Meadows Site Plan,” below for the locations of proposed employee housing.)

Tuolumne Meadows Site Plan

The locations identified below are illustrated on the site plan map (figure 8-7) at the end of this section. The estimated net construction costs for Tuolumne Meadows under alternative 2 would be approximately \$70 million, based on calculations included in appendix N.

Visitor Facilities

- Retain the store, grill, post office, and public fuel station in their current locations. No feasible location exists for relocating the fuel station outside the river corridor; it would remain at its current location where the existing underground fuel tanks have been upgraded to mitigate risk to water quality. Provide a

new visitor contact station, picnic area, and public shower/restroom facility in this commercial service area. Consolidating NPS and commercial visitor services would provide better separation between visitor services and operational functions than what exists at the current visitor center location, facilitate visitor access to services, and improve operational efficiency.

- Expand the campground (see below).
- Retain the Tuolumne Meadows Lodge at its current capacity, while relocating the three guest tent cabins nearest the river to protect adjacent riparian habitat.
- Readjust the shuttle bus stops to reflect site-development changes. (Shuttle buses would no longer stop at location 3 on the site plan map [figure 8-7] once the trailhead for the Cathedral Lakes trail was relocated. A new stop would be provided at location 12 to serve the new picnic area.).

Campground

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Design for a capacity of 370 sites, including 304 car/RV sites, 41 additional walk-in sites, 4 horse sites, and 21 backpacker sites (all with a maximum capacity of 6 people per site), plus 7 group sites (with a maximum capacity of 30 people per site), for a maximum of 2,430 people. All walk-in sites would be on the same loop, located west of loop A, and served by composting toilets to minimize additional water consumption.
- Retain the campground office.
- Retain the existing entrance road alignment.
- Retain the campground A-loop road. Relocate the A-loop sites that are closest to the Lyell Fork away from the river.
- Formalize a trail connection between the campground and the John Muir Trail.

Trails and Trailheads

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Delineate or fence the Cathedral Lakes trail to facilitate ecological restoration while allowing for use by pack stock and hikers.
- Move the Tioga Road trailhead for Parsons Memorial Lodge to the new day parking area south of Tioga Road and provide a trail connection to the existing trail; install protective fencing on either side of the trail from Tioga Road to Parsons Memorial Lodge to facilitate meadow recovery.
- Install protective fencing on either side of the trail/access road between Lembert Dome and Tuolumne Meadows Lodge to facilitate recovery.
- Provide a new formal trail connecting the visitor services core with the existing Parsons Memorial Lodge footbridge and trail.
- Provide a new hiking trail connecting facilities along Tioga Road; tie into the section of the Great Sierra Wagon Road east of Lembert Dome.

Picnic Areas

- Retain the picnic area at Lembert Dome.
- Provide new picnic areas
 - east of Pothole Dome
 - in the consolidated visitor services area
 - in association with the new day parking area near the Parsons Memorial Lodge trailhead

- at the site overlooking the meadow that is currently occupied by the concessioner stable

Parking

The total number of designated parking spaces in the Tuolumne Meadows area (day and overnight) would be increased from 533 to 982 spaces, as shown in table 8-11.

Table 8-11.
Number of Parking Spaces in Designated Parking Areas, Alternative 2

Type of Parking	Current	Alternative 2	Description
Day Parking	16	18	existing parking area at Pothole Dome
	0	22	currently undesignated parking/viewing area ^a east of Pothole Dome
	0	58	new parking area associated with the relocated stables
	50	126	existing parking area at the visitor center (expanded to also include Cathedral Lakes trailhead parking)
	0	80	new day parking area west of Unicorn Creek and across Tioga Road from the Parsons Memorial Lodge trailhead
	11	13	existing parking area at the campground office
	11	11	existing parking in the campground for the Elizabeth Lakes trailhead
	15	15	existing parking area at the fuel station
	51	55	existing parking area at the current site of the store and grill
	58	0	existing parking area at the concessioner stable
	0	30	new parking area in conjunction with picnic area at the existing concessioner stable
	0	34	roadside parking along the road to the concessioner stable
	29	50	existing parking area at the base of Lumbert Dome
	7	7	existing parking area at the ranger station (relocated in this alternative)
	25	52	existing parking area at the Dog Lake/John Muir Trail trailhead
	67	71	existing parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	642	Total day parking
Overnight Parking (excluding cars parked in the Tuolumne Meadows campground)	58	86	existing parking area at the wilderness office
	33	59	existing parking area at the Dog Lakes/John Muir Trail trailhead
	0	35	relocated parking area for the Cathedral Lakes trailhead
	0	58	roadside parking along the road to the concessioner stable
	102	102	Tuolumne Meadows Lodge
	193	340	Total overnight parking
	533	982	Total day and overnight parking

a Although people currently park in this area, it is not yet a designated parking area; therefore it is counted as part of the undesignated parking under the no-action alternative.

NPS and Concessioner Stables

- Co-locate the NPS and concessioner stables in a new location near the wastewater treatment plant.
- Reserve the current site of the NPS stable for NPS employee housing, if needed.

Park Operations

In addition to “Actions Common to Alternatives 1–4,” earlier in this chapter:

- Adapt the CCC mess hall building (current site of the visitor center) for park operations
- Relocate the visitor protection function from the ranger station to the wilderness center; expand the facility to accommodate both functions.
- Retain the search-and-rescue cache at Ranger Camp.
- Retain the aboveground diesel fuel tank at the ranger station for concessioner and NPS use.

Employee Housing

- Provide NPS employee housing for no more than 144 employees, plus campsites for an additional 30 employees. This would accommodate a total of 174 NPS employees, which is the number determined to be necessary in the Tuolumne Meadows area to support the kinds and levels of visitor use included in this alternative. It would be infeasible to locate this housing outside the river corridor due to site constraints; therefore, it must be inside the corridor. To protect river values, the housing would be provided at the following locations determined not to contain river-related or sensitive resources:
 - Road Camp (30 employees)
 - Ranger Camp (70 employees)
 - Gaylor Pit (44 employees, plus 30 additional employee campsites). The area currently does not contain water, wastewater, or communication infrastructure. Additional planning and environmental compliance for employee housing at this site would be required in order to address utilities.
- Provide concessioner employee housing for 101 concessioner employees at a new housing area at Gaylor Pit, immediately west of the helipad. As stated above, the area currently does not contain water, wastewater, or communication infrastructure. Future planning for this site for employee housing would need to address utilities. Provide hard-sided cabin for two stable employees at the concessioner stable at a location that would comply with relevant OSHA and NPS housing regulations regarding the proximity of housing and stock corrals, and relocate all other stable employees to Gaylor Pit.

Utility Systems

The general direction for site-specific planning for utility systems under alternative 2, intended to protect and enhance the river's free flow, water quality, and outstandingly remarkable values, is outlined below. Additional site-specific planning and compliance would be required prior to implementing these actions.

Tuolumne Meadows Wastewater Collection, Treatment, and Disposal

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- Upgrade wastewater treatment plant; design for an average water demand of 65,000 gallons per day.
- Seek technology to allow removal of the wastewater containment ponds and sprayfields from the north side of Tioga Road and replace with facilities on the south side of the road, to be designed in conjunction with the new wastewater treatment plant. Even if technology was not available, it might be possible to eliminate the ponds because tertiary treatment might produce wastewater of a quality high enough to be distributed directly to the sprayfield if no other factors required temporary containment in the ponds. Tertiary treatment would also greatly reduce the risk to water quality from potential failure of the existing wastewater line under the meadows. If the ponds could not be eliminated, they would be redesigned to minimize risks of overflow and fenced for facility security. The sprayfield would be redesigned to minimize risk of saturation.

Site Restoration

See “Actions Common to Alternatives 1–4,” beginning on page 8-21.

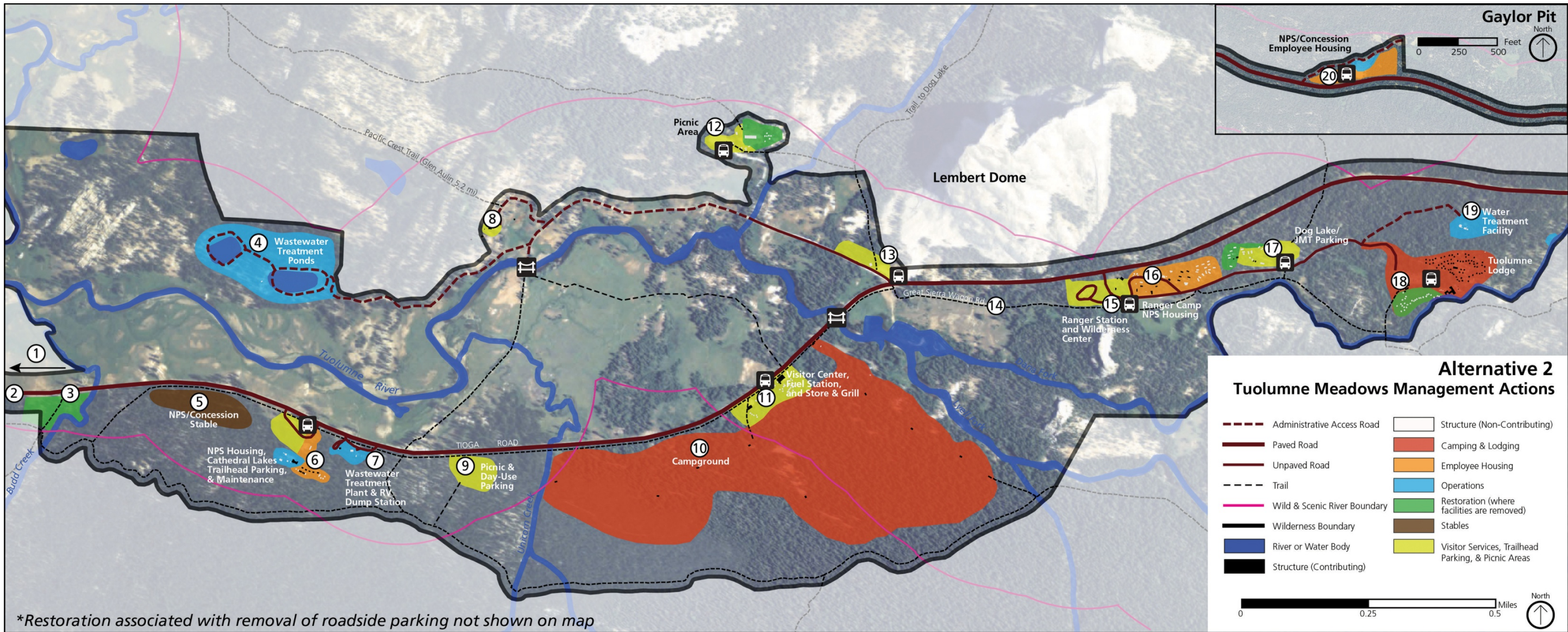


Figure 8-7. Tuolumne Meadows Site Plan, Alternative 2.

Key to figure 8-7 and List of Facilities Management Actions (actions marked with an asterisk (*) are specific to this alternative. All other actions are common to alternatives 1–4):

1. Pothole Dome scenic pullout/ parking areas	<ul style="list-style-type: none">Designate day parking with trailhead on north side of Tioga Road.Improve trail to Pothole Dome.Formalize the parking/viewing area east of Pothole Dome; add facilities for picnicking.	6. Existing visitor center and Road Camp	<ul style="list-style-type: none">Relocate visitor center to location #11; convert building to park operations.Construct new Cathedral Lakes trailhead with day and overnight parking.Retain maintenance yard and office.Increase NPS employee housing.	11. Existing commercial services core	<ul style="list-style-type: none">Retain store, grill, public fuel station, and post office.Eliminate mountaineering shop/school function.Add visitor contact station, shower/restroom facility, picnic area, and day parking.Add trail connector to campground.Relocate concessioner employee housing to location #20.	16. Existing ranger station and Ranger Camp	<ul style="list-style-type: none">Replace NPS employee housing with hard-sided cabins.Relocate ranger station function to location #15.Retain the SAR cache.Retain aboveground diesel fuel tank.
2. Tioga Road through the Tuolumne Meadows area	<ul style="list-style-type: none">Retain the Tioga Road in its current alignment.Add roadside curbing to eliminate undesignated roadside parking and associated informal trails.Add approximately four viewing turnouts (four vehicles each; no parking).Modify Tioga Road bridge to improve its ability to accommodate peak flows.Add hiking trail paralleling the road.	7. Wastewater treatment plant	<ul style="list-style-type: none">Upgrade wastewater treatment plant.Retain recreational vehicle dump station.	12. Existing concessioner stable	<ul style="list-style-type: none">Relocate existing concessioner stable and concessioner employee housing to location #5.Add meadow overlook picnic area and day parking.Retain day and overnight parking along access road.	17. Bug Camp, Dog Lake/John Muir Trail parking	<ul style="list-style-type: none">Increase day and overnight parking.Eliminate NPS housing.
3. Existing Cathedral Lakes trailhead	<ul style="list-style-type: none">Relocate trailhead and parking to location #6; restore to natural conditions.	8. Parsons Memorial Lodge	<ul style="list-style-type: none">Preserve lodge and retain vehicle access and footbridge.	13. Lumber Dome	<ul style="list-style-type: none">Retain picnic area.Expand day parking and retain trailheads for Lumber Dome and Parsons Memorial Lodge.Add shuttle stop.	18. Tuolumne Meadows Lodge	<ul style="list-style-type: none">Retain Lodge at current capacity.Eliminate roadside parking.Relocate concessioner employee housing to location #20.
4. Existing wastewater ponds and sprayfields	<ul style="list-style-type: none">Retain and upgrade (or relocate if feasible).	9. Area west of Unicorn Creek	<ul style="list-style-type: none">Add day parking and picnic area.Add trailhead for Parsons Memorial Lodge.	14. Great Sierra Wagon Road	<ul style="list-style-type: none">Preserve as trails; mitigate impacts of historic roads to meadow hydrology.	19. Water treatment facility	<ul style="list-style-type: none">Retain water treatment facility.
5. Area east of Budd Creek and west of existing visitor center	<ul style="list-style-type: none">Construct new Cathedral Lakes trail connector.Co-locate new NPS and concessioner stables and day parking.Build new hard-sided cabin for two stable employees.	10. Tuolumne Meadows campground	<ul style="list-style-type: none">Rehabilitate campground in its current configuration, adding 41 additional walk-in campsites; relocate the A-loop sites closest to the Lyell Fork.Retain campground office and day parking.Retain the existing entrance road.Formalize John Muir Trail connection.Retain Elizabeth Lakes trailhead and day parking.Remove riprap from riverbank.	15. Existing wilderness center and NPS stable	<ul style="list-style-type: none">Combine ranger station with existing wilderness center; expand parking.Relocate NPS stable to location #5; use site for expansion of NPS employee housing.	20. Gaylor Pit	<ul style="list-style-type: none">Retain helipad.Add NPS and concessioner employee housing.

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Summary of Protection and Enhancement of River Values under Alternative 2

The *Tuolumne River Plan* will be evaluated in terms of four primary legal requirements: (1) the WSRA requirement that it protect and enhance river values; (2) the NEPA requirement that it fully consider the effects on the human environment; (3) the NHPA requirement that it consider effects on historic properties; and (4) the requirement of the Wilderness Act that it preserve wilderness character in designated Wilderness. (The NEPA process coordinates compliance with the body of additional federal laws and regulations applicable to the plan.) Guidelines for each of these requirements describe the criteria to be used in determining the effects of the plan. This section focuses directly on how the plan would meet the WSRA requirement to protect and enhance river values if alternative 2 were to be selected. The NEPA, NHPA, and Wilderness Act analyses are presented in chapter 9.

All the action alternatives, including alternative 2, would protect and enhance river values as described in detail in chapter 5 and summarized in this chapter under “Summary of Protection and Enhancement of River Values under All Action Alternatives,” earlier in this chapter. In addition, alternative 2 would take the following additional actions, primarily related to management of visitor use, user capacity, and development, to further protect or enhance river values.

Free-Flowing Condition of the River

Provided that river low flows remained around or above 1 cubic foot per second, maximum daily water withdrawals of 65,000 gallons per day would ensure that no more than 10% of flow was consumed. The average daily water use for alternative 2 would increase to approximately 50,000 gallons per day, with spikes up to 10% of low flow or 65,000 gallons per day, whichever was less. Water conservation measures and best management practices to level out the variations in water withdrawals from the river into the water storage tank, both proposed under this alternative, would be necessary to remain within the standard for protecting river flows. If climate change led to longer low-flow durations starting earlier in the summer, reductions in levels of service, including temporary facility closures, might be required to remain within the limits of no more than 10% of low flows.

Management to Protect Water Quality

Risks to water quality in the Tuolumne Meadows area would be mitigated by upgrading the wastewater treatment plant, wastewater ponds, and sprayfields. The improved utilities would be designed for loads commensurate with the estimate of domestic water use. The risk to water quality from fuel storage at the public fuel station would be mitigated, but not eliminated, by continued monitoring. Risks to water quality at Glen Aulin would be reduced by replacing the wastewater treatment system and leach mound with a new composting toilet. Water use would be greatly reduced there. Water used for meal preparation and sanitation would be screened before disposal in a wastewater sump. Monitoring would be ongoing to ensure that water quality remained excellent at both Tuolumne Meadows and Glen Aulin.

Management to Protect the Subalpine Meadow and Riparian Complex

Most of the actions to protect and enhance the subalpine meadow and riparian complex would be common to all the action alternatives. Alternative 2 would additionally enhance this river value by directing visitors to designated trails and delineating or fencing certain trail segments to facilitate the ecological recovery of adjacent vegetation.

Management to Protect Prehistoric archeological Sites

The management of visitor use common to all the action alternatives would reduce impacts on prehistoric archeological sites in the Tuolumne Meadows and Lower Dana Fork segments. Monitoring would be ongoing to ensure that site disturbance did not exceed the protective standard established for these sites. If conditions were not being maintained within the protective standards, additional actions would be taken to further manage or reduce visitor use, as described in chapter 5.

Management to Protect and Enhance Scenic Values

Scenic views and viewpoints in the Tuolumne Meadows area and along the Tioga Road corridor would be protected and enhanced by managing unnatural features, such as facilities and parked cars, to minimize their intrusion into remarkable views. The eight scenic vista points identified by the *Tuolumne River Plan* would be protected and enhanced, if necessary, by removing encroaching vegetation, primarily conifers.

Management to Protect and Enhance the Wilderness Experience along the River

The wilderness experience along trails in wild segments would be protected by restricting use to levels that resulted in encounters with an average of no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne.

Management to Protect and Enhance Rare and Easy Access to the River through Tuolumne and Dana Meadows

Opportunities for scenic driving along Tioga Road would be enhanced by eliminating undesignated roadside parking and congestion caused by vehicles slowing to park and pedestrians crossing the road. Opportunities for people wishing to park their cars would be enhanced by increasing the number of designated parking spaces.

Alternative 3: Celebrating the Tuolumne Cultural Heritage

Alternative 3 builds upon all the major elements included in the *Tuolumne River Plan* to identify a set of management actions that would work together to protect river values while accommodating day and overnight visitors in a historic setting.

Alternative 3 includes the technical correction to the river corridor boundary (presented in chapter 3), the section 7 determination process for evaluating water resources projects (presented in chapter 4), the management standards and actions for protecting and enhancing river values (presented in chapter 5), and the guidance for identifying an appropriate visitor experience and associated user capacity (presented in chapter 6). The site plan for Tuolumne Meadows reflects the facilities analysis in chapter 7.

Concept

Alternative 3 responds to those members of the public who have strong traditional ties to the Tuolumne River corridor and who expressed a desire to see the area remain unchanged. It would preserve many aspects of Tuolumne Meadows' historic setting.

As with all alternatives, most of the river corridor would be managed as wilderness. In these areas, natural river-related systems would be sustained by natural ecological processes, prehistoric archeological and American Indian traditional cultural resources would characterize the cultural landscape, and recreational opportunities would be primitive and unconfined.

In comparison to no action, alternative 3 would include the following actions:

- Restore previously disturbed ecological conditions to subalpine meadow and riparian areas.
- Reduce risks to stream flow and water quality.
- Increase protection of archeological sites and resources important to American Indians.
- Reduce the capacity of the Tuolumne Meadows Lodge by half.
- Slightly reduce lodging and the level of service at Glen Aulin.

Tuolumne Meadows and Glen Aulin would serve as platforms for celebrating the relationships people have had with the Tuolumne River over decades. Many of the historic visitor facilities at Tuolumne Meadows and Glen Aulin date from a time when a trip to the Tuolumne River was a rigorous journey and amenities were few. Visitors would continue to have the opportunity for a classic national park experience, characterized by ranger-guided walks and interpretive programs, independent exploration along the river (including opportunities to disperse away from formal trails), horseback riding, camping, and rustic lodging, in a high -country setting retaining historic structures and buildings. 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.

In giving primacy to the cultural landscape, this alternative would not endorse perpetuating past patterns of use that proved to be unsustainable, like unmanaged camping in the meadows. The desire to maintain strong, tangible ties with the past would be balanced with lessons from the past and present so that the experience could be perpetuated for future generations.

Virtual Tour

Under alternative 3, the majority of facilities in Tuolumne Meadows would remain in their historic locations, with key improvements made to protect river values and the visitor experience. Slightly fewer visitors would be present in the area. This section provides an overview of how visitors would experience Tuolumne Meadows and how administrative and visitor services would function.

Visitors entering Tuolumne Meadows from the west would be introduced to views of the meadows largely unobstructed by vehicles along Tioga Road because the majority of roadside parking would have been

eliminated (with new subdued curbing or boulder placement preventing continued roadside parking). The partially gravel pullout on the north side of Tioga Road at Pothole Dome would be paved with designated parking for 20 vehicles and a new picnic area and formal trailhead to Pothole Dome. In addition, a new parking/viewing area for 22 vehicles would be provided east of Pothole Dome. Four additional viewing pullouts would be located farther east, on the north side of Tioga Road, so that visitors passing through can stop for photographs. An additional viewing pullout would be directly across from Pothole Dome on the south side of Tioga Road. The multiple informal social trails in the meadows would be restored to natural conditions, and the primary trail to Pothole Dome and the river would be delineated with rustic fencing and signs at the trailhead. Naturalistic barriers would be placed along the roadside and along trails to discourage visitors from damaging the meadow by leaving the formally designated trail to and around Pothole Dome.

The large number of visitors coming to hike the Cathedral Lakes trail would no longer park along the road shoulder, but would instead be directed to a designated trailhead parking lot and picnic area at the existing visitor center. A new ½-mile trail segment would be constructed to connect the parking area with the Cathedral Lakes trail to the west. The visitor center would remain in its current location, and NPS employee housing at Road Camp would remain in use. The NPS maintenance yard would be moved from its current location near the visitor center to the wastewater treatment plant site to the east. The wastewater treatment plant would be upgraded in its present location to meet current treatment standards. Wastewater would continue to be treated here and pumped beneath the river and meadow to the north side of the river, where it would continue to be evaporated in the existing wastewater containment ponds before being sprayed onto an upland area. If technology became available to evaporate the treated wastewater at the site of the existing plant on the south side of the road, the containment ponds would be removed. The recreational vehicle dump station would remain near the wastewater treatment plant.

The store and grill would be retained at their current location. The public fuel station and the mountaineering shop/school would be demolished and removed, and the employee cabins behind the fuel station would be removed, as they are currently located in a sensitive wetland area.

The campground would be upgraded at its current capacity of 329 sites (including 304 tent/RV sites, 4 horse campsites, and 21 backpacker sites), plus 7 group sites. Primary improvements would include upgrading and adding restrooms, repairing the campground roads, formalizing camping spots to reduce resource damage, and overhauling the water and wastewater lines as needed. The campground office and trailhead parking for Elizabeth Lakes would remain.

The Lumbert Dome parking area would be expanded, with an improved picnic area and restrooms. The concessioner stable would continue to support the concessioner day and overnight rides and service the Glen Aulin High Sierra Camp. Parking at Lumbert Dome and on the road to the stables would continue to serve as primary access points for the Glen Aulin, Young Lakes, and Dog Lake trails. Those visitors traveling to Glen Aulin would still be able to camp at the backpacker campground or stay at the tent cabins at the High Sierra Camp, although the capacity at the camp would be slightly reduced. The flush toilets for guests visiting the camp would be replaced with composting toilets to conserve water and to prevent the septic system from failing.

Visitors seeking backcountry permits and information would continue to be served at the wilderness center, where the parking would be expanded modestly to include 86 spaces for overnight use. The NPS stable would remain in its current location, and the NPS housing at Ranger Camp would be relocated to address health code issues associated with its current proximity to the stable. NPS employees would continue to be housed at Ranger Camp and Bug Camp. The ranger station would remain. The parking for Dog Lake and the John Muir Trail, just to the east of the employee housing area, would be increased.

At the Tuolumne Meadows Lodge, the capacity would be reduced by half of what it is today. Three guest cabins and all of the employee cabins would be moved away from the river to protect riparian vegetation. Roadside parking on the road to the lodge would be eliminated. A new concessioner housing area would be built just north of the Tuolumne Meadows Lodge parking lot, which would accommodate those employees displaced from cabins at the stables, behind the fuel station, and at the lodge. A camping area for NPS employees on temporary duty would also be provided in this area.

River values would be protected and enhanced by restoring ecological conditions to meadow and riparian areas, and by directing use in scenic segments to resilient areas (see “Summary of Protection and Enhancement of River Values under Alternative 3” at the end of this alternative).

The visitor use capacity under alternative 3 would be reduced to a maximum of 4,316 people at one time, as shown in table 8-12. Actual day use levels would be lower than the capacity during nonpeak periods, and actual overnight use levels would be lower even during peak periods because not all individual campsites and lodging units would be occupied by the maximum number of people allowable. The administrative use capacity under alternative 3 would be reduced to a maximum of 236 employees at one time (table 8-12).

Table 8-12.
Corridorwide Visitor and Administrative Use Capacity, Alternative 3

Visitor Overnight Capacity					
River Segment	Existing Use Calculation	Current Overnight Visitors	Proposed Action	Units	Maximum Overnight Visitors, Alt. 3
Scenic Segments					
Tuolumne Meadows Lodge	# of lodging units (69) × max of 4 people per unit	276	Reduce lodge capacity (minus 35 guest tent cabins).	34 guest tent cabins	136
Tuolumne Meadows Campground	# of campsites (329 sites × max 6 people per site, plus 7 group sites × max 30 people per site)	2,184	Retain campground capacity.	329 sites, 7 groups sites	2,184
Wild Segments					
Glen Aulin HSC	# of lodging units (8) × max of 4 people per unit	32	Reduce Glen Aulin HSC capacity (minus 1 guest tent cabin).	7 guest tent cabins	28
Wilderness	Maximum capacity of wilderness zones (400)	400	Retain current wilderness zone capacities.	–	400
Subtotal, Overnight		2,892			2,748
Visitor Day Use Capacity					
River Segment	Existing Use Calculation	Maximum Observed People At One Time, 2011^a	Proposed Action	Proposed Units	Maximum People At One Time, Alt. 3
Scenic Segments					
Access from Tuolumne Meadows	# of cars parking in designated parking spaces (340) × 2.9 ^b	986	Increase designated day parking (plus 170 spaces).	510 spaces at 90% occupancy × 2.9 ^b	1,331
	# cars parking in undesignated spaces (190) × 2.9 ^b	551	Eliminate undesignated roadside parking.	–	0
	Maximum people arriving by in-park hiker bus, tour buses, and regional public transit	225	Maintain current level of arrivals by in-park shuttles, tour buses, and regional public transit.	–	225
Access from below O'Shaughnessy Dam	# of cars parking in designated spaces (4) × 2.9 ^b	12	Retain existing parking.	4 spaces × 2.9 ^b	12
Subtotal, Day Use		1,774			1,568
Total Visitor Use People At One Time		4,666			4,316
Administrative Capacity					
River Segment	Existing Use Calculation	Maximum employees (existing)	Proposed Action	Units	Maximum employees, Alt. 3
Wild Segments					
Concessioner	Approximately 9 employees at Glen Aulin HSC	9	Retain all employees at Glen Aulin HSC.	9	9
Scenic Segments					
NPS	Approximately 150 employees assigned to Tuolumne Meadows	150	Meet staffing need with 124 employees at Tuolumne Meadows.	124 employees	124
Concessioner	103 employees based at Tuolumne Meadows	103	Meet staffing need with 103 employees at Tuolumne Meadows.	103 employees	103
Total Administrative People At One Time		262			236
Total Capacity Corridorwide		4,928 (existing)			4,552 (proposed)

a The peak number of vehicles observed during vehicle counts in 2011 (observed on August 13, 2011).

b The vehicle occupancy rate is 2.9 people per vehicle, based on visitor studies conducted over the past 20 years that found an average vehicle occupancy ranging from 2.6 to 3.4 (Van Wagtenonk and Coho 1980, FHWA 1982, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

Abbreviations: Alt. = alternative; HSC = High Sierra Camp; max = maximum; # = number

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Protection and Enhancement

Free Flowing Condition

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Water Quality

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Continue to restrict water use at the Glen Aulin High Sierra Camp to 600 gallons per day to mitigate the risk to water quality posed by the potential failure of the leach mound (see “Glen Aulin,” below).

Biological Value: Subalpine Meadow and Riparian Complex

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Biological Value: Low-Elevation Riparian and Meadow Habitat

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Scenic Value: Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Recreational Value: Wilderness Experience along the River

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Manage use levels along wilderness trails to achieve the management standards established for individual trail sections. As described in chapter 5, these standards would be consistent with studies of wilderness user preferences (Broom and Hall 2010; Cole and Hall 2008) and would differ by trail as follows:
 - Lyell Canyon trail section from Rafferty Creek to Ireland Lake Junction: an average of no more than 12 encounters per hour
 - Lyell Canyon trail section from Ireland Lake Junction to Kuna Creek: an average of no more than 8 encounters per hour
 - Glen Aulin trail: an average of no more than 12 encounters per hour
 - Grand Canyon trail (Rogers Creek Crossing to Pate Valley): an average of no more than 2 encounters per hour
- Continue concessioner stock day rides into wilderness, but at a reduced capacity to reduce conflicts on trails (four-hour and all-day rides eliminated; two-hour rides reduced from 3 to 2 per day, accommodating a maximum of 24 people per day).
- Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary (see appendix C) that gives priority to noncommercial use and restricts commercial use to no more than one overnight group per zone per night and no more than one day group per trail per day. Additional restrictions would include the following:
 - *Restrictions on types of use, Glen Aulin zone, peak months only:* During the peak use months of July and August, commercial parties having only a recreational purpose would no longer have access to the Glen Aulin zone; parties having an educational or scenic, as well as recreational, purpose (as defined in appendix C) would continue to have access consistent with limitations on total use levels, described above.

- *Restrictions on types of use, Lyell Canyon zone, peak months only:* During the peak use months of July and August, commercial use in the Lyell Canyon zone by parties with only a recreational purpose would be restricted to Monday–Thursday only. Parties having an educational or scenic, as well as a recreational, purpose would continue to have access to the Lyell Canyon zone on weekends, as well as weekdays, consistent with limitations on total use levels, described above.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

All ongoing recreational activities would continue.

Maximum Amounts of Visitor Use

Maximum use along popular wilderness trails would be limited as necessary to achieve the management standards of average encounters with no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne. The overnight capacity for backpacker camping in wild segments would be retained at 400 persons per night (350 persons per night above the reservoir and 50 persons per night below the reservoir). This capacity might be reduced in the future if determined necessary to protect wilderness values; however, it would not be increased above this amount, which has been determined to be protective of river values. The overnight capacity at the Glen Aulin High Sierra Camp would be reduced to 28 guests, which would remain independent of the wilderness trailhead quota.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- The current overnight trailhead quota system would be retained to regulate overnight use in wild segments. If monitoring determined that the new standard for day use was not being met, the NPS would increase monitoring, inform visitors about alternative trails within the corridor, and encourage visitors to hike during days and times of day at which lower encounter rates occur. If encounter rates increased despite these efforts, the NPS would consider establishing a day use permitting system and making necessary changes in the backcountry quota system to better manage for opportunities for solitude. This action would require additional compliance and public involvement.

Administrative Use

The types and levels of administrative use in wild segments would remain the same as existing conditions. Nine concessioner employees would be housed at the Glen Aulin High Sierra Camp.

Glen Aulin (Potential Wilderness Addition)

Glen Aulin High Sierra Camp

The Glen Aulin High Sierra Camp would be retained at a reduced capacity of 28 guests to facilitate opportunities for visitors with a broader range of physical abilities to connect with the river in a remote setting, while increasing protection of river values. Day use at Glen Aulin would decrease commensurate with an overall reduction in day use in the river corridor. The level of service at the camp would be reduced:

- Eliminate flush toilets for guests to reduce demands for water use and waste disposal. Provide composting toilets for guests. Retain flush toilets for employees living at Glen Aulin.
- Discontinue wood for heat stoves in visitor tent cabins to reduce the need for stock use to supply wood to the camp.

- Discontinue meals-only service for people who are not lodge guests to reduce demands for water use and waste disposal.
- Continue overnight saddle trips to the camp.

Utility improvements at the camp would include the following (see figure 8-8):

- Design for a capacity of 600 gallons per day.
- Construct a new composting toilet facility between the granite slab behind the kitchen and the septic tank. To the extent possible, facility design would be consistent with the Secretary's Standards for Historic Properties and would be in conformity with the *Yosemite Design Guidelines* (2011a).
- Install one water treatment tank (1,200 gallons) and one water storage tank (1,200 gallons) north of the existing water tank; remove the existing tank. Replace the existing chlorinator, filter tank, and surge tanks.
- Pull the water intake line back to its former location, entirely within the boundaries of the Glen Aulin potential wilderness addition. To provide for sufficient water pressure for the camp (when river flows drop below that necessary for such), temporarily utilize a microhydro unit at a suitable location within the potential wilderness addition.
- Retain the existing septic tank and leach mound.

The replacement storage tanks, filter tank, and surge tanks would be flown in by helicopter. The rest of the materials would be either flown in by helicopter or packed in with stock. The determination as to which mode of transport to use would be based on the minimum-requirement criteria established under the Wilderness Act. The estimated net construction costs for Glen Aulin under alternative 3 would be approximately \$1.1 million (see appendix N).

Backpacker Campground

See "Actions Common to Alternatives 1-4," beginning on page 8-21.

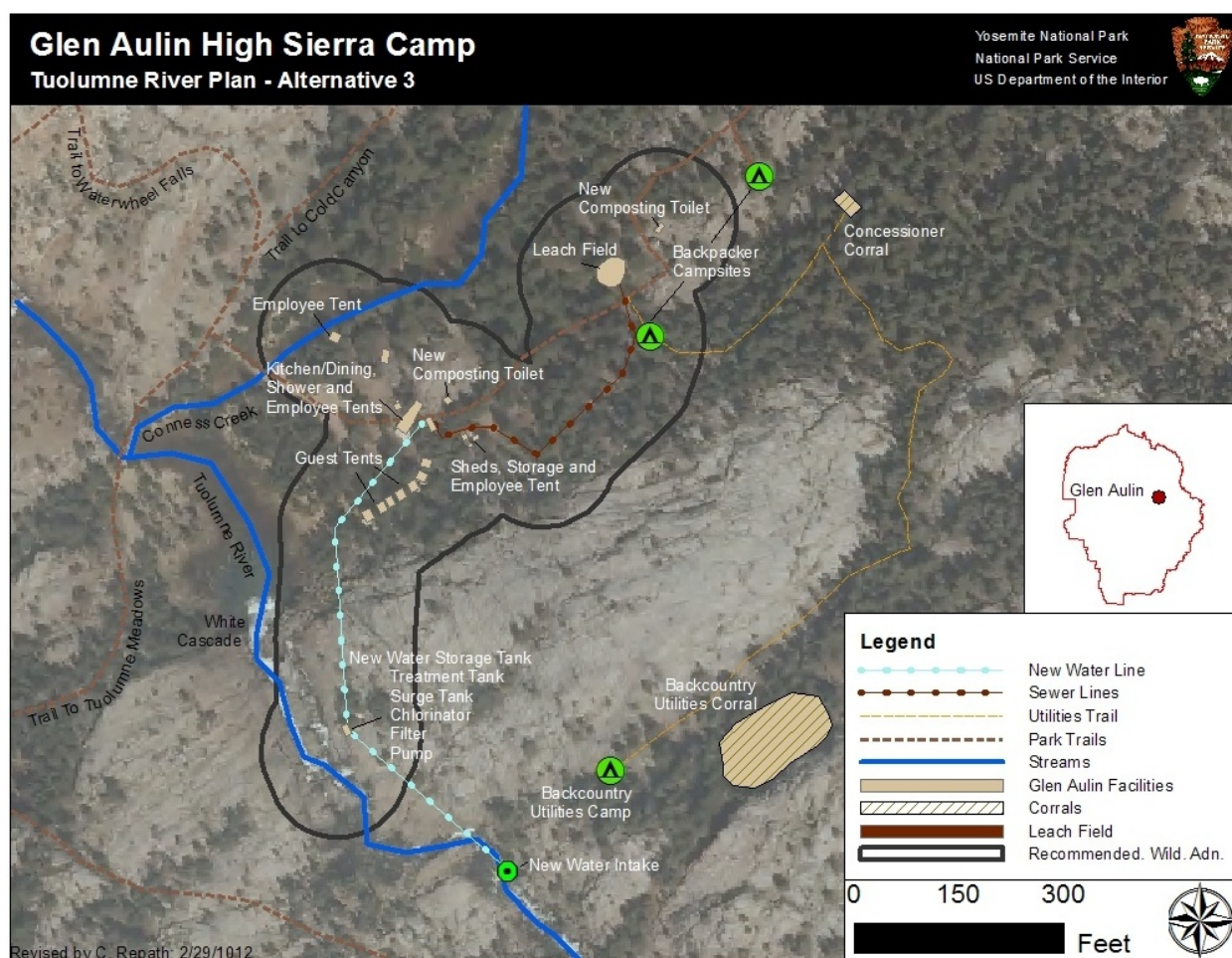


Figure 8-8. Glen Aulin Site Plan, Alternative 3.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

Note that this discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. The portions of these segments within designated Wilderness would be managed the same as the wild segments.

Resource Protection and Enhancement

Free Flowing Condition

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Reduce the average water demand to approximately 42,000 gallons per day, with rare spikes up to about 61,000 gallons per day (see table 8-13).

Water demand figures for alternative 3 are based on an 8% decrease in visitor use compared to current use. No data have been collected that would distinguish between visitor and administrative use; therefore, visitor use data have been adopted as a proxy to estimate water consumption for both types of use.

Table 8-13.
Summary of Average Estimated Water Demand, Alternative 3

Month	No Action (current use)		Alternative 3 (8% reduction in use)	
	Average Daily use	Maximum Daily use	Average Daily use	Maximum Daily use
July	46,015	66,818	42,334	61,472
August	44,715	65,640	41,138	60,389
September	34,581	62,060	31,815	57,095

This level of water withdrawal would be expected to remain within the standard of no more than 10% of low flow unless climate change led to longer low-flow durations occurring earlier in the summer, in which case further reductions in water use would be required as discussed in chapter 5.

Water Quality

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Upgrade utility systems to conserve water and protect water quality; retain force mains that cross the Tuolumne River beneath the Tioga Road bridge and that cross beneath the river and meadow between the wastewater treatment plant and the containment ponds (unless technology is found to allow consolidation of wastewater treatment facilities on the south side of Tioga Road, as described under “Tuolumne Meadows Site Plan,” below).
- Reduce concessioner stock day rides to reduce stock use and risks to water quality. Compared to current service levels, the amount of stock use on trails would be reduced by 1 two-hour and 2 four-hour rides per day, which might otherwise involve up to 14 head of stock per ride on the trails. Full-day rides, which occur only occasionally, would also be eliminated.
- Demolish and remove the public fuel station to eliminate the risk to water quality.

Biological Value: Subalpine Meadow and Riparian Complex

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Cultural Value: Parsons Memorial Lodge

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Tuolumne Meadows, Soda Springs, and Tioga Road Historic Districts

The Tuolumne Meadows, Soda Springs, and Tioga Road Historic Districts did not meet the outstandingly remarkable value criteria (see the criteria in the “Background” section of chapter 5). However, these historic districts are considered critical to the implementation of alternative 3 and therefore are addressed under this alternative. Under alternative 3, the three historic districts would be managed as follows to preserve their historic character and to protect and enhance opportunities for visitors to connect with the history and traditional uses of the Tuolumne River:

- Keep all visitor and administrative functions that are to be retained under alternative 3 in their current structures and current locations, most of which are historic and contributing elements of the Tuolumne Meadows Historic District. (Half the Tuolumne Meadows Lodge guest tent cabins and the fuel station/mountaineering shop would be demolished and removed under this alternative.) All of the functions to be retained under alternative 3 have been determined to be necessary, and no feasible locations exist outside the river corridor to relocate these functions; therefore, it would be consistent with

the intent of the WSRA and the concept of this alternative to retain them in their historic structures and locations.

- Upgrade the exterior of wilderness center in a manner consistent with the Secretary's Standards for Historic Properties (recognizing that the facility, while not a contributing element, is inside a historic district) and in conformity with the *Yosemite Design Guidelines* (2011a). Retain the Tioga Road on its current alignment. Impacts of culvert improvements on the district would be minimized or avoided by salvaging and reusing materials of the original historic culverts and ensuring that new or modified structures (e.g., headwalls) were consistent with the Secretary's Standards for Historic Properties and in conformity with the *Yosemite Design Guidelines* (2011a).

Scenic Value: Scenery through Dana and Tuolumne Meadows

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Maintain views from eight scenic vista points (identified in chapter 5) by controlling the encroachment of vegetation in a manner that was protective of ecological conditions and archeological values at each vista point. Each particular vista point would be managed in accordance with an individual work plan based on evaluations of river values and other resources at that specific location. The work plans are included in appendix I. No other vegetation management would be conducted to enhance scenery or viewing opportunities.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Increase the amount of designated parking available to visitors wishing to get out of cars to enjoy recreational experiences in a river-related landscape.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

All ongoing recreational activities would continue, including rustic lodging and concessioner stock day rides. To retain opportunities for visitors to connect with the history and traditional uses of the Tuolumne River, the historic setting would be preserved under alternative 3. The day and overnight capacities would be somewhat reduced to allow for a mix of traditional park programs and relatively unstructured exploration to continue, but at a level of use that would be protective of river values (see below). As with alternatives 2 and 4, visitors would be directed from trailheads at designated parking lots to trails and encouraged to minimize their impacts on sensitive meadow and riparian resources; however, unlike alternatives 2 and 4, they would not be prohibited from dispersing into the meadow or along the riverbank as they have done traditionally. Congestion would be reduced by reducing use levels, improving parking and trailhead conditions, increasing shuttle bus service between destinations within the Tuolumne Meadows area, and expanding visitor information and orientation services to advise visitors about less used destinations and trail segments.

Visitor services would be managed as follows:

- Conduct a full range of orientation, interpretation, and education programs, with increased emphasis on education about the need to protect river values, at the visitor center, wilderness center, and Parsons Memorial Lodge, as well as in the field.
- Retain some commercial services (store/grill, concessioner stock day rides) and the postal service (subject to future USPS level of service decisions beyond NPS control). The public fuel station and mountaineering shop and school would be eliminated.

- Reduce concessioner stock day rides to 2 two-hour rides per day (maximum of 24 people per day); eliminate the four-hour and full-day rides.
- Retain the campground at its current capacity of 329 sites, plus 7 group campsites.
- Retain the Tuolumne Meadows Lodge, but at half its current capacity. Such a reduced capacity would preserve the historic setting while reducing use levels to allow for a mix of traditional park programs and relatively unstructured exploration at a level that would be protective of river values. The reduced capacity would also decrease demands for water use and disposal.
- Increase the frequency of shuttle bus service among destinations within the Tuolumne Meadows area, and add stops at visitor service areas, thereby making it easier for visitors to use public transportation to circulate within the Tuolumne Meadows area.

Maximum Amounts of Visitor Use

- Reduce the maximum day use capacity above Hetch Hetchy Reservoir from 1,762 people at one time to a maximum of 1,556 people at one time (table 8-12).
- Reduce the overnight capacity at Tuolumne Meadows to 2,320 people per night: 2,184 people accommodated in the campground, and 136 people accommodated by the 34 guest tent cabins at Tuolumne Meadows Lodge (table 8-12). Actual overnight use levels would be lower than these capacities because individual campsites and lodging units would not always be occupied by the maximum number of people allowable.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

Day Use

Day use capacity would be managed by controlling day parking, which would be restricted to paved or otherwise authorized spaces. No undesignated roadside parking would be allowed through the Tuolumne Meadows area. Undesignated roadside parking would continue to be allowed along Tioga Road west and east of Tuolumne Meadows. The amount of formal, designated day parking in the Tuolumne Meadows area would be increased from 340 to 510 spaces. (See parking details under “Tuolumne Meadows Site Plan,” below.)

Overnight Use

Overnight user capacity under alternative 3 would be managed by the facility capacities of the campground and Tuolumne Meadows Lodge. These facilities would continue to be available through a reservation system, with some campsites also available on a first-come, first-served basis.

Administrative Use

NPS staffing would be reduced to a maximum of 124 employees (table 8-12). In addition to current housing, 20 employee campsites would be provided to meet the need for incidental “housing” for employees on temporary duty in the Tuolumne Meadows area (see “Employee Housing,” below). Concessioner employee staffing and housing necessary to support commercial services would remain the same as under the no-action alternative (103 employees). (See “Tuolumne Meadows Site Plan,” below for the location of proposed employee housing.)

Tuolumne Meadows Site Plan

The locations identified below are illustrated on the site plan map (figure 8-9) at the end of this section on alternative 3. The estimated net construction costs for Tuolumne Meadows under alternative 3 would be approximately \$49.5 million, based on calculations included in appendix N.

Visitor Facilities

- Retain the visitor center, wilderness center, and store and grill in their existing locations and arrangement to maintain the historic character of the river corridor. The exterior of the wilderness center would be upgraded in a manner consistent with the Secretary's Standards for Historic Properties (recognizing that the facility, while not historic, is inside a historic district) and in conformity with the *Yosemite Design Guidelines* (2011a). The public fuel station and the mountaineering shop/school would be eliminated.
- Retain the campground at its current capacity (see the next subhead below).
- Retain the Tuolumne Meadows Lodge but at half its current capacity. The 35 tent cabins on the north side of the lodge complex would be demolished and removed. The three guest tent cabins nearest the river would be relocated to protect adjacent riparian habitat.
- Increase shuttle bus stops. (Shuttle buses would no longer stop at location 3 on the site plan after a new trailhead was provided for the Cathedral Lakes trailhead.)

Campground

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Design for a capacity of 304 car/RV sites, 4 horse sites, and 21 backpacker sites (all with a maximum capacity of 6 people per site), plus 7 group sites (with a maximum capacity of 30 people per site), for a maximum of 2,184 people).
- Retain the campground A-loop road and campsites.
- Retain the campground office.
- Retain the existing entrance road alignment.
- Formalize a trail connection between the campground and the John Muir Trail.

Trails and Trailheads

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Picnic Areas

- Retain the picnic area near Lembert Dome (replace the waterless toilets in kind).
- Provide new picnic area east of Pothole Dome.
- Provide new picnic area near the new Cathedral Lakes trailhead.

Parking

The total number of designated parking spaces in the Tuolumne Meadows area (day and overnight) would be increased from 533 to 813 spaces, as shown in table 8-14.

Table 8-14.
Number of Parking Spaces in Designated Parking Areas, Alternative 3

Type of Parking	Current	Alternative 3	Description
Day Parking	16	18	existing parking area at Pothole Dome
	0	22	currently undesignated parking/viewing area ^a east of Pothole Dome
	50	113	existing parking area at the visitor center, including additional parking for the Cathedral Lakes trailhead
	11	13	existing parking area at the campground office
	11	11	existing parking in the campground for the Elizabeth Lakes trailhead
	15	15	existing parking area at the fuel station
	51	55	existing parking area at the current site of the store and grill
	58	58	existing parking area at the concessioner stable
	0	34	roadside parking along the road to the concessioner stable
	29	37	existing parking area at the base of Lember Dome
	7	7	existing parking area at the ranger station
	25	45	existing parking area at the Dog Lake/John Muir Trail trailhead
	0	15	currently undesignated parking area at Gaylor pit ^a
	67	67	existing parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	510	Total day parking
Overnight Parking (excluding cars parked in the Tuolumne Meadows campground)	58	86	existing parking area at the wilderness office
	33	59	existing parking area at the Dog Lakes/John Muir Trail trailhead
	0	32	relocated parking area for the Cathedral Lakes trailhead
	0	56	roadside parking along the road to the concessioner stable
	102	70	Tuolumne Meadows Lodge
	193	303	Total overnight parking
	533	813	Total day and overnight parking

a Although people currently park in these areas, they are not yet designated parking areas; therefore they are counted as part of the undesignated parking under the no-action alternative.

NPS and Concessioner Stables

- Retain the NPS and concessioner stables in their current locations. Housing for all but two employees would be removed from the stable area and replaced at the consolidated concessioner employee housing area near Tuolumne Meadows Lodge (see “Employee Housing,” below).

Park Operations

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Add a new maintenance yard and office and consolidate operational facilities related to roads, trails, buildings, and grounds at the wastewater treatment site.
- Retain the ranger station.
- Retain the search-and-rescue cache at Ranger Camp.
- Provide aboveground gasoline and diesel fuel tank at the new maintenance yard for concessioner and NPS use.

Employee Housing

- Provide NPS employee housing for no more than 104 employees, plus campsites for an additional 20 employees to be added behind Tuolumne Meadows Lodge. This would accommodate a total of 124 employees, which is the amount of housing determined to be necessary in the Tuolumne Meadows area to support the kinds and levels of visitor use included in alternative 3. It would be infeasible to locate this housing outside the river corridor due to site constraints; therefore, it must be inside the corridor.

- Road Camp (17 employees)
- Ranger Camp (54 employees)
- Bug Camp (33 employees)
- campsites behind Tuolumne Meadow Lodge (20 employees)
- Provide concessioner employee housing for 101 employees north of the existing Tuolumne Meadows Lodge parking area (at a density equal to that of the existing lodge employee area plus kitchen, dining, toilet, and shower house facilities). Provide a hard-sided cabin for two stable employees at the concessioner stable at a location that would comply with relevant OSHA and NPS housing regulations regarding the proximity of housing and stock corrals, and relocate all other stable employees to the lodge area.

Utility Systems

The general direction for site-specific planning for utility systems under alternative 3, intended to protect and enhance the river's free flow, water quality, and outstandingly remarkable values, is outlined below. Additional site-specific planning and compliance would be required prior to implementing these actions.

Tuolumne Meadows Wastewater Collection, Treatment, and Disposal

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Upgrade wastewater treatment plant; design for a maximum water demand of 61,000 gallons per day.
- Seek technology to allow removal of the wastewater containment ponds and sprayfields from the north side of Tioga Road and replace with facilities on the south side of the road, to be designed in conjunction with the new wastewater treatment plant. Even if technology was not available, it might be possible to eliminate the ponds because tertiary treatment might produce wastewater of a quality high enough to be distributed directly to the sprayfield if no other factors required temporary containment in the ponds. Tertiary treatment would also greatly reduce the risk to water quality from potential failure of the existing wastewater line under the meadows. If the ponds could not be eliminated, they would be redesigned to minimize risks of overflow and fenced for facility security. The sprayfield would be redesigned to minimize risk of saturation.

Site Restoration

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

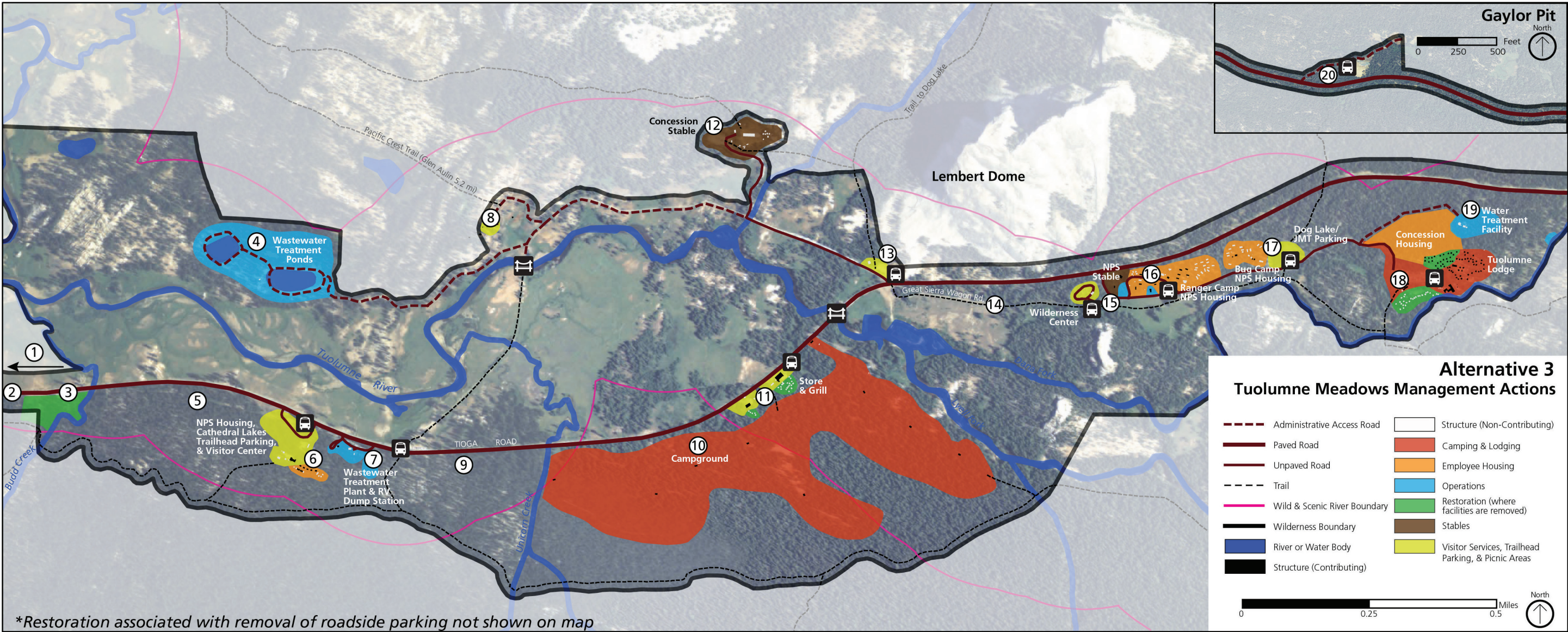


Figure 8-9. Tuolumne Meadows Site Plan, Alternative 3.

Key to figure 8-9 and List of Facilities Management Actions (actions marked with an asterisk (*) are specific to this alternative. All other actions are common to alternatives 1–4):

1. Pothole Dome scenic pullout/ parking areas	Designate day parking with trailhead on north side of Tioga Road. Improve trail to Pothole Dome. Formalize parking/viewing area east of Pothole Dome; add facilities for picnicking.	6. Existing visitor center and Road Camp	Retain visitor center in current location. Construct new cathedral lakes trailhead and picnic area, day and overnight parking. Relocate maintenance yard and office to location #7. Retain NPS employee housing.	11. Existing commercial services core	Retain store, grill, post office, and day parking. Eliminate mountaineering shop/school and public fuel station; demolish and remove the structure; retain day parking at fuel station site. Upgrade restroom. Add trail connector to campground. Relocate concessioner employee housing to location #18.	16. Existing ranger station and Ranger Camp	Retain ranger station, SAR cache, and day parking. Relocate aboveground diesel fuel tank to location #7. Replace NPS employee housing with hard-sided cabins.
2. Tioga Road through the Tuolumne Meadows area	Retain the Tioga Road in its current alignment. Add roadside curbing to eliminate undesigned roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows.	7. Wastewater treatment plant	Upgrade wastewater treatment plant. Retain recreational vehicle dump station. Add new modest operational facilities related to roads, trails, buildings, and grounds. Add NPS maintenance yard and office, including aboveground diesel fuel tank. Diesel fuel tank for NPS and concessioner use relocated from location #16.	12. Existing concessioner stable	Retain concessioner stable and day parking. Retain one hard-sided cabin for two stable employees (most employee housing relocated to location #18). Retain day and overnight parking along access road.	17. Bug Camp, Dog Lake/ John Muir Trail parking	Increase day and overnight parking. Retain NPS employee housing.
3. Existing Cathedral Lakes trailhead	Relocate trailhead and parking to location #6; restore to natural conditions.	8. Parsons Memorial Lodge	Preserve lodge and retain vehicle access and footbridge.	13. Lembert Dome	Retain picnic area. Expand day parking and retain trailheads for Lembert Dome and Parsons Memorial Lodge. Add shuttle stop.	18. Tuolumne Meadows Lodge	Retain Lodge with reduced capacity. Relocate the three guest tent cabins and all employee tent cabins away from the river. Eliminate roadside parking. Expand concessioner employee housing Provide camping area for NPS employees on temporary duty.
4. Existing wastewater ponds and sprayfields	Retain and upgrade (or relocate if feasible).	9. Area west of Unicorn Creek	Retain as undeveloped natural area.	14. Great Sierra Wagon Road	Preserve as trails; mitigate impacts of historic roads to meadow hydrology.	19. Water treatment facility	Retain water treatment facility.
5. Area east of Budd Creek and west of existing visitor center	Construct new cathedral lakes trailhead connector. Retain as undeveloped natural area except for trail segment.	10. Tuolumne Meadows campground	Rehabilitate the campground in its current configuration and current capacity. Retain campground office and day parking. Retain existing entrance road. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank.	15. Existing wilderness center and NPS stable	Retain wilderness center; expand parking. Retain NPS stable.	20. Gaylor Pit	Retain helipad. Add day parking.

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Summary of Protection and Enhancement of River Values under Alternative 3

The *Tuolumne River Plan* will be evaluated in terms of four primary legal requirements: (1) the WSRA requirement that it protect and enhance river values; (2) the NEPA requirement that it fully consider the effects on the human environment; (3) the NHPA requirement that it consider effects on historic properties; and (4) the requirement of the Wilderness Act that it preserve wilderness character in designated Wilderness. (The NEPA process coordinates compliance with the body of additional federal laws and regulations applicable to the plan.) Guidelines for each of these requirements describe the criteria to be used in determining the effects of the plan. This section focuses directly on how the plan would meet the WSRA requirement to protect and enhance river values if alternative 3 were to be selected. The NEPA, NHPA, and Wilderness Act analyses are presented in chapter 9.

All the action alternatives, including alternative 3, would protect and enhance river values as described in detail in chapter 5 and summarized in this chapter under “Summary of Protection and Enhancement of River Values under All Action Alternatives,” beginning on page 8-32. In addition, alternative 3 would take the following additional actions, primarily related to management of visitor use, user capacity, and development, to further protect or enhance river values.

Free-Flowing Condition of the River

Provided that river low flows remained around or above 1 cubic foot per second, maximum daily water withdrawals of 65,000 gallons per day would ensure that no more than 10% of flow was consumed. The average daily water demand for alternative 3 would be reduced by about 8%, to approximately 42,000 gallons per day, with rare spikes up to about 61,000 gallons per day. Based on these estimates, alternative 3 would be protective of river flow and downstream habitat under the current flow conditions. If low flows reduced significantly, reductions in levels of service would keep demand within the limits of no more than 10% of low flows.

Management to Protect Water Quality

Risks to water quality in the Tuolumne Meadows area would be mitigated by upgrading the wastewater treatment plant, wastewater ponds, and sprayfields. The improved utilities would be designed for loads commensurate with estimates of domestic water use. The risk to water quality from fuel storage at the public fuel station would be eliminated. Risks to water quality at Glen Aulin would be mitigated by replacing flush toilets with composting toilets and slightly decreasing use levels, which would keep the demand for water at no more than 600 gallons per day. Monitoring would be ongoing to ensure that water quality remained excellent at both Tuolumne Meadows and Glen Aulin.

Management to Protect the Subalpine Meadow and Riparian Complex

Most of the actions to protect and enhance the subalpine meadow and riparian complex would be common to all the action alternatives. Alternative 3 would additionally reduce the maximum people at one time in the river corridor (almost all of whom would access through the Tuolumne Meadows area) by an estimated 8% (from an estimated maximum user capacity of 4,928 visitors and employees to a maximum user capacity of 4,552 visitors and employees). The reduction in numbers of people would be expected to keep meadow fragmentation associated with foot traffic within the protective standard discussed in chapter 5.

Management to Protect Prehistoric Archeological Sites

The same management of visitor use described above would also reduce impacts on prehistoric archeological sites in the Tuolumne Meadows and Lower Dana Fork segments. Monitoring would be ongoing to ensure that site disturbance did not exceed the protective standard established for these sites. If conditions were not being

maintained within the protective standards, additional actions would be taken to further manage or reduce visitor use, as described in chapter 5.

Management to Protect and Enhance Scenic Values

Scenic views and viewpoints in the Tuolumne Meadows area and along the Tioga Road corridor would be protected and enhanced by managing unnatural features, such as facilities and parked cars, to minimize their intrusion into remarkable views.

The eight scenic vista points identified by the *Tuolumne River Plan* would be protected and enhanced if necessary by removing encroaching vegetation, primarily conifers.

Management to Protect and Enhance the Wilderness Experience along the River

The wilderness experience along trails in wild segments would be protected by restricting use to levels that resulted in encounters with an average of no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne.

Management to Protect and Enhance Rare and Easy Access to the River through Tuolumne and Dana Meadows

Opportunities for scenic driving along Tioga Road would be enhanced by eliminating the undesignated roadside parking and the congestion currently caused by vehicles slowing to park and pedestrians crossing the road. Opportunities for people wishing to park and get out of their cars would be enhanced by increasing the number of designated parking spaces.

Alternative 4 (Preferred): Improving the Traditional Tuolumne Experience

Alternative 4 builds upon all the major elements in the *Tuolumne River Plan* to identify a set of management actions that would work together to protect river values, while accommodating existing amounts of day and overnight use and providing improved, but more highly structured, opportunities for day visitors at Tuolumne Meadows.

Alternative 4 includes the technical correction to the river corridor boundary (presented in chapter 3), the section 7 determination process for evaluating water resources projects (presented in chapter 4), the management standards and actions for protecting and enhancing river values (presented in chapter 5), and the guidance for identifying an appropriate visitor experience and associated user capacity (presented in chapter 6). The site plan for Tuolumne Meadows reflects the facilities analysis in chapter 7.

Concept

Alternative 4 balances a traditional Tuolumne experience with reduced and more sustainable development and enhanced resource protection. It also addresses the need to provide a meaningful introduction to the Tuolumne River for the growing number of short-term visitors.

As with all alternatives, most of the river corridor would be managed as wilderness. In these areas, natural river-related systems would be sustained by natural ecological processes, prehistoric archeological and American Indian traditional cultural resources would characterize the cultural landscape, and recreational opportunities would be primitive and unconfined. A limited portion of the river (from Pothole Dome to Pate Valley) would be opened to recreational whitewater boating on a trial basis.

In comparison to no action, alternative 4 would include the following actions:

- Restore previously disturbed ecological conditions to subalpine meadow and riparian areas.
- Reduce risks to stream flow and water quality.
- Increase protection of archeological sites and resources important to American Indians.
- Retain all current recreation opportunities except concessioner day rides.
- Allow whitewater boating on limited portions of the river.
- Reduce capacity and the level of service at Glen Aulin.

At Tuolumne Meadows, day visitors would be encouraged to park their cars and explore the area on walks or short hikes to sites of natural and cultural interest, where they could enjoy activities such as sightseeing and participating in interpretive and educational programs, fishing, swimming, and picnicking. Visitors would be directed to formally maintained trails and specific destinations to protect and enhance recovering meadow and riparian habitats while accommodating slightly increased levels of day use. Current levels of camping and lodging would be retained, as would a small store and grill. The potential for traffic congestion on peak days would be reduced by providing designated parking and by increasing public transit as an option for arriving at Tuolumne Meadows.

The Glen Aulin High Sierra Camp would remain open but at a reduced level of service. This would decrease risks to water quality and improve the wilderness experience while still allowing visitors with a broader range of physical abilities the opportunity to experience a wild segment of the river.

River values would be protected and enhanced by restoring ecological conditions to meadow and riparian areas, by directing visitors to designated trails, by eliminating most risks to water quality, and by undertaking the suite of actions common to all the alternatives (see “Summary of Protection and Enhancement of River Values under Alternative 4” at the end of this alternative).

The visitor use capacity under alternative 4 would be slightly increased to a maximum of 4,727 people at one time, as shown in table 8-15. Actual day use levels would be lower than the capacity during nonpeak periods,

and actual overnight use levels would be lower than the capacity even during peak periods because not all individual campsites and lodging units would be occupied by the maximum number of people allowable. The administrative use capacity under alternative 4 would decrease slightly to 261 employees at one time (table 8-15).

Virtual Tour

Under the preferred alternative, the majority of facilities in Tuolumne Meadows would remain, with key improvements made to protect river values and the visitor experience. This section provides an overview of how visitors would experience Tuolumne Meadows and how administrative and visitor services would function.

Visitors entering Tuolumne Meadows from the west would be introduced to views of the meadows largely unobstructed by vehicles along Tioga Road because the majority of roadside parking would have been eliminated (with new subdued curbing or boulder placement preventing continued roadside parking). The partially gravel pullout on the north side of Tioga Road at Pothole Dome would be paved with designated parking for 18 vehicles and there would be a formal trailhead to Pothole Dome. In addition, a new parking/viewing area for 22 vehicles would be provided east of Pothole Dome. The multiple informal trails in the meadows would be restored to natural conditions, and the primary trail to Pothole Dome and the river would be delineated with rustic fencing and signs at the trailhead. Naturalistic barriers would be placed along the roadside and along trails to discourage visitors from damaging the meadow by leaving the formally designated trail to and around Pothole Dome.

The large number of visitors coming to hike the Cathedral Lakes trail would no longer park along the road shoulder, but would instead be directed to a designated trailhead parking lot and picnic area near the existing visitor center. A new ½-mile trail segment would be constructed to connect the parking area with the Cathedral Lakes trail to the west. The NPS maintenance yard would remain at this location, and the CCC mess hall building, which currently houses the visitor center, would be repurposed to provide needed office space for NPS employees. The visitor center would be relocated to a more central location with better views and access to the river and meadows. The amount of NPS employee housing at Road Camp would be increased.

The wastewater treatment plant located east of the maintenance yard would be upgraded in its present location to meet current treatment standards. Wastewater would continue to be treated there and pumped beneath the river and meadow to the north side of the river, where it would continue to be sprayed onto an upland area. If technology became available to evaporate the treated wastewater at the site of the existing plant on the south side of the road, the containment ponds would be removed. The recreational vehicle dump station would remain near the wastewater treatment plant.

A new visitor contact station, with the same level of service as the existing visitor center, would be located on the south side of Tioga Road, across from the existing Parsons Memorial Lodge trailhead. This would replace the current function of the visitor center. Visitors would park in a new lot there for access to Parsons Memorial Lodge, Soda Springs, and the Glen Aulin trail on the north side of the river across the meadows. A new pedestrian trail would be provided along the south side of Tioga Road to connect the visitor contact station to the campground, store, grill, and post office, which would remain in their current locations. A new picnic area would be in the vicinity of the store and grill. The public fuel station and mountaineering shop would be demolished and removed, and the parking lot would be expanded to provide 85 spaces at that site. The mountaineering school would continue to provide guiding services based out of a new location at the Tuolumne Meadows Lodge. The employee cabins behind the fuel station would also be removed because they are currently located in a sensitive wetland area.

Table 8-15.
Corridorwide Visitor and Administrative Use Capacity, Alternative 4

Visitor Overnight Capacity					
River Segment	Existing Use Calculation	Current # Overnight Visitors	Proposed Action	Units	Maximum Overnight Visitors, Alt. 4
Scenic Segments					
Tuolumne Meadows Lodge	# of lodging units (69) × max of 4 people per unit	276	Retain lodge capacity.	69 guest tent cabins	276
Tuolumne Meadows Campground	# of campsites (329 sites × max of 6 people per site, plus 7 group sites × max 30 people per site)	2,184	Retain campground capacity.	329 sites, 7 group sites	2,184
Wild Segments					
Glen Aulin HSC	# of lodging units (8) × max of 4 people per unit	32	Reduce Glen Aulin HSC capacity.	Retain all historic tent cabins but at a lower guest capacity.	28 or less
Wilderness	Maximum capacity of wilderness zones (400)	400	Retain current wilderness zone capacities.	–	400
Subtotal, Overnight		2,892			2,888
Visitor Day Use Capacity					
River Segment	Existing Use Calculation	Maximum Observed People At One Time, 2011^a	Proposed Action	Proposed Units	Maximum People At One Time, Alt. 4
Scenic Segments					
Access from Tuolumne Meadows	# of cars parking in designated parking spaces (340) × 2.9 ^b	986	Increase designated day parking (plus 222 spaces).	562 spaces at 90% occupancy × 2.9 ^b	1,467
	# cars parking in undesignated spaces (190) × 2.9 ^b	551	Eliminate undesignated roadside parking.	–	0
	Maximum people arriving by in-park hiker bus, tour buses, and regional public transit (YARTS)	225	Maintain current level of arrivals by in-park shuttles and tour buses; increase capacity for regional public transit.	–	360
Access from below O'Shaughnessy Dam	# of cars parking in designated spaces (4) × 2.9 ^b	12	Retain existing parking.	4 spaces × 2.9 ^b	12
Subtotal, Day Use		1,774			1,839
Total Visitor People At One Time		4,666			4,727
Administrative Capacity					
River Segment	Existing Use Calculation	Maximum employees (existing)	Proposed Action	Units	Maximum employees, Alt. 4
Wild Segments					
Concessioner	Approximately 9 employees at Glen Aulin HSC	9	Reduce staffing at Glen Aulin HSC to 8 employees.	8 employees	8
Scenic Segments					
NPS	Approximately 150 employees assigned to Tuolumne Meadows	150	Meet staffing need with 163 employees at Tuolumne Meadows.	163 employees	163
Concessioner	103 employees based at Tuolumne Meadows	103	Meet staffing need with 90 employees at Tuolumne Meadows.	90 employees	90
Total Administrative People at One Time		262			261
Total Corridorwide Capacity		4,928 (existing)			4,988 (proposed)

a The peak number of vehicles observed during vehicle counts in 2011 (observed on August 13, 2011).

b The vehicle occupancy rate is 2.9 people per vehicle, based on visitor studies conducted over the past 20 years that found an average vehicle occupancy ranging from 2.6 to 3.4 (Van Wagtendonk and Coho 1980, FHWA 1982, ORCA 1999, Littlejohn et al. 2005, Le et al. 2008). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

Abbreviations: HSC = High Sierra Camp; max = maximum; # = number; YARTS = Yosemite Area Regional Transit Service

The campground would be upgraded but remain at its current capacity of 329 sites (including 304 tent/RV sites, 4 horse campsites, and 21 backpacker sites), plus 7 group sites. Primary improvements would include upgrading and adding restrooms, relocating the entrance road and kiosk out of the floodplain, repairing the campground roads, formalizing camping spots to reduce resource damage, relocating campsites away from the river, realigning the A-loop road, and overhauling the water and wastewater lines as needed. The campground office and trailhead parking for Elizabeth Lakes would remain.

The Lembert Dome parking area would be retained at its existing size, with an improved picnic area and restrooms. The stable would be reconfigured to incorporate the NPS stable function, an action made possible by eliminating concessioner stock day rides. Parking at Lembert Dome and on the road to the stables would continue to serve as primary access points for the Glen Aulin, Young Lakes, and Dog Lake trails. Those visitors travelling to Glen Aulin would still be able to camp at the backpacker campground or stay in the tent cabins at the High Sierra Camp, although the capacity at the camp would be slightly reduced. The flush toilets would be replaced with composting toilets to conserve water and to prevent the septic system from failing.

Visitors seeking backcountry permits and information would continue to be served at the wilderness center, where the parking would be expanded to include 89 total spaces for overnight use. The nearby NPS stable would be relocated to address health code issues associated with its current proximity to employee housing at Ranger Camp. New NPS employee housing would be provided at the stable site, and the housing at Ranger Camp and Bug Camp would be brought into compliance with current codes, in a manner consistent with the Secretary's Standards for Historic Properties and in conformity with the *Yosemite Design Guidelines* (2011a). The ranger station would be retained and modified to better accommodate administrative functions. The parking for Dog Lake and the John Muir Trail, just to the east of the employee housing area, would be increased.

At the Tuolumne Meadows Lodge, the capacity would remain as it is today with an upgraded shower house, which would be open to the public. Three guest cabins, the dining hall and kitchen, and all of the employee cabins would be moved away from the river to protect riparian vegetation, pending identification of a suitable site and in consultation with the state historic preservation officer. Roadside parking on the road to the lodge would be eliminated. A new concessioner housing area would be built just north of the Tuolumne Meadows Lodge parking lot, which would accommodate those employees displaced from cabins at the stables, behind the fuel station, and at the lodge.

NPS employees with short-term assignments in Tuolumne Meadows would be provided a dry camp and parking at Gaylor Pit, near the existing helipad, just east of Lembert Dome. Some full-season employees could also camp here as a temporary solution to the employee housing shortage while additional housing units were being constructed, including a bunkhouse facility on the site of the former NPS stable.

Wild Segments (Designated Wilderness and Glen Aulin)

Resource Protection and Enhancement

Free Flowing Condition

See "Actions Common to Alternatives 1-4," beginning on page 8-21.

Water Quality

In addition to "Actions Common to Alternatives 1-4," beginning on page 8-21:

- Reduce water use at the Glen Aulin High Sierra Camp to 500 gallons per day to mitigate the risk to water quality (see "Glen Aulin," below).

Biological Value: Subalpine Meadow and Riparian Complex

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Biological Value: Low-Elevation Riparian and Meadow Habitat

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Scenic Value: *Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne*

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Recreational Value: Wilderness Experience along the River

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Manage use levels along wilderness trails to achieve the management standards established for individual trail sections. As described in chapter 5, these standards would be consistent with studies of wilderness user preferences (Broom and Hall 2010, Cole and Hall 2008) and would differ by trail as follows:
 - Lyell Canyon trail section from Rafferty Creek to Ireland Lake Junction: an average of no more than 12 encounters per hour
 - Lyell Canyon trail section from Ireland Lake Junction to Kuna Creek: an average of no more than 8 encounters per hour
 - Glen Aulin trail: an average of no more than 12 encounters per hour
 - Grand Canyon trail (Rogers Creek Crossing to Pate Valley): an average of no more than 2 encounters per hour
- Discontinue concessioner stock day rides into wilderness to eliminate conflicts on trails and enhance opportunities for self-reliance.
- Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary (see appendix C) that gives priority to noncommercial use and restricts commercial use to no more than two overnight parties per zone per night and no more than two day parties per trail per day. Additional restrictions would include the following:
 - Restrictions on types of use, Glen Aulin zone, peak months only: During the peak use months of July and August, commercial parties having only a recreational purpose would no longer have access to the Glen Aulin zone; parties having an educational or scenic, as well as recreational, purpose (as defined in appendix C) would continue to have access consistent with limitations on total use levels, described above.
 - Restrictions on types of use, Lyell Canyon zone, peak months only: During the peak use months of July and August, commercial use in the Lyell Canyon zone by parties having an educational purpose would be restricted to 15% of total use on weekend nights; parties with a scenic/recreational purpose would be restricted to 10% of total use on weekend nights. These restrictions would not apply on weekday nights.
- Provide a new river-dependent wilderness experience by allowing boating in the Grand Canyon of the Tuolumne, from Pothole Dome (where the Tuolumne River exits Tuolumne Meadows) to Pate Valley, with the exact put-in, take-out, portage trails, landing zones, and no-landing zones to be determined in consultation with the boating community, tribal interests, and NPS resource experts. Overnight boating would be permitted under the wilderness overnight trailhead quota system used to manage the user capacity in all wilderness zones. Wilderness users who planned to boat would have to declare their intention to boat the Grand Canyon of the Tuolumne when they obtained their wilderness permit (they

would fall under the “pass-through” quota—those who are traveling through the Grand Canyon of the Tuolumne without staying at Glen Aulin, which is 15 people per day). However, actual use levels for whitewater boating 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. Only noncommercial boating would be permitted. The NPS would provide for such use on a trial basis, monitoring and adjusting the provision of this opportunity as needed and adding additional restrictions during the trial period as needed. Specifically, the agency might use any combination of temporal or flow restrictions; seasonal, temporary, or permanent closures; group size and equipment restrictions; and other standard management and regulatory mechanisms (including wilderness camping regulations) it deemed necessary—with temporary or permanent closures likely if any boaters opted to violate the prohibition on boating on Hetch Hetchy Reservoir.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

Most ongoing recreational activities would continue; however, concessioner stock day rides into designated Wilderness would be discontinued. In addition, limited recreational whitewater boating would be allowed on portions of the river from Pothole Dome to Pate Valley on a trial basis.

Maximum Amounts of Visitor Use

Maximum use along popular wilderness trails would be limited as necessary to achieve the management standards of average encounters with no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne. The overnight capacity in wild segments would be retained at 400 persons per night (350 persons per night above the reservoir and 50 persons per night below the reservoir). This capacity might be reduced in the future if determined necessary to protect wilderness values; however, it would not be increased above this amount, which has been determined to be protective of river values. The overnight visitor capacity at the Glen Aulin High Sierra Camp would be reduced to 28 guests or less, which would remain independent of the wilderness trailhead quota. As noted above, whitewater boaters would be subject to the wilderness trailhead quota for those “pass-through” visitors who are traveling through the Grand Canyon of the Tuolumne without staying at Glen Aulin (up to 15 people per day).

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1–4,” beginning on page 8-21:

- The current overnight trailhead quota system would be retained to regulate overnight use in wild segments. If monitoring determined that the new standard for day use was not being met, the NPS would increase monitoring, inform visitors about alternative trails within the corridor, and encourage visitors to hike during days and times of day at which lower encounter rates occur. If encounter rates increased despite these efforts, the NPS would consider establishing a day use permitting system and making necessary changes in the backcountry quota system to better manage for opportunities for solitude. This action would require additional compliance and public involvement.
- Overnight boating would be permitted under the overnight wilderness trailhead quotas already in existence (that is, the existing trailhead quota for the Grand Canyon of the Tuolumne would include the boating parties, without expanding the quota), and a day use boating permit system would be implemented as needed (if boaters chose to float this stretch in one day or less).

Administrative Use

The types and levels of administrative use in wild segments would remain the same as existing conditions. Eight concessioner employees would be housed at the Glen Aulin High Sierra Camp.

Glen Aulin (Potential Wilderness Addition)

Glen Aulin High Sierra Camp

The Glen Aulin High Sierra Camp would be retained at no more than 28 guests, thereby continuing to offer the opportunity for visitors with a broader range of physical abilities to connect with the river in a remote setting. Camp operations would be required to meet the following criteria:

- Reduce water use from the current 600 gallons of water per day to a maximum of 500 gallons per day, resulting in a maximum generation of 500 gallons of wastewater per day.
- Limit pack stock use to resupply the camp to a maximum of two packstrings (six mules or horses and one rider¹) per week. Based on the average usage from 2009–2012, this restriction would reduce total pack stock use on the Glen Aulin trail by 43% (including private stock use, commercial outfitter use, and NPS administrative use), which would greatly reduce conflicts with hikers and trail impacts from stock use.

The layout of the camp's historic structures would remain the same, with eight guest tent cabins. However, the capacity of two of the tent cabins would be reduced from four to two by removing two beds from each. Reducing the camp's total capacity from 32 to 28 in this manner (a 12.5% reduction) would better protect wilderness character in the vicinity of the camp.

The camp operator would have two years to adjust to these parameters. Operations by the third year must comply with these parameters or the camp capacity would be reduced progressively until compliance was achieved.

Several additional actions would further protect water quality, wilderness character, the hiking experience, and scenic values:

- Replace flush toilets with composting toilets for guests and employees to reduce demands for water use and waste disposal. (Adapt the historic toilet structure for another use.) Retain showers and sinks with running water for the employees living at Glen Aulin. Through these actions, all wastewater going to the treatment mound would be gray water; all human waste would be retained in the composting toilets.
- Discontinue wood for heat stoves in visitor tent cabins to further reduce stock trips to the camp.
- Limit the number of packstrings (as defined above) used to set the camp up in spring to 10 and the number of packstrings necessary to take the camp down in fall to 9 to further reduce pack stock use on the Glen Aulin trail. Ten was the minimum needed to set up the camp in the last four years; nine was the average needed to take down the camp in that same time period.
- Discontinue meals-only service for people who are not lodge guests to reduce demands for water use and waste disposal.
- Discontinue concessioner day rides to the camp to further reduce pack stock use on the Glen Aulin trail (as discussed below in the actions under "Scenic Segments").

¹ If llamas or human porters are used instead, their freight-carrying capacity shall be equivalent to those of two packstrings per week. Helicopters may not be used, with the exception of flights dead-heading empty to the camp for other authorized purposes. Currently, the camp's operators use 5–6 packstrings per week.

- Limit overnight saddle trips passing through Glen Aulin to 80 riders and 120 pack stock per season (the average from 2009– 2012) to reduce pack stock trail impacts.
- Move the nonhistoric employee tent nearest Conness Creek to be more than 100 feet from the creek and from the Tuolumne River to protect water quality and riparian vegetation.
- When the canvas siding on the tents needs replacing, consider using tan, green, or gray fabric if a contrast analysis indicates such a color would blend more harmoniously with the surrounding landscape.
- If the camp capacity reductions do not succeed in reducing water consumption to 500 gallons per day, consider removing the water faucet in the backpacker's camp. If it is removed, provide a hardened access point to Conness Creek for backpackers to obtain water for personal filtration and consumption.
- Allow the concessioner two additional packstrings per season for unanticipated needs or emergencies.

Utility improvements at the camp would include the following (see figure 8-10):

- Design for a production of 500 gallons of treated domestic drinking water per day. Install a water meter on the treatment facility to ensure compliance with the 500-gallon-per-day limit.
- Construct a new composting toilet facility between the granite slab behind the kitchen and the septic tank that is capable of serving up to 45 people daily (28 guests plus 8 employees, plus 25% oversize as a precaution against the undersizing problem that limits functionality of the existing composting toilet at the backpackers camp). To the extent possible, facility design would be consistent with the Secretary's Standards for Historic Properties and in conformity with the *Yosemite Design Guidelines* (2011a). Install one water treatment tank (1,000 gallons) and one water storage tank (1,000 gallons) north of the existing water tank; remove the existing tank. Replace the existing chlorinator, filter tank, and surge tanks. (Note that the extra 500 gallons are necessary for emergency use).
- Retain the existing septic tank and leach mound.
- Pull the water intake line back to its former location, entirely within the boundaries of the Glen Aulin potential wilderness addition. To provide for sufficient water pressure for the camp (when river flows drop below that necessary for such), temporarily utilize a microhydro unit at a suitable location within the potential wilderness addition.
- Remove the water lines and water tank serving the two corrals adjacent to the camp and the NPS Back Country Utilities (BCU) camp.

Materials for the projects identified above may be flown in by helicopter or packed in with stock, depending on the outcome of the minimum-requirement analysis pursuant to the Wilderness Act. Unlike the sludge from the wastewater treatment system that currently must be removed by helicopter at the end of the season, the waste from the composter toilets could be packed out by stock. Although this would slightly increase the NPS pack stock use at the end of the season, it would avoid the need for helicopter flights over wilderness.

The estimated net construction costs for Glen Aulin under alternative 4 would be approximately \$1.1 million (see appendix N).

Backpacker Campground

See "Actions Common to Alternatives 1-4," beginning on page 8-21.

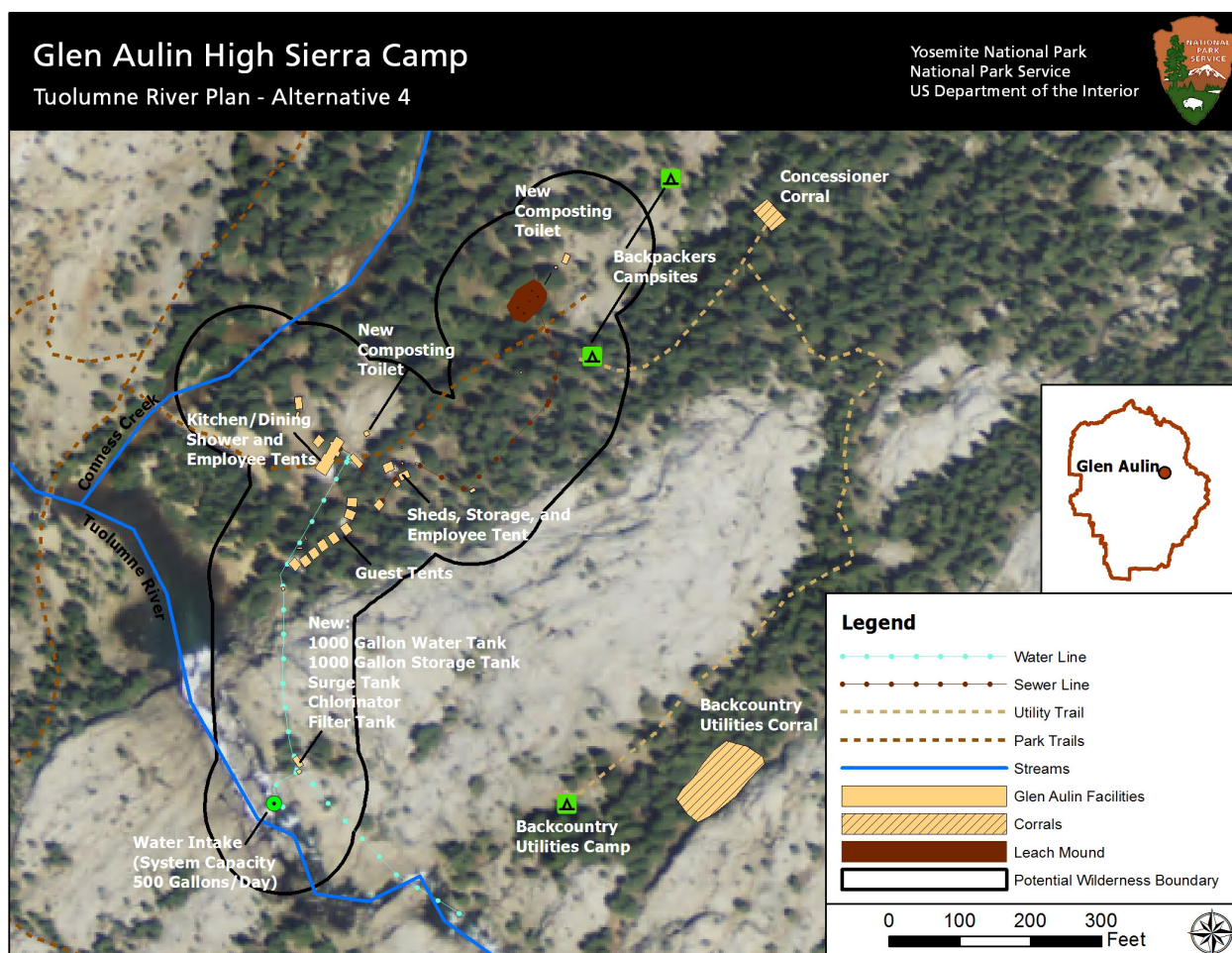


Figure 8-10. Glen Aulin Site Plan, Alternative 4.

Scenic Segments (Tuolumne Meadows and Tioga Road Corridor)

Note that this discussion pertains only to the nonwilderness portions of the Tuolumne Meadows and Lower Dana Fork segments. Portions of these segments within designated Wilderness would be managed the same as the wild segments.

Resource Protection and Enhancement

Free Flowing Condition

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Allow for an increase in the average water demand to up to 47,000 gallons per day, with rare spikes up to 10% of low flow or 65,000 gallons per day, whichever was less (see table 8-16). Implementation of the water conservation measures and best management practices would level out the variations in water withdrawals from the river and ensure that water use remained within the management standard.

The water demand figures for alternative 4 are based on a 1.5% increase in visitor use compared to current use. No data have been collected that would distinguish between visitor and administrative use; therefore, visitor use data have been adopted as a proxy to estimate water consumption for both types of use.

This level of water withdrawal would be expected to remain within the standard of no more than 10% of low flow unless climate change led to longer low-flow durations occurring earlier in the summer, in which case further reductions in water use would be required as discussed in chapter 5.

Table 8-16.
Summary of Average Estimated Water Demand, Alternative 4

Month	No Action (current use)		Alternative 4 (1.5% increase in use)	
	Average Daily Use	Maximum Daily Use	Average Daily Use	Maximum Daily Use ^a
July	46,015	66,818	46,705	65,000
August	44,715	65,640	45,386	65,000
September	34,581	62,060	35,100	65,000

a Maximum daily use would have to remain within the management standard of no more than 10% of low flows or 65,000 gallons per day, whichever was less. Water conservation measures and best management practices for leveling out spikes in water withdrawals, which would be implemented as part of alternative 4 along with additional actions to reduce kinds or levels of service if necessary, would reduce maximum water withdrawals so that they did not exceed the management standard for protecting river flows.

Water Quality

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Upgrade utility systems to conserve water and protect water quality; retain force mains that cross the Tuolumne River beneath the Tioga Road bridge and that cross beneath the river and meadow between the wastewater treatment plant and the containment ponds (unless technology is found to allow consolidation of wastewater treatment facilities on the south side of Tioga Road, as described under “Tuolumne Meadows Site Plan,” below).
- Discontinue concessioner stock day rides to reduce risks to water quality (as well as impacts on the visitor experience and impacts on trail corridors) associated with stock use. Compared to current service levels, the amount of stock use on trails could be reduced by 3 two-hour and 2 four-hour rides per day, which might otherwise involve up to 14 head of stock per ride on the trails. Full-day rides, which occur only occasionally, would also be eliminated. These actions would reduce the number of horses that pass a fixed point on the Young Lakes trail by about 2,000 per year.
- Demolish and remove the public fuel station to eliminate the risk to water quality.

Biological Value: Subalpine Meadow and Riparian Complex

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Implement a riparian buffer to protect water quality and riparian habitat. All development within 100 feet of the river would be removed, and no new development would be allowed within 150 feet of the river, with the exception of boardwalks or similar facilities designed to minimize the effects of visitor use. The buffer would affect existing facilities at the Tuolumne Meadows campground, where 21 campsites closer than 100 feet from the river would be relocated, and at the Tuolumne Meadows Lodge, where three guest tent cabins, all of the employee cabins, and the dining hall/kitchen structure would be relocated (see “Tuolumne Meadows Site Plan,” below).

Cultural Value: Prehistoric Archeological Landscape

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Cultural Value: Parsons Memorial Lodge

See “Actions Common to Alternatives 1-4,” beginning on page 8-21.

Scenic Value: Scenery through Dana and Tuolumne Meadows

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Maintain views from eight scenic vista points (identified in chapter 5) by controlling the encroachment of vegetation in a manner that was protective of ecological conditions and archeological values at each vista point. Each particular vista point would be managed in accordance with an individual work plan based on

evaluations of river values and other resources at that specific location. The work plans are included in appendix I. No other vegetation management would be conducted to enhance scenery or viewing opportunities.

Recreational Value: Rare and Easy Access to the River through Tuolumne and Dana Meadows

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Increase the amount of designated parking available to visitors wishing to get out of cars to enjoy recreational experiences in a river-related landscape.

Management of Visitor Use and User Capacity

Kinds of Visitor Use

Most ongoing recreational activities would continue; however, concessioner stock day rides would be discontinued. Visitor services, facilities, and management strategies would be reoriented to improve opportunities for day visitors to connect with the river in a way that is protective of river values, while retaining existing opportunities for traditional overnight use. The day use capacity would be slightly increased, thus allowing for a slight increase in use compared to existing conditions. As with alternative 2, visitors would be directed from trailheads at designated parking lots onto trails and boardwalks, some with fencing or other forms of delineation to discourage dispersed foot traffic through these sensitive environments, and to formal picnic areas. Visitor services would be managed as follows:

- Conduct a full range of orientation, interpretation, and education programs, with increased emphasis on education about the need to protect river values, at a small visitor contact station, wilderness center, and Parsons Memorial Lodge, as well as in the field.
- Reduce commercial services, retaining only the store and grill (in its current location) and the mountaineering school (which would be relocated to the Tuolumne Meadows Lodge). Public fuel service, the mountaineering shop, and concessioner stock day rides would be discontinued. The historic structure housing the public fuel station and the mountaineering shop would be demolished and removed. The postal service would be retained (subject to future USPS level of service decisions beyond NPS control).
- Retain the campground at its current capacity and renovate it as described in the “Virtual Tour” for this alternative.
- Retain the Tuolumne Meadows Lodge at its current capacity, while relocating the three guest tent cabins nearest the river, all the employee tent cabins, and the dining hall/kitchen (if feasible), to protect adjacent riparian habitat. Upgrade the shower house at the lodge for improved service to lodge guests and campers.
- Increase the capacity of regional transit as an option for arriving at Tuolumne Meadows.
- Increase the frequency of shuttle bus service among destinations within the Tuolumne Meadows area, and add stops at visitor service areas, making it easier for visitors to use public transportation to circulate within the Tuolumne Meadows area.

Maximum Amounts of Visitor Use

- Slightly increase the maximum day use capacity above the Hetch Hetchy Reservoir from 1,762 people at one time to a maximum of 1,827 people at one time (see table 8-15; in this table, the total maximum day use number includes the maximum day use below O’Shaughnessy Dam, which would remain at 12 people at one time).
- Retain the current overnight capacity of 2,460 people per night at Tuolumne Meadows: 2,184 people accommodated in the campground, and 276 people accommodated at Tuolumne Meadows Lodge (see table 8-15). Actual overnight use levels would be lower than these capacities because individual campsites and lodging units would not always be occupied by the maximum number of people allowable.

Management of Visitor Use Capacity

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

Day Use

Day use capacity would be managed by controlling day parking, which would be restricted to paved or otherwise authorized spaces. No undesignated roadside parking would be allowed through the Tuolumne Meadows area; it would be prevented through the use of curbing (as has been done in Yosemite Valley) or placement of large boulders (as has already been done in some areas of Tuolumne Meadows), or other well-designed and appropriate barriers. Undesignated roadside parking would continue to be allowed along Tioga Road west and east of Tuolumne Meadows. The amount of formal, designated day parking in the Tuolumne Meadows area would be increased from 340 to 562 spaces. In addition, regional transit capacity would be increased by 135 people, the equivalent of three 45-passenger shuttle buses, to encourage use of regional transit and relieve traffic congestion at Tuolumne Meadows on peak days. The NPS might increase the number of such regional bus runs in the future so long as the total visitor capacity of this alternative was not exceeded (if more people arrived by public transit, less on-site parking would be required).

Overnight Use

Overnight use capacity would be managed by the facility capacities of the campground and lodge. These facilities would continue to be available through a reservation system, with some campsites also available on a first-come, first-served basis.

Administrative Use

NPS staffing would be increased to a maximum of 163 employees to provide for increased resource protection needs (including management of the user capacity program, below), resource management, and monitoring (see table 8-15). NPS employee housing or campsites would be increased by 59 additional units, including a bunkhouse to be constructed at the site of the current NPS stable as funds become available. (While only 13 additional NPS employees would be required in the Tuolumne Meadows area under this alternative, compared to the no-action alternative, housing would be increased by 59 units, to accommodate the additional employees plus existing employees who currently have no assigned housing, many of whom currently camp.) Designated staff campsites at Gaylor Pit would meet the need for incidental “housing” for employees on temporary duty in the Tuolumne Meadows area. Concessioner employee staffing and housing necessary to support commercial services would be reduced by 13 stable employees, to a total of 90 employees. See “Tuolumne Meadows Site Plan,” below for the location of proposed employee housing.

Tuolumne Meadows Site Plan

The locations identified below are illustrated on the site plan map (see figure 8-11) at the end of this section. The estimated net construction costs for Tuolumne Meadows under alternative 4 would be approximately \$63 million, based on calculations included in appendix N. Phasing of major actions in alternative 4 is also shown in appendix N.

Visitor Facilities

- Provide a new visitor contact station on the south side of Tioga Road across from the Parsons Memorial Lodge trailhead. The new contact station would provide the same level of service (visitor information and orientation, modest interpretive services, modest exhibits, and modest sales space) as the current visitor center and accommodate the same level of use. Enhance opportunities for day visitors to experience the river, meadows, and historic setting by providing a new trail along Tioga Road that connects the new visitor contact station with the existing trail across the meadow to Parsons Memorial Lodge. This would allow short-term visitors to receive information and take a short stroll across the meadow to the river and the lodge before continuing on their way. A visitor contact station at this location would also provide improved separation between this visitor function, commercial services, and park operations.

- Retain the store and grill, post office, wilderness center, and ranger station in their current locations.
- Retain the campground at its current capacity (see below).
- Retain the Tuolumne Meadows Lodge at its current capacity, while relocating the three guest tent cabins nearest the river (and all the employee cabins) to protect adjacent riparian habitat. Additionally, 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. This move would be dependent on identification of a suitable site and a determination of feasibility, which would be conducted in consultation with the California SHPO. The purpose of this move would be to protect riparian vegetation; at the current site of the dining hall, the NPS would construct one or more river viewing platforms with access to the river that would be designed to protect riparian vegetation. Upgrade the shower house at the lodge and make it available to campers.
- Increase shuttle bus runs (shuttle buses would no longer stop at location 3 on the site plan after a new trailhead was provided for the Cathedral Lakes trail).

Campground

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Design for a capacity of 304 car/RV sites, 4 horse sites, and 21 backpacker sites (all with a maximum capacity of 6 people per site), plus 7 group sites (with a maximum capacity of 30 people per site), for a maximum of 2,184 people.
- Realign the campground A-loop road to a location just to the west of the existing alignment; relocate the 21 campsites that are currently within 100 feet of the Lyell Fork as part of the overall campground rehabilitation, ensuring that they are more than 150 feet from the river. The campsites that would be relocated are numbers 1–6, 48–55, 63, 66, 67, 71, 72, 88, and 89.
- Retain the campground office.
- Relocate the existing entrance road and kiosk out of the floodplain.
- Formalize a trail connection between the campground and the John Muir Trail.

Picnic Areas

- Provide a new picnic area at the visitor services core.
- Expand the picnic area near Lembert Dome.
- Provide a new picnic area in association with the new visitor contact station and day parking.

Trails and Trailheads

In addition to “Actions Common to Alternatives 1-4,” beginning on page 8-21:

- Delineate or fence the Cathedral Lakes trail to facilitate ecological restoration while allowing for use by stock and hikers.
- Move the Tioga Road trailhead for Parsons Memorial Lodge to the new day parking area south of Tioga Road (near the visitor contact station) and provide a trail connection to the existing trail; delineate or fence either side of the trail from Tioga Road to Parsons Memorial Lodge to ensure that visitors stayed on the trail and do not adversely affect meadow recovery. A new trail connector would also connect the trailhead at this day parking area with the John Muir Trail to the south and from there to the Cathedral Lakes trail.
- Delineate or fence either side of the trail/access road between Lembert Dome and Tuolumne Meadows Lodge to ensure that visitors stay on the trail and do not adversely affect meadow recovery.

- Upgrade the ventilation systems in the existing Lembert Dome trailhead vault toilets 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, it will consider replacing the pit toilets with a comfort station with low-flow flush toilets, to be located as closely as possible to the existing vault toilets. This action would require additional site-specific compliance, including an archeological survey, and consultation with the associated American Indian tribes.
- Provide a new hiking trail connecting facilities along Tioga Road that ties into the section of the Great Sierra Wagon Road east of Lembert Dome.

Parking

The total number of designated parking spaces in the Tuolumne Meadows area (day and overnight) would be increased from 533 to 914 spaces (table 8-17).

The number of visitors delivered by public transit to the river corridor would be managed according to the overall user capacity in alternative 4 and would be higher than the no-action alternative.

Table 8-17.
Number of Parking Spaces in Designated Parking Areas, Alternative 4

Type of Parking	Current	Alternative 4	Description
Day Parking	16	18	Existing parking area at Pothole Dome
	0	22	Currently undesignated parking/viewing area ^a east of Pothole Dome
	50	76	Existing parking area at the visitor center, for Cathedral Lakes trailhead parking
	0	80	New parking area for visitor contact station and picnic area
	11	13	Existing parking area at the campground office
	11	11	Existing parking in the campground for the Elizabeth Lakes trailhead
	15	30	Existing parking area at the fuel station
	51	55	Existing parking area at the store and grill
	58	38	Existing parking area at the concessioner stable
	0	55	Road to the concessioner stable, widened as needed to accommodate additional parking ^b
	29	29	Existing parking area at the base of Lembert Dome
	7	7	Existing parking area at the ranger station (relocated in this alternative)
	25	52	Existing parking area at the Dog Lake/John Muir Trail trailhead
	0	5	Currently undesignated parking area ¹ at Gaylor pit
	67	71	Existing parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	562	Total day parking
Overnight Parking (excluding cars parked in the Tuolumne Meadows campground)	58	89	Existing parking area at the wilderness office
	33	68	Existing parking area at the Dog Lakes/John Muir Trail trailhead
	0	35	Relocated parking area for the Cathedral Lakes trailhead
	0	58	Road to concessioner stable, widened as needed to accommodate additional parking ^a
	102	102	Tuolumne Meadows Lodge
	193	352	Total overnight parking
	533	914	Total day and overnight parking

a Although people currently park in these areas, they are not yet designated parking areas; therefore, they are counted as part of the undesignated parking under the no-action alternative.

b The road from Lembert Dome to the concessioner stable could be widened by up to 10 feet in areas of nonsensitive resources to accommodate additional pull-in parking.

NPS and Concessioner Stables

- Co-locate the NPS and concessioner stables at the current site of the concessioner stable, an action made possible by eliminating the concessioner day rides and associated reduction in stock held in Tuolumne Meadows. Concessioner stock would be reduced from a maximum of 100 head to about 25 head to support the High Sierra Camps; NPS stock would generally be no more than 25 head to support trail maintenance and ranger patrols. The co-located facilities would still provide for separation between the NPS and concessioner herds and supplies/equipment. Housing for all but two employees would be relocated to the concessioner employee housing area north of the Tuolumne Meadows Lodge. The current site of the NPS stable would be used for construction of additional NPS employee housing.
- Provide parking for up to two private or commercial stock trailers.

Park Operations

In addition to "Actions Common to Alternatives 1-4," beginning on page 8-21:

- Retain and slightly expand the small historic ranger station at its current location to accommodate needed office space. This action would require additional NHPA consultation and compliance.
- Adapt the CCC mess hall building (current site of the visitor center) for NPS offices.
- Retain the maintenance yard at its existing location near the existing visitor center.
- Retain the search-and-rescue cache at Ranger Camp.
- Provide administrative fuel tanks (aboveground gasoline and diesel) near the wastewater treatment plant. The pumps would be unstaffed and unsigned and operated by credit card. Employees could refuel their own vehicles and their government vehicles, and visitors who ran out of fuel could be directed to the pumps.

Employee Housing

- Provide NPS housing for no more than 133 employees, plus campsites for an additional 30 employees. This would accommodate a total of 163 employees, which is the number determined to be necessary in the Tuolumne Meadows area to support the kinds and levels of visitor use included in this alternative. It would be infeasible to locate this housing outside the river corridor; therefore, it must be inside the corridor. The existing housing, which currently accommodates 104 employees, would be renovated or replaced to comply with all OSHA codes, NPS standards, and the Tuolumne River Corridor Design Guidelines specific to employee housing (appendix M). All new housing would continue to be very modest in scale. The nonhistoric housing would receive the highest priority for renovation or replacement. The NPS would replace the 27 nonhistoric NPS employee tent cabins with new hard-sided and hard-roofed structures that comply with all OSHA and NPS housing codes. Subsequent to this action, the NPS would alter, renovate, or replace the 11 contributing tent cabins in consultation with the California SHPO. In the case of both the nonhistoric and the historic cabins, the NPS would attempt to follow the general layout of the existing cabins and reuse the existing materials and/or foundations to the extent possible.

In addition to the actions outlined above, the NPS would consider the following options for additional housing for 29 employees:

- Use existing housing structures more efficiently. For example, conduct an efficiency analysis to determine where infill of beds within existing structures is possible.
- Provide a new bunkhouse(s), with bathrooms and communal kitchen at the current NPS stable site. Retain and adaptively use the historic stable structures if possible, in consultation with the California SHPO.

- If the previously mentioned options proved insufficient to provide the additional 29 beds needed under this alternative, construct up to five new double-capacity units at Road Camp, designed to be similar to existing units, with current code compliance.
- Provide dry campsites at Gaylor Pit, west of the helipad, for 30 NPS employees on temporary duty in the Tuolumne Meadows area. The employee campground would have vault toilets and a potable water tank. As an interim measure, while additional permanent housing was under construction, an additional 30 campsites for employees would be provided east of the helipad. Parking for employees camping at Gaylor Pit would be provided at this location. The campsites east of the helipad would eventually be made available on a priority basis for tribal use. During the interim period when up to 60 NPS employees could be using the camping area, sites would be made available for tribal use with advance notice.
- Provide concessioner employee housing for 88 employees north of the existing Tuolumne Meadows Lodge parking area (at a density equal to that of the existing lodge employee area plus kitchen, dining, toilet, and shower house facilities). All new concessioner employee housing would be hard-sided and compliant with all current NPS standards and OSHA codes. A hard-sided cabin for two stable employees would be provided at the concessioner stable at a location that would comply with relevant OSHA and NPS housing regulations regarding the proximity of housing and stock corrals, and all other stable employees would be relocated to the lodge area.

Utility Systems

The general direction for site-specific planning for utility systems under alternative 4, intended to protect and enhance the river's free-flowing condition, water quality, and outstandingly remarkable values, is outlined below. Additional site-specific planning and compliance would be required prior to implementing these actions.

Tuolumne Meadows Wastewater Collection, Treatment, and Disposal

In addition to "Actions Common to Alternatives 1-4," beginning on page 8-21:

- Upgrade wastewater treatment plant at its current location, designing for an estimated maximum water demand of 65,000 gallons per day and employing tertiary treatment technologies in compliance with current California wastewater treatment codes.
- Seek technology to allow removal of the wastewater containment ponds and sprayfields from the north side of Tioga Road and replace with facilities on the south side of the road, to be designed in conjunction with the new wastewater treatment plant. Even if technology was not available, it might be possible to eliminate the ponds because tertiary treatment might produce wastewater of a quality high enough to be distributed directly to the sprayfield if no other factors required temporary containment in the ponds. Tertiary treatment would also greatly reduce the risk to water quality from potential failure of the existing wastewater line under the meadows. If the ponds could not be eliminated, they would be redesigned to minimize risks of overflow and then fenced for facility security. The sprayfield would be redesigned to minimize risk of saturation.

Site Restoration

Please see "Actions Common to Alternatives 1-4," beginning on page 8-21.

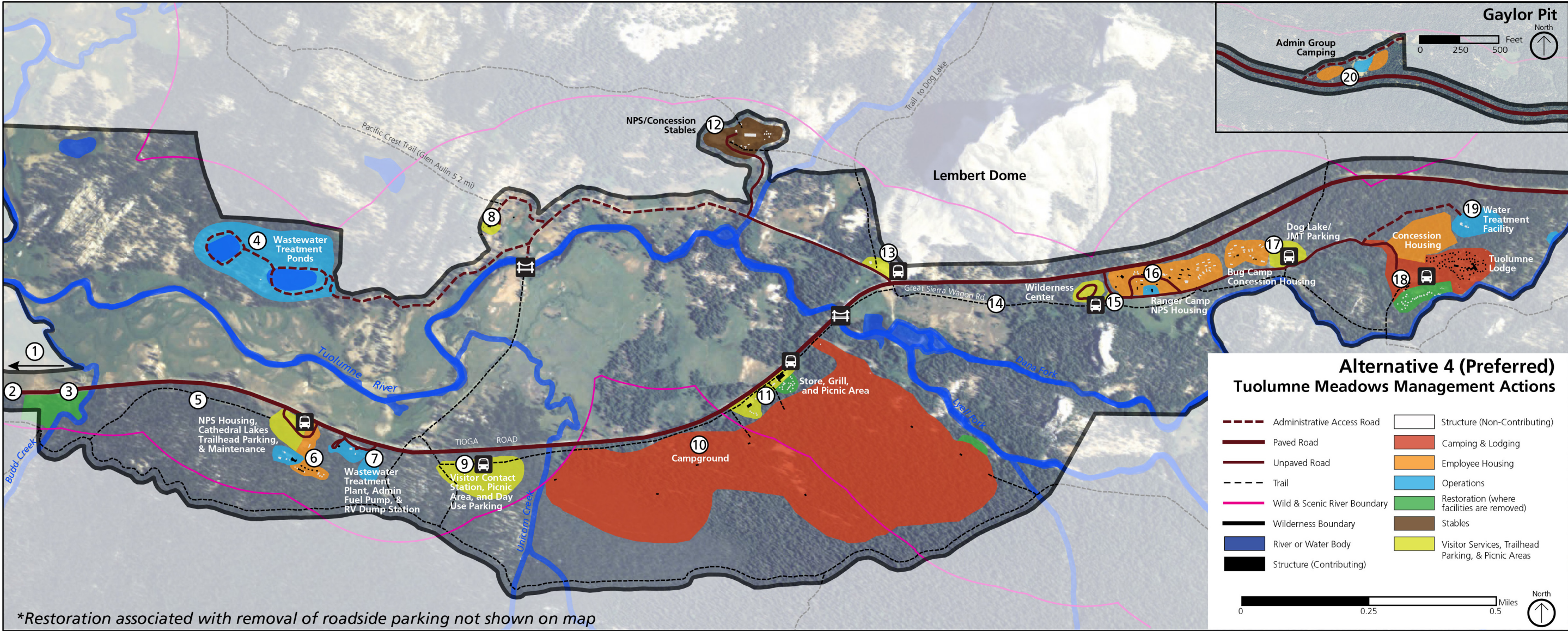


Figure 8-11. Tuolumne Meadows Site Plan, Alternative 4.

Key to figure 8-11 and List of Facilities Management Actions (actions marked with an asterisk (*) are specific to this alternative. All other actions are common to alternatives 1–4):

1. Pothole Dome scenic pullout/ parking areas	Designate parking with trailhead on north side of Tioga Road. Improve trail to Pothole Dome. * Formalize parking/viewing area east of Pothole Dome.	6. Existing visitor center and Road Camp	* Relocate visitor center to location #9; convert building for NPS offices. Construct new Cathedral Lakes trailhead with day and overnight parking. Retain maintenance yard. * Increase NPS employee housing.	11. Existing commercial services core	* Retain store, grill, and post office; expand day parking. * Add picnic area. * Demolish and remove the mountaineering shop and public fuel station, add parking. * Upgrade restroom. * Add trail connector to campground. * Move concessioner employee housing to location #18.	15. Existing wilderness center and NPS stable	* Retain wilderness center; expand parking. * Move NPS stable to location #12; use site for expansion of NPS employee housing.
2. Tioga Road through the Tuolumne Meadows area	Retain the Tioga Road in its current alignment. Add roadside curbing or large boulders to eliminate undesignated roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows. * Add hiking trail parallel to the road.	7. Wastewater treatment plant	Upgrade wastewater treatment plant. Retain recreational vehicle dump station. * Add aboveground administrative gasoline and diesel fuel tanks.	12. Existing concessioner stable	* Co-locate NPS and small concessioner stable (for administrative use only). * Retain one hard-sided cabin for two stable employees (relocate most concessioner employee housing to location #18). * Provide parking for up to two private or commercial stock trailers. * Formalize day and overnight parking along road between Lembert Dome and the concessioner stable; widen the road by up to 10 feet in nonsensitive upland areas to accommodate pull-in parking.	16. Existing ranger station and Ranger Camp	Retain and slightly expand station; retain search-and-rescue cache and day parking. * Relocate aboveground diesel fuel tank to location #6. * Replace NPS employee housing with hard-sided cabins.
3. Existing Cathedral Lakes trailhead	Relocate trailhead and parking to location #6; restore to natural conditions.	8. Parsons Memorial Lodge	* Preserve lodge and retain vehicle access and footbridge.	13. Lembert Dome	Retain picnic area. * Upgrade ventilation system in vault toilets; possibly convert to flush toilets in the future. Retain day parking and trailheads for Lembert Dome and Parsons Memorial Lodge.	17. Bug Camp, Dog Lake/ John Muir Trail parking	Increase day and overnight parking. * Replace NPS employee housing with hard-sided cabins.
4. Existing wastewater ponds and sprayfields	* Retain and upgrade (or relocate if feasible).	9. Area west of Unicorn Creek	* Add new visitor contact station, picnic area, trailhead for Parsons Memorial Lodge, and day parking.	14. Great Sierra Wagon Road	Retain camp office and day parking. * Relocate entrance road and kiosk out of floodplain. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank.	18. Tuolumne Meadows Lodge	Retain at current capacity; relocate three tent cabins, all employee cabins, and possibly dining hall/kitchen to a location more than 150 feet from the river. * Upgrade shower house. * Relocate the mountaineering school to the lodge. Eliminate roadside parking. * Expand concessioner employee housing.
5. Area east of Budd Creek and west of existing visitor center	Construct new Cathedral Lakes trailhead connector. * Retain as undeveloped natural area except for trail segment.	10. Tuolumne Meadows campground	Rehabilitate the campground at its current capacity; realign the A-loop road and relocate 21 campsites currently within 100 feet of the river to a location just west of the existing A-loop, more than 150 feet from the river.			19. Water treatment facility	Retain water treatment facility.
						20. Gaylor Pit	Retain helipad. * Add NPS employee campsites, vault toilets, and potable water tank * Provide campsites for priority tribal use.

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Summary of Protection and Enhancement of River Values under Alternative 4 (Preferred)

The *Tuolumne River Plan* will be evaluated in terms of four primary legal requirements: (1) the WSR requirement that it protect and enhance river values; (2) the NEPA requirement that it fully consider the effects on the human environment; (3) the NHPA requirement that it consider effects on historic properties; and (4) the requirement of the Wilderness Act that it preserve wilderness character in designated Wilderness. (The NEPA process coordinates compliance with the body of additional federal laws and regulations applicable to the plan.) Guidelines that describe the criteria to be used in determining the effects of the plan exist for each of these requirements. This section focuses directly on how the plan would meet the WSR requirement to protect and enhance river values if alternative 4 were to be selected. The NEPA, NHPA, and Wilderness Act analyses are presented in chapter 9.

All the action alternatives, including alternative 4, would protect and enhance river values as described in detail in chapter 5 and summarized in this chapter under “Summary of Protection and Enhancement of River Values under All Action Alternatives,” beginning on page 8-32. In addition, alternative 4 would take the following additional actions, primarily related to management of visitor use, user capacity, and development, to further protect or enhance river values.

Free-Flowing Condition of the River

Provided that river low flows remained around or above 1 cubic foot per second, maximum daily water withdrawals of 65,000 gallons per day would ensure that no more than 10% of flow was consumed. The average daily water demand for alternative 4 would slightly increase to up to 47,000 gallons per day, with rare spikes up to 10% of low flow or 65,000 gallons per day, whichever was less. Water conservation measures and best management practices to level out the variations in water withdrawals from the river into the water storage tank, both of which are included in this alternative, would be necessary. If climate change led to longer low-flow durations starting earlier in the summer, reductions in levels of service, including temporary facility closures, might be required to remain within the limits of no more than 10% of low flows.

Management to Protect Water Quality

Risks to water quality in the Tuolumne Meadows area would be mitigated by upgrading the wastewater treatment plant, treatment ponds, and sprayfields. The improved utilities would be designed for loads commensurate with estimates of domestic water use. The risk to water quality from fuel storage at the public fuel station would be eliminated; the administrative fuel tanks that would be provided near the wastewater treatment plant would be relatively small and above ground, posing less risk to water quality. A further reduction in risks to water quality would be achieved by greatly reducing the size of the concessioner stable operation.

Risks to water quality at Glen Aulin would be mitigated by replacing flush toilets with composting toilets, thereby slightly reducing the guest capacity, and reducing the level of services, which would decrease the demand for water use and wastewater disposal to no more than 500 gallons per day; all water going to the leach mound would be gray water (water left over from washing, rather than human waste). The employee tent nearest Conness Creek would be relocated to be more than 100 feet from the creek and from the Tuolumne River to further protect water quality. Monitoring would be ongoing to ensure that water quality remained excellent at both Tuolumne Meadows and Glen Aulin.

Management to Protect the Subalpine Meadow and Riparian Complex

Most of the actions to protect and enhance the subalpine meadow and riparian complex would be common to all the action alternatives. Alternative 4 would additionally enhance this river value by directing visitors to

designated trails and delineating or fencing certain trail segments to facilitate the ecological recovery of adjacent vegetation. Riparian buffers would be implemented at the Tuolumne Meadows campground, where 21 campsites that are currently within 100 feet of the river would be relocated, and at the Tuolumne Meadows Lodge, where the NPS would work with the California SHPO to seek a new location for the dining hall/kitchen that would be more than 150 feet from the river. The subalpine meadows in Lyell Canyon would be protected by regulating the amount and locations of stock use.

Management to Protect Prehistoric Archeological Sites

The same management of visitor use described above would also reduce impacts on prehistoric archeological sites in the Tuolumne Meadows and Lower Dana Fork segments. Monitoring would be ongoing to ensure that site disturbance did not exceed the protective standard established for these sites. If conditions were not being maintained within the protective standards, additional actions would be taken to further manage or reduce visitor use, as described in chapter 5.

Management to Protect and Enhance Scenic Values

Scenic views and viewpoints in the Tuolumne Meadows area and along the Tioga Road corridor would be protected and enhanced under all the action alternatives by managing unnatural features, such as facilities and parked cars, to minimize their intrusion into remarkable views.

The eight scenic vista points identified by the *Tuolumne River Plan* would be protected and enhanced if necessary by removing encroaching vegetation, primarily conifers.

Management to Protect and Enhance the Wilderness Experience along the River

The wilderness experience along trails in wild segments would be protected by restricting use to levels that resulted in encounters with an average of no more than 12 other parties per hour on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties per hour on the Lyell Canyon trail above Ireland Lake junction, and 2 parties per hour on the trail through the Grand Canyon of the Tuolumne.

Reducing the number of pack stock trips to resupply the Glen Aulin High Sierra Camp from an average of five or six per week to a maximum of two per week would reduce this use by almost two-thirds and reduce total stock use on the Glen Aulin trail (including private stock use, commercial outfitter used, and NPS administrative use) by 43%, which would greatly improve trail conditions for wilderness hikers and backpackers.

Management to Protect and Enhance Rare and Easy Access to the River through Tuolumne and Dana Meadows

Opportunities for scenic driving along Tioga Road would be enhanced by eliminating undesignated roadside parking and the congestion currently caused by vehicles slowing to park and pedestrians crossing the road. Opportunities for people wishing to park and get out of their cars would be enhanced by increasing the number of designated parking spaces.

Summary Comparisons of Alternatives

Protection and Enhancement of River Values, Alternatives 1–4

Section 10(a) of WSRA requires managers to “protect and enhance the values which caused [the river] to be included in [the wild and scenic rivers] system.” Consistent with WSRA, the actions proposed in alternatives 1 – 4 emphasize protection and enhancement of the “aesthetic, scenic, historic, archeological and scientific [biological, geologic, and hydrologic] features” of the Tuolumne River. While the actions specific to those alternatives are designed to improve the condition of individual river values, this section examines the impact on river values of all the actions that would be common to all the alternatives, collectively. Thus, it addresses (1) those actions listed in chapter 5 to protect and manage river values, including the Ecological Restoration Plan (detailed in appendix H) and the monitoring program designed to provide early warning before conditions decline; (2) actions specific to visitor management, including capacity limits (chapter 6); (3) actions related to visitor services and facilities (chapter 7); and (4) actions specific to each alternative (chapter 8 and table 8-18).

Subalpine Meadow and Riparian Complex

Chapter 5, supplemented by the full text of the ecological restoration plan in appendix H, presents restoration actions that will reduce fragmentation and bare soil and bring meadow integrity to above the management standards. Proactive restoration actions will include eliminating roadside parking and informal trails, removing structures too close to the riverbanks, restoring riparian vegetation, mitigating effects of the Tioga Road culverts and of the Great Sierra Wagon Road, mitigating effects from stock use in Lyell canyon, and conducting additional research to identify additional management actions. Chapter 5 also describes the monitoring program, which will give early warning—well before a meadow’s condition has dropped to the management standard—when a meadow’s condition is declining, so the park can take additional actions to reverse that trend, as outlined in chapter 5.

Actions specific to visitor management are described in chapter 6. All alternatives would manage use at levels that would protect and enhance meadow integrity, although the kinds and levels of use would vary by alternative, as described in chapter 8. By restricting day users to the capacities of the established parking lots and overnight users to the capacities established for the campground, the lodges, and the overnight wilderness trailhead quota system, visitor numbers will be effectively controlled. Meadow and riparian areas will be protected and enhanced by confining parking to established lots and directing visitor use onto trails that have been located or hardened such that the meadows will withstand their use (or, in the case of alternative 1 and to a lesser extent in alternative 3, by reducing use to an amount that the meadows can withstand without such directional guidance and trail hardening).

Chapter 7 lists specific areas where trampling and impacts are occurring from existing facilities and services. For example, most existing concessioner employee housing is located in wet areas, and three guest cabins at the lodge are too close to the river. By removing such structures and restoring streamside vegetation, riparian vegetation will be restored, again creating the conditions for natural processes to dominate.

Finally, actions specific to the alternatives are provided in chapter 8. Alternative 1, which would allow off-trail use, and to a lesser extent, alternative 3, which would encourage but not require visitors to stay on trails, would have lower use levels than alternatives 2 and 4, which would require visitors to use designated trails that are sited and constructed to protect the meadows. Either way, meadow fragmentation and trampling would be reduced, allowing for the restoration of natural processes and vegetation that would be as close to natural as possible.

The result of this suite of actions will be the restoration, to the maximum extent possible, of natural hydrological and biological processes and a significant reduction in the ecological stress caused by informal

trails and trampling. Improving water flow under the Tioga Road and across the Great Sierra Wagon Road will restore natural hydrology. Restoration of hydrologic flows will, in turn, set the stage for decreasing amounts of bare soil, as meadow and riparian plants colonize the areas that will receive more water and less disturbance from foot traffic. Wetter conditions will not be as conducive to lodgepole pine encroachment, and pines may disappear from very wet areas. Direct plantings of willows and other actions detailed in the ecological restoration plan will stabilize the streambanks and reverse the channel widening that has lowered the groundwater level to the detriment of meadow vegetation. Directing visitor use to hardened areas will reduce fragmentation and trampling, further allowing vegetation to recover and to be mainly influenced by natural forces. The meadows will no longer be trampled, fragmented by trails, and dried out; instead, their functions will be subject to natural hydrological and biological processes, to the maximum extent possible. Few informal trails will be present, amounts of bare soil will be low, and streambanks will be stable, all indicating healthy ecological function and a protected and enhanced meadow and riparian complex. It is expected that meadow fragmentation will gradually decrease, until each meadow is at least 90% whole and the weighted average for all meadows is at least 93% whole. No adverse impacts or degradation are present now, nor will they be allowed to occur, as a result of the combined proactive actions and the land use decisions called for in each alternative.

Low-Elevation Riparian and Meadow Habitat

Chapter 5 discusses the fact that the low-elevation riparian and meadow habitat is largely dependent on high water tables and annual flooding. Because this habitat is downstream of O'Shaughnessy Dam, and the Raker Act gives the SFPUC authority over dam releases, the NPS does not manage the river flows that affect this habitat. However, the SFPUC is working collaboratively with the NPS to establish water-release strategies that protect meadows, wetlands, and riparian zones in Poopenaut Valley by mimicking natural flows to the extent possible while fulfilling their responsibilities under the Raker Act.

Actions specific to visitor management are described in chapter 6. These primarily consist of retaining the existing parking lot and wilderness trailhead quotas for the Poopenaut Valley. The parking lot accommodates only four cars, and the trail into Poopenaut Valley is extremely steep, so few people visit the area. This low level of use is expected to continue preventing any user-created impacts in the area.

Chapter 7 lists specific existing facilities and services that are affecting river values. None are affecting Poopenaut Valley. Chapter 8 describes four action alternatives and compares them to the no-action alternative. No actions or facilities are planned for Poopenaut Valley.

In summary, by continuing to work cooperatively with the SFPUC to establish water release strategies that protect the low-elevation riparian and meadow habitat, and by continuing to limit visitor use to the valley to that which can be accommodated by the very small parking lot there, the NPS will continue to protect and enhance this river value to the extent possible, given the constraints of the Raker Act.

Stairstep River Morphology

Chapter 5 discusses the fact that stairstep river morphology is impervious to human actions because it was created by massive geologic forces well outside of human influence. More specifically, visitor use does not influence this landform, as discussed in chapter 6. Similarly, no structures or services influence it, as discussed in chapter 7. Finally, no actions are proposed that will, in any way, affect this geologic landform, as detailed in chapter 8.

Because this river value was created by massive geologic forces, is impervious to human use, and will not be affected by any actions in the alternatives, it will remain protected and enhanced, without adverse impact or degradation.

Prehistoric Archeological Landscape

Chapter 5 discusses actions to address visitor-created impacts and construction-related impacts. These include managing use levels, using natural features to conceal and divert foot traffic around sites, and undertaking the ecological restoration program in such a way that there are no associated impacts upon prehistoric archeological resources. Many of the restoration program's actions, such as eliminating roadside parking and associated off-trail travel and trampling, will further protect the prehistoric archeological landscape. Other actions include evaluating sites where appropriate, confining actions to nonsensitive areas wherever feasible, and mitigating unavoidable effects through site-specific data recovery or other treatments in compliance with section 106 of the NHPA. Chapter 5 also describes the monitoring program, which will give early warning when the prehistoric archeological landscape's condition is declining—well before the condition has dropped to the management standard—so that park staff can take action to reverse that trend, as outlined in chapter 5.

Chapter 6 discusses actions specific to visitor use management. All alternatives would manage use at levels that would protect prehistoric archeological sites, although the kinds and levels of use would vary by alternative, as described in chapter 8. By restricting day users to the capacities of the established parking lots and overnight users to the capacities established for the campground, the lodges, and the overnight wilderness trailhead quota system, visitor numbers will be effectively controlled. By confining parking to established lots and directing visitor use onto trails that have been located or hardened to avoid sensitive archeological sites (or, in the case of alternative 1 and to a lesser extent in alternative 3, by reducing use to an amount that will be protective of archeological sites without such directional guidance and trail hardening), sensitive archeological sites will be protected.

Chapter 7 lists specific existing facilities and services that are affecting the prehistoric archeological landscape. While four different structures were constructed on or near prehistoric archeological sites, the structures are no longer causing any impacts. All new structures proposed in the alternatives would be sited so as to avoid known archeological sites or to minimize disturbance using the actions identified in chapter 5. Ongoing disturbance from humans (primarily through visitor disturbance, such as collecting or inadvertent disruption) will be reduced through the methods discussed in chapter 5.

Finally, actions specific to the alternatives are provided in chapter 8. As noted above, these actions primarily consist of restricting visitors to designated trails (mostly alternatives 2 and 4) or reducing use to levels that are protective of all river values (mostly alternative 1, with alternative 3 using a combination of modest reductions and partial restrictions). Trails are located (or would be rerouted, in certain cases) to conceal prehistoric archeological sites, so restricting use to designated trails would protect this river value. Reducing use levels would also protect this value, as fewer visitors would be present to disturb the sites.

The condition of the prehistoric archeological landscape, as discussed in chapter 5, is already good, with those sites possessing high data potential and those possessing low data potential both well within the management standards. The condition of archeological sites cannot be enhanced, but the level of protection afforded these sites can be. The suite of actions proposed within chapters 5, 6, 7, and 8 will improve the protection of this river value, ensuring that it remains within the management standard, free of adverse impacts or degradation.

Parsons Memorial Lodge

Chapter 5 discusses actions the NPS will take to continue the protection of Parsons Memorial Lodge. As discussed in that chapter, the structure is currently in good condition, within the management standard. The NPS will continue its program of annual inspection and upkeep, focusing in particular on a list of eight different key components of the building's structural integrity.

Chapter 6 lists actions specific to visitor use management. Because Parsons Memorial Lodge is not accessible to the public by road, and visitation to the lodge remains low (as it would under all alternatives), visitation is not

expected to affect the lodge. Chapter 7 lists specific existing facilities and services that are affecting river values. None are affecting Parsons Memorial Lodge. Chapter 8 describes four action alternatives and compares them to the no-action alternative. The only actions proposed near the lodge are ecological restoration actions, none of which would affect the lodge.

The condition of Parsons Memorial Lodge is already good, well within the management standard. The suite of actions proposed within chapters 5, 6, 7, and 8 will continue its already high level of protection. This cultural river value will remain within the management standard, free of adverse impacts or degradation.

Scenic Values

Chapter 5 discusses actions the NPS will take to continue the protection and enhancement of scenic river values. These primarily consist of inventorying the existing scenic landscape in three river segments, assigning the appropriate landscape class and management standard, and performing a contrast analysis on any new structures proposed in these areas to ensure that they meet the standard. The landscapes have been inventoried and classified based on the Visual Resource Management (VRM) system refined by the BLM as landscape class I (the wild segments) and II (the scenic segments through Tuolumne and Dana Meadows). The localized impacts at Glen Aulin and in Tuolumne Meadows will be addressed by changing the tent colors to grey, tan, or green if the contrast analysis suggests this will enhance the scenic value, and by eliminating roadside parking along Tioga Road through Tuolumne Meadows. Additionally, key vistas from eight scenic points will be maintained. With the exception of vegetation management at vista points, lodgepole pine control in the meadows has been suspended, pending further study as to whether this action would be consistent with the ecological restoration of natural biological processes.

Chapters 6, 7, and 8 largely repeat the importance of these actions, especially the elimination of roadside parking. The primary impact to scenic values is the visual intrusion of vehicles parked along the roads and the facilities necessary to support visitor use. To address these impacts, each of the alternatives would eliminate roadside parking and replace it with small lots located throughout the Tuolumne Meadows area but out of view from the meadows, and replace the white canvas tents at Glen Aulin and at the store with gray, tan, or green colors to be more compatible with the natural landscape (pending the results of the contrast analysis). Additionally, the alternatives were all constructed to continue the park's long tradition of locating visitor and administrative developments in Tuolumne Meadows out of sight of the meadows; for example, the new visitor contact station in alternative 4 would be south of the road and meadows, in a forested upland area.

The condition of the scenic river values, as discussed in chapter 5, is already good, with all three values being within the management standards (class I for wild segments, class II for the scenic segments). The actions proposed within chapters 5, 6, 7, and 8 regarding scenic values will improve protection, eliminating the only localized concerns present (roadside parking and tent colors) and will place the few new developments away from the meadows (almost always in forested upland areas). Through these actions, the scenic values will be enhanced and will remain within the management standard, free of adverse impacts or degradation.

Rare and Easy Access to the River

Chapter 5 discusses the actions the NPS will take to continue the protection and enhancement of this recreational value. These primarily consist of keeping the road open for visitor traffic, eliminating roadside parking (which will reduce traffic congestion, safety hazards, and the intrusion of parked cars into the viewing experience), providing more designated parking (except for alternative 1, which would reduce visitor use to a level where existing designated parking would be sufficient), and providing better trail access to designated parking.

Chapter 6 lists actions specific to visitor use management. Under all alternatives, overnight visitation will be managed by the number of wilderness permits, beds at Glen Aulin, campsites at the Tuolumne Meadows

campground, and beds at Tuolumne Meadows Lodge. Day use will be managed by the number of designated parking spots and the capacity of public transportation. Administrative use will be limited by the number of employee beds present in the meadows, as well as a small number of employee campsites in some alternatives. These actions will provide managers with several tools to manage user capacity. For all but alternative 1, well over 4,000 visitors may be present at any one time in Tuolumne Meadows, with daily visitation being greater and more designated parking available than exists at present—so ample access will be available to the high country. The Tioga Road will remain open during its operating season, with significantly improved parking and traffic management, presenting an orderly, aesthetically pleasing, and visitor-friendly driving and parking experience.

Chapter 7 lists specific existing facilities and services that affect river values. None are negatively affecting the rare and easy access to the river corridor. Chapter 8 describes four action alternatives and compares them to the no-action alternative. The primary actions proposed are the same ones already described—eliminating roadside parking, providing designated parking, and managing user capacity according to the means already identified. The specific user capacities vary by alternative, according to the theme of the given alternative. All alternatives propose to keep the Tioga Road open during its operating season.

Through this suite of actions, the access provided by the Tioga Road to the high country will be protected and enhanced. The road will remain open, with a more orderly structure restored to the parking situation in Tuolumne Meadows. Designated parking will be provided in several areas throughout the meadows, all of them near attractions, but not in the meadows themselves. Safety hazards and traffic congestion will be greatly reduced. By keeping the overall user capacity within the limits specified for each alternative, rare and easy access will continue while protecting and enhancing all river values.

Wilderness Experience along the River

Chapter 5 discusses actions the NPS will take to protect and enhance the wilderness experience along the river. Such actions will primarily consist of continuing to utilize the park's overnight trailhead quota system to manage the numbers of overnight visitors in designated Wilderness, and to limit day use in Wilderness through the day user capacity established for Tuolumne Meadows. The overnight trailhead quota system can be (indeed, has already been) adjusted as needed to continue providing opportunities for solitude or a primitive and unconfined type of recreation in the Yosemite Wilderness. By regularly monitoring these encounter rates, park staff will know when they are approaching the management standards specified in chapter 5, at which point the NPS will take measures to keep the encounter rates within the management standard for the given stretch of trail. Implementation of a day use reservation system is a last resort option; another option to reduce use on heavily used trails is to direct visitors to other less crowded trails they may hike. Finally, in some alternatives the NPS will eliminate the commercial day rides from Tuolumne Meadows, as well as limiting the commercial trips through the Yosemite Wilderness; both actions would reduce the conflicts between hikers and pack stock, as well as the impacts of pack stock on the trails themselves. Chapters 6 and 8 largely repeat the importance of these actions, especially the trailhead quota system. No facilities or services are identified in chapter 7 as affecting the wilderness experience.

In summary, by retaining the overnight trailhead quota system, enforcing the day use capacity for Tuolumne Meadows, educating visitors about trail options, and employing a day use trailhead quota system as a last resort, the NPS will effectively manage the numbers of trail users within the bounds of whichever alternative is selected. All alternatives include actions to reduce or eliminate commercial day rides and the use of pack stock to supply the Glen Aulin High Sierra Camp, which will reduce the conflicts between hikers and stock users, as well as the impacts of stock on the trails themselves. By keeping the encounter rates within the trail-specific standards identified in chapters 5 and 8, the NPS will ensure that enjoyable wilderness experiences along the river remain widely available and that this value is protected and enhanced.

Water Quality

Chapter 5 discusses actions the NPS will take to continue the protection and enhancement of water quality. Water quality is already excellent, far exceeding state and national standards, so most actions are intended to preserve this condition. The NPS will stabilize the “little blue slide,” thereby preventing the erosion of fine sediments into the Dana Fork. The wastewater treatment plant will be upgraded, with the containment ponds eliminated if technology permits and/or if demand allows. Risks from pack stock manure and from the fuel storage tanks will continue to be minimized through manure removal practices and secondary containment and periodic testing.

Chapter 6 lists actions specific to visitor use management. Under most alternatives (including the preferred), the public fuel station and its tanks would be demolished and removed, eliminating that risk to water quality. Some or all of the commercial pack stock associated with the day rides would be eliminated, thereby reducing the risk to water quality associated with pack stock manure; again, ongoing manure removal will be employed to minimize the risk from pack stock that remain (some would remain under all alternatives to service the High Sierra Camps outside of the river corridor). The Glen Aulin High Sierra Camp would either be eliminated (as would the risk that its leach mound poses to water quality) or the flush toilets at the camp would be converted to composting toilets (which would greatly reduce the risk to water quality, as all the waste going to the mound would be gray water).

Chapter 7 lists specific existing facilities and services that are affecting river values. In addition to the wastewater treatment system, fuel station, and Tuolumne Meadows corrals, the Glen Aulin corrals and composting toilet for the backpacker camp there are also identified. As with the corrals in the meadows, manure removal will continue at the Glen Aulin corral, and the backpacker toilet will be replaced with one sized to handle the load at this location effectively.

Chapter 8 largely repeats this suite of actions. While the precise design of the new wastewater treatment plant, as well as the disposition of the public fuel station, vary among alternatives, all proposed solutions will protect and enhance the water quality in the Tuolumne River. Similarly, solutions at Glen Aulin vary, from complete camp closure, to downsizing of it, to replacement of the flush toilets with composting toilets.

Through this suite of actions, the quality of water in the Tuolumne River will remain excellent, far superior to state and federal standards. The few risks to water quality will be eliminated or greatly reduced, along with the periodic influx of sediments from the “little blue slide,” enhancing water quality and ensuring that it remains protected, well within the management standard.

Free-flowing Condition

Chapter 5 discusses actions the NPS will take to continue the protection and enhancement of the river’s free-flowing condition. The NPS will limit water withdrawals from the Dana Fork to 10% of the river’s flow or 65,000 gallons per day, whichever is less. While existing withdrawals are well within the standard with only a few rare exceptions, the NPS will replace water fixtures with low-flow fixtures and employ conservation measures as needed to ensure its ability to meet the 10%/65,000 gallon per day restriction. Prior to undertaking any project within the bed and banks of the river, the NPS will complete the analysis required under section 7 the Wild and Scenic Rivers Act. The NPS will eliminate the restriction to the river’s free-flowing condition caused by the short section of riprap in the campground. The water diversion on the Dana Fork will remain in place, as it is necessary for removing domestic drinking water from the river and does not restrict its flow. The agency will continue to work with the SFPUC to establish releases from O’Shaughnessy Dam that more closely mimic natural flows. Chapters 6, 7, and 8 largely reemphasize these actions.

The Tuolumne River was free-flowing upon designation, with only the short section of riprap installed since that time. Maximum water withdrawals have declined significantly (by up to a third) since the time of

designation (when the campground was almost twice as large as it is today), and NPS has made progress in developing a flow regime for the Poopenaut Valley, in cooperation with the SFPUC. The free-flowing condition of the Tuolumne River, in other words, has been protected since its designation as a Wild and Scenic River; the actions described above will enhance that free-flowing condition.

Protection and Enhancement of River Values, by Alternative

The actions that would be taken under each alternative to protect and enhance river values are summarized and compared in table 8-18.

Table 8-18.
Summary Comparison of Alternative Actions to Protect and Enhance River Values

Actions to Protect and Enhance River Values:	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (preferred)
WILD SEGMENTS				
Free Flow				
Continue to work cooperatively with the SFPUC and others to inform releases from O'Shaughnessy Dam intended to more closely mimic natural flows.	✓	✓	✓	✓
Water Quality				
Eliminate or mitigate the risk associated with wastewater disposal at the Glen Aulin High Sierra Camp (details would differ as shown below):	✓	✓	✓	✓
▪ Close the camp, eliminating the risk to water quality.	✓			
▪ Convert camp to a seasonal outfitter camp to greatly reduce water use.		✓		
▪ Continue to restrict water use at the camp to 600 gallons per day.			✓	
▪ Reduce water use at the camp to 500 gallons per day.				✓
▪ Replace flush toilets for guests with composting toilets.			✓	
▪ Replace all flush toilets with composting toilets.				✓
▪ Move the employee tent nearest Conness Creek to be more than 100 feet from the creek and from the Tuolumne River, to protect water quality.				✓
Replace the composting toilet at the backpacker campground at Glen Aulin.	✓	✓	✓	✓
Biological Values				
Subalpine Meadow and Riparian Complex				
Discontinue commercial pack stock use to reduce impacts on subalpine meadow/riparian areas.	✓			
Reduce the potential for stock-related impacts in meadows along the Lyell Fork by managing stock use: allow no more than 167 – 249 grazing-nights per season, depending on the year and its snowfall and rainfall patterns, and regulate an opening date, campsite locations and access routes, and grazing locations.		✓	✓	✓
Restore localized areas previously disturbed by human use in Lyell Canyon, using techniques that meet the minimum-requirement criteria established under the Wilderness Act.	✓	✓	✓	✓
Low-Elevation Riparian and Meadow Habitat				
Make informed recommendations for water releases from O'Shaughnessy Dam that would provide maximum ecological benefits to the river-dependent ecosystems downstream of the dam.	✓	✓	✓	✓
Cultural Values				
Prehistoric Archeological Landscape				
Protect prehistoric archeological sites by diverting use away from sensitive areas.	✓	✓	✓	✓
Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.	✓	✓	✓	✓

Table 8-18.
Summary Comparison of Alternative Actions to Protect and Enhance River Values (continued)

Actions to Protect and Enhance River Values: WILD SEGMENTS (continued)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (preferred)
Scenic Values				
Scenery through Lyell Canyon and the Grand Canyon of the Tuolumne				
Continue to allow the natural scenery to evolve in response to natural ecological processes, with no management of scenic vistas (no scenic vista points are managed in wild segments).	✓	✓	✓	✓
Recreational Value				
Wilderness Experience Along the River				
Enhance opportunities for primitive, unconfined recreation or solitude in a primitive setting (details would differ as shown below):	✓	✓	✓	✓
<i>Overnight use:</i>				
▪ Continue to manage overnight use in wilderness through an overnight trailhead quota system (see "Maximum Amounts of Use," below) to protect opportunities for solitude.	✓	✓	✓	✓
<i>Trail use:</i>				
▪ Greatly reduce the maximum use levels along wilderness trails to achieve an average of no more than four encounters with other parties per hour on most trails and no more than two parties per hour on the trail through the Grand Canyon of the Tuolumne.	✓			
▪ Manage use levels along wilderness trails to achieve an average hourly encounter rate of no more than 12 other parties on the Glen Aulin trail and the Lyell Canyon trail below Ireland Lake Junction, 8 parties on the Lyell Canyon trail above Ireland Lake junction, and 2 parties on the trail through the Grand Canyon of the Tuolumne.		✓	✓	✓
Greatly reduce stock use along the trail to Glen Aulin, improving trail conditions for wilderness hikers and backpackers.	✓			✓
Allow limited recreational whitewater boating on portions of the river to provide opportunities for people with expert paddling skills to experience and connect with the Tuolumne in a uniquely adventurous pursuit.		✓		✓
<i>Commercial use:</i>				
▪ Discontinue all commercial use in wilderness.	✓			
▪ Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary that gives priority to noncommercial use and restricts commercial use to no more than 1 overnight group per zone per night and no more than 1 day group per trail per day.			✓	
▪ Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary that gives priority to noncommercial use and restricts commercial use to no more than 2 overnight parties per zone per night and no more than 2 day parties per trail per day. Further restrict use in the Glen Aulin and Lyell Canyon zones on weekends and holidays to ensure that it remains a relatively small percentage of total use.		✓		✓
<i>Glen Aulin:</i>				
▪ Demolish and remove the Glen Aulin High Sierra Camp to enhance opportunities for self-reliance.	✓			
▪ Convert the Glen Aulin High Sierra Camp to a seasonal outfitter camp to allow guests to connect with the river in a setting with no permanent facilities (except a composting toilet).		✓		
▪ Retain the Glen Aulin High Sierra Camp at reduced capacity to allow guests to connect with the river in a remote setting.			✓	✓
▪ Reduce levels of service at the Glen Aulin High Sierra Camp so that the camp can be supplied with only two pack stock trips per week, to reduce stock impacts on trails used by hikers.				✓
▪ Relocate the water intake for the Glen Aulin High Sierra Camp to its previous location inside the camp boundary.			✓	✓

Table 8-18.
Summary Comparison of Alternative Actions to Protect and Enhance River Values (continued)

Actions to Protect and Enhance River Values: WILD SEGMENTS (continued)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (preferred)
Recreational Value (continued)				
Wilderness Experience Along the River (continued)				
<i>Stock use:</i>				
▪ Discontinue concessioner stock day rides into wilderness to reduce stock impacts on trails used by hikers.	✓			✓
▪ Continue concessioner stock day rides into wilderness but at a reduced capacity to reduce conflicts on trails.		✓	✓	
Actions to Protect and Enhance River Values: SCENIC SEGMENTS	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (preferred)
Free Flow				
Reduce demand for domestic water withdrawals from the Dana Fork (details would differ as shown below):	✓		✓	
▪ Reduce employee housing.	✓			
▪ Reduce overnight lodging.			✓	
▪ Eliminate overnight lodging.	✓			
▪ Reduce overnight camping.	✓			
Continue to improve water conservation and sustainability practices, including installation of water meters, use of low-flow fixtures, and visitor and employee education, and identify and implement additional long-term water conservation measures.	✓	✓	✓	✓
Remove the boulder riprap from approximately 150 feet of riverbank near the campground A-loop road to allow the river to flow more freely.	✓	✓	✓	✓
Water Quality				
Upgrade utility systems to conserve water and protect water quality (details would differ as shown below):	✓	✓	✓	✓
Remove the wastewater ponds and sprayfields and replace them with new facilities on the south side of Tioga Road.	✓			
As technology allows, remove the wastewater ponds and/or the sprayfields and replace them with new facilities on the south side of Tioga Road.		✓	✓	✓
Stabilize the road cut east of Tuolumne Meadows along Tioga Road to reduce erosion into the Dana Fork.	✓	✓	✓	✓
Continue best management practices to mitigate the potential for impacts on water quality associated with stock use.	✓	✓	✓	✓
Eliminate concessioner stock day rides to reduce stock use and risks to water quality.	✓			✓
Reduce concessioner stock day rides to reduce stock use and risks to water quality.		✓	✓	
Demolish and remove the public fuel station to eliminate the risk to water quality posed by this facility.	✓		✓	✓
Convert the pit toilet for winter skiers to a vault toilet.	✓	✓	✓	✓
Biological Values				
Subalpine Meadow and Riparian Complex				
Eliminate undesignated roadside parking and associated informal trails.	✓	✓	✓	✓
Remove nonhistoric structures inappropriately sited near the riverbank or in wet areas.	✓	✓	✓	✓
Crush or remove the existing wastewater line that runs beneath the meadow from the treatment plant to the containment ponds.	✓			
Restore riparian vegetation along riverbanks.	✓	✓	✓	✓
Mitigate effects of Tioga Road culverts on surface flows into Tuolumne Meadows.	✓	✓	✓	✓
Mitigate the effects of the Great Sierra Wagon Road bed on surface flows across Tuolumne Meadows and on streamflow where the Great Sierra Wagon Road approaches the Parsons Memorial Lodge footbridge.	✓	✓	✓	✓

Table 8-18.
Summary Comparison of Alternative Actions to Protect and Enhance River Values (continued)

Actions to Protect and Enhance River Values: SCENIC SEGMENTS (continued)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (preferred)
Biological Values (continued)				
Subalpine Meadow and Riparian Complex (continued)				
Conduct additional research to support ecological restoration.	✓	✓	✓	✓
Reduce user capacities to protect subalpine meadow/riparian habitat from foot traffic.	✓		✓	
Confine use to protect subalpine meadow/riparian habitat from foot traffic.		✓		✓
Increase interpretive programming to educate visitors about the fragility of meadow/riparian areas.	✓	✓	✓	✓
Cultural Values				
Prehistoric Archeological Landscape				
Protect prehistoric archeological sites by removing informal trails and managing visitor use to avoid sensitive areas.	✓	✓	✓	✓
Use noninvasive techniques wherever possible to mitigate ecological restoration practices. Undertake data recovery where necessary to avoid resource loss.	✓	✓	✓	✓
Parsons Memorial Lodge				
Continue to preserve Parsons Memorial Lodge through periodic assessments and appropriate treatments directed by the List of Classified Structures.	✓	✓	✓	✓
Scenic Values				
Scenery through Dana and Tuolumne Meadows				
Maintain views from eight scenic vista points, following individual work plans developed to protect ecological conditions at each particular location.		✓	✓	✓
Perform contrast analysis on all new structures or renovations of existing ones	✓	✓	✓	✓
Mitigate human intrusions into views by eliminating undesignated roadside parking, removing informal trails, and restoring more natural conditions to many currently disturbed sites.	✓	✓	✓	✓
Recreational Value				
Rare and Easy Access to the River through Tuolumne and Dana Meadows				
Retain seasonal (generally late May or early June through October) recreational access to the river through Tuolumne and Dana Meadows by way of Tioga Road. Recreational opportunities afforded by this access include both scenic driving along the river and the opportunity to park and get out of cars to enjoy recreational experiences in a river-related landscape.	✓	✓	✓	✓
Retain Tioga Road on its current alignment.	✓	✓	✓	✓
Enhance the scenic driving experiences by eliminating undesignated roadside parking.	✓	✓	✓	✓
Increase the amount of designated parking available to visitors wishing to get out of their cars and enjoy recreational experiences in a river-related landscape.		✓	✓	✓
Adhere to the user capacity limit of the alternative.	✓	✓	✓	✓

User Capacities, All Alternatives

The visitor and administrative use capacities under each alternative are summarized and compared in table 8-19.

Table 8-19.
Corridorwide Comparison of User 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
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.

Average Estimated Water Demand, Tuolumne Meadows, All Alternatives

The average estimated water demand associated with facilities and use at Tuolumne Meadows under each alternative is summarized and compared in table 8-20. These demand figures are based on the percentage increase or decrease in user capacity, compared to the data reporting existing water use demand under the no-action alternative.

Table 8-20.
Summary Comparison of Average Estimated Daily Water Demand, All Alternatives

Month	No Action (current use)		Alternative 1 (35% reduction in use)		Alternative 2 (9% increase in use)		Alternative 3 (8% reduction in use)		Alternative 4 (1.5% increase in use)	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
July	46,015	66,818	30,429	44,100	50,156	65,000	42,334	61,472	46,705	65,000
August	44,715	65,640	29,512	43,322	48,739	65,000	41,138	60,389	45,386	65,000
September	34,581	62,060	22,823	40,960	37,693	65,000	31,815	57,095	35,100	65,000

Summary Comparison of Site Development at Tuolumne Meadows, All Alternatives

The facilities that would be provided at Tuolumne Meadows under each alternative are summarized and compared in table 8-21, and parking capacities are summarized and compared in table 8-22. The location numbers in table 8-21 correspond to the numbering on the site development maps for each alternative.

Table 8-21.
Site Plan Summary, All Alternatives

Location	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	Pothole Dome scenic pullout/parking areas: <ul style="list-style-type: none"> Retain roadside pullout/day parking and trailhead on north side of road. Retain trail to Pothole Dome. Retain roadside pullout/day parking on south side of road. 	Pothole Dome scenic pullout/parking areas: <ul style="list-style-type: none"> Designate day parking with trailhead on north side of road. Improve trail to Pothole Dome. 	Pothole Dome scenic pullout/parking areas: <ul style="list-style-type: none"> Designate day parking with trailhead on north side of road. Improve trail to Pothole Dome. Formalize the parking/viewing, area east of Pothole Dome; add facilities for picnicking. 	Pothole Dome scenic pullout/parking areas: <ul style="list-style-type: none"> Designate day parking with trailhead on north side of road. Improve trail to Pothole Dome. Formalize the parking/viewing, area east of Pothole Dome; add facilities for picnicking. 	Pothole Dome scenic pullout/parking areas: <ul style="list-style-type: none"> Designate day parking with trailhead on north side of road. Improve trail to Pothole Dome. Formalize the parking/viewing area east of Pothole Dome.
2	Tioga Road through the Tuolumne Meadows area: <ul style="list-style-type: none"> Retain Tioga Road in its current alignment. Allow undesignated roadside parking. Retain Tioga Road bridge. 	Tioga Road through the Tuolumne Meadows area: <ul style="list-style-type: none"> Retain Tioga Road in its current alignment. Add roadside curbing to eliminate undesignated roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows. 	Tioga Road through the Tuolumne Meadows area: <ul style="list-style-type: none"> Retain Tioga Road in its current alignment. Add roadside curbing to eliminate undesignated roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows. Add hiking trail that parallels the south side of the road. 	Tioga Road through the Tuolumne Meadows area: <ul style="list-style-type: none"> Retain Tioga Road in its current alignment. Add roadside curbing to eliminate undesignated roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows. 	Tioga Road through the Tuolumne Meadows area: <ul style="list-style-type: none"> Retain Tioga Road in its current alignment. Add roadside curbing or large boulders to eliminate undesignated roadside parking and associated informal trails. Add approximately four viewing turnouts (four vehicles each; no parking). Modify Tioga Road bridge to improve its ability to accommodate peak flows. Add hiking trail that parallels the south side of the road.
3	Existing Cathedral Lakes trailhead: <ul style="list-style-type: none"> Allow undesignated roadside parking; retain trailhead. 	Existing Cathedral Lakes trailhead: <ul style="list-style-type: none"> Relocate trailhead and parking to location #6; restore to natural conditions. 	Existing Cathedral Lakes trailhead: <ul style="list-style-type: none"> Relocate trailhead and parking to location #6; restore to natural conditions. 	Existing Cathedral Lakes trailhead: <ul style="list-style-type: none"> Relocate trailhead and parking to location #6; restore to natural conditions. 	Existing Cathedral Lakes trailhead: <ul style="list-style-type: none"> Relocate trailhead and parking to location #6; restore to natural conditions.
4	Existing wastewater ponds and sprayfields: <ul style="list-style-type: none"> Retain ponds, sprayfields, and service road. 	Existing wastewater ponds and sprayfields: <ul style="list-style-type: none"> Pending additional planning, replace with upgraded wastewater treatment plant at locations #7 and #9; restore to natural conditions. 	Existing wastewater ponds and sprayfields: <ul style="list-style-type: none"> Pending additional planning, retain and upgrade (or relocate if new technology allows). 	Existing wastewater ponds and sprayfields: <ul style="list-style-type: none"> Pending additional planning, retain and upgrade (or relocate if new technology allows). 	Existing wastewater ponds and sprayfields: <ul style="list-style-type: none"> Pending additional planning, retain and upgrade (or relocate if new technology allows).

Table 8-21.
Site Plan Summary, All Alternatives (continued)

Location	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
5	Area east of Budd Creek: <ul style="list-style-type: none"> Retain as undeveloped natural area. 	Area east of Budd Creek: <ul style="list-style-type: none"> Construct new Cathedral Lakes trailhead connector. Retain as undeveloped natural area except for trail segment. 	Area east of Budd Creek: <ul style="list-style-type: none"> Co-locate new NPS and concessioner stables and day parking. Build new hard-sided cabin for two stable employees. Construct new Cathedral Lakes trailhead connector. 	Area east of Budd Creek: <ul style="list-style-type: none"> Construct new Cathedral Lakes trailhead connector. Retain as undeveloped natural area except for trail segment. 	Area east of Budd Creek: <ul style="list-style-type: none"> Construct new Cathedral Lakes trailhead connector. Retain as undeveloped natural area except for trail segment.
6	Existing visitor center and Road Camp: <ul style="list-style-type: none"> Retain visitor center and day parking. Retain NPS employee housing. Retain maintenance yard and office. 	Existing visitor center and Road Camp: <ul style="list-style-type: none"> Relocate visitor contact station to location #15; convert building to park operations. Construct new Cathedral Lakes trailhead with day and overnight parking. Retain maintenance yard and office. Increase NPS employee housing. 	Existing visitor center and Road Camp: <ul style="list-style-type: none"> Relocate contact station to location #11; convert building to park operations. Construct new Cathedral Lakes trailhead with day and overnight parking. Retain maintenance yard and office. Increase NPS employee housing. 	Existing visitor center and Road Camp: <ul style="list-style-type: none"> Retain visitor center in current location. Construct new Cathedral Lakes trailhead and picnic area, day and overnight parking. Relocate maintenance yard and office to location #7. Retain NPS employee housing. 	Existing visitor center and Road Camp: <ul style="list-style-type: none"> Relocate visitor contact station to location #9; convert building to NPS offices. Construct new Cathedral Lakes trailhead with day and overnight parking. Retain maintenance yard. Increase NPS employee housing.
7	Wastewater treatment plant: <ul style="list-style-type: none"> Retain wastewater treatment plant. Retain recreational vehicle dump station. 	Wastewater treatment plant: <ul style="list-style-type: none"> Upgrade wastewater treatment plant. Retain recreational vehicle dump station. 	Wastewater treatment plant: <ul style="list-style-type: none"> Upgrade wastewater treatment plant. Retain recreational vehicle dump station. 	Wastewater treatment plant: <ul style="list-style-type: none"> Upgrade wastewater treatment plant. Retain recreational vehicle dump station. Add new modest operational facilities related to roads, trails, buildings, and grounds. Add NPS maintenance yard and office, aboveground gasoline and diesel fuel tanks to this location. 	Wastewater treatment plant: <ul style="list-style-type: none"> Upgrade wastewater treatment plant. Retain recreational vehicle dump station. Add aboveground administrative gasoline and diesel fuel tanks.
8	Parsons Memorial Lodge: <ul style="list-style-type: none"> Preserve Parsons Memorial Lodge and retain vehicle access. and footbridge. 	Parsons Memorial Lodge: <ul style="list-style-type: none"> Preserve lodge; eliminate vehicle access; retain footbridge. 	Parsons Memorial Lodge: <ul style="list-style-type: none"> Preserve lodge and retain vehicle access and footbridge. 	Parsons Memorial Lodge: <ul style="list-style-type: none"> Preserve lodge and retain vehicle access and footbridge. 	Parsons Memorial Lodge: <ul style="list-style-type: none"> Preserve lodge and retain vehicle access and footbridge.
9	Area west of Unicorn Creek: <ul style="list-style-type: none"> Retain as undeveloped natural area. 	Area west of Unicorn Creek: <ul style="list-style-type: none"> Retain as undeveloped natural area; if needed, use area for wastewater treatment facilities. 	Area west of Unicorn Creek: <ul style="list-style-type: none"> Add day parking and picnic area. Add trailhead for Parsons Memorial Lodge. 	Area west of Unicorn Creek: <ul style="list-style-type: none"> Retain as undeveloped natural area. 	Area west of Unicorn Creek: <ul style="list-style-type: none"> Add new visitor contact station, picnic area, trailhead for Parsons Memorial Lodge, and day parking.

Table 8-21.
Site Plan Summary, All Alternatives (continued)

Location	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
10	<p>Tuolumne Meadows campground:</p> <ul style="list-style-type: none"> Retain campground in current loop configuration (304 sites, plus 7 group sites and 21 backpacker sites). Retain campground office and day parking. Retain Elizabeth Lakes trailhead and day parking. 	<p>Tuolumne Meadows campground:</p> <ul style="list-style-type: none"> Retain smaller campground; eliminate the A-loop road and 67 campsites. Retain campground office and day parking. Add vending machine for ice and firewood. Relocate entrance road and kiosk outside of floodplain. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank. 	<p>Tuolumne Meadows campground:</p> <ul style="list-style-type: none"> Expand campground in current configuration, adding 41 additional walk-in campsites; relocate the A-loop sites closest to the Lyell Fork. Retain campground office and day parking. Retain existing entrance road alignment. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank. 	<p>Tuolumne Meadows campground:</p> <ul style="list-style-type: none"> Retain campground in current configuration at current capacity. Retain campground office and day parking. Retain existing entrance road alignment. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank. 	<p>Tuolumne Meadows campground:</p> <ul style="list-style-type: none"> Retain campground at current capacity; realign the A-loop road and relocate 21 campsites that are currently within 100 feet of the river to a location just west of the existing A loop, more than 150 feet away from the river. Retain campground office and day parking. Relocate entrance road and kiosk outside of floodplain. Formalize John Muir Trail connection. Retain Elizabeth Lakes trailhead and day parking. Remove riprap from riverbank.
11	<p>Existing commercial services core:</p> <ul style="list-style-type: none"> Retain store, grill, mountaineering shop/school, public fuel station, and day parking. Retain concessioner employee housing. 	<p>Existing commercial services core:</p> <ul style="list-style-type: none"> Demolish and remove store, grill, mountaineering shop/school, public fuel station and post office. Convert area to day parking and picnic area. Add new public restroom. Add trail connector to campground. Eliminate concessioner employee housing. 	<p>Existing commercial services core:</p> <ul style="list-style-type: none"> Retain store, grill, public fuel station, and post office. Eliminate mountaineering shop/school. Add visitor contact station, shower/restroom facility, picnic area, and day parking. Add trail connector to campground. Relocate concessioner employee housing to location #20. 	<p>Existing commercial services core:</p> <ul style="list-style-type: none"> Retain store, grill, post office, and day parking. Demolish and remove mountaineering shop/school and public fuel station. Upgrade restroom. Add trail connector to campground. Relocate concessioner employee housing to location #18. 	<p>Existing commercial services core:</p> <ul style="list-style-type: none"> Retain store, grill, and post office; expand day parking. Add picnic area. Demolish and remove public fuel station and mountaineering shop. Relocate mountaineering school function to location 18. Upgrade restroom. Add trail connector to campground. Relocate concessioner employee housing to location #18.

Table 8-21.
Site Plan Summary, All Alternatives (continued)

Location	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
12	Existing concessioner stable: <ul style="list-style-type: none"> Retain concessioner stable and day parking. Retain concessioner employee housing. Retain day and overnight parking along access road. 	Existing concessioner stable: <ul style="list-style-type: none"> Co-locate NPS stable with concessioner stable (for administrative use only). Eliminate most concessioner employee housing except for one hard-sided cabin for two stable employees; restore to natural conditions. Eliminate parking along access road. 	Existing concessioner stable: <ul style="list-style-type: none"> Relocate concessioner stable and concessioner employee housing to location #5. Add meadow overlook picnic area and day parking. Retain day and overnight parking along access road. 	Existing concessioner stable: <ul style="list-style-type: none"> Retain concessioner stable and day parking. Retain one hard-sided cabin for two stable employees (most employee housing relocated to location #18). Retain day and overnight parking along access road. 	Existing concessioner stable: <ul style="list-style-type: none"> Co-locate NPS and concessioner stable (for administrative use only). Retain one hard-sided cabin for two stable employees (relocate most concessioner employee housing to location #18). Provide parking for up to two private or commercial stock trailers. Formalize day and overnight parking along road between Lembert Dome and the concessioner stable; widen the road by up to 10 feet in nonsensitive upland areas to accommodate pull-in parking.
13	Lembert Dome: <ul style="list-style-type: none"> Retain day parking and trailheads for Lembert Dome and Parsons Memorial Lodge. Retain picnic area. 	Lembert Dome: <ul style="list-style-type: none"> Retain day parking and trailheads for Lembert Dome and Parsons Memorial Lodge. Retain picnic area. Add shuttle stop. 	Lembert Dome: <ul style="list-style-type: none"> Expand day parking. Retain picnic area. Add shuttle stop. Retain trailheads for Lembert Dome and Parsons Memorial Lodge. 	Lembert Dome: <ul style="list-style-type: none"> Expand day parking and retain trailheads for Lembert Dome and Parsons Memorial Lodge. Retain picnic area. Add shuttle stop. 	Lembert Dome: <ul style="list-style-type: none"> Retain picnic area. Upgrade ventilation system in vault toilets; possibly convert to flush toilets in the future. Retain day parking and trailheads for Lembert Dome and Parsons Memorial Lodge.
14	Great Sierra Wagon Road: <ul style="list-style-type: none"> Preserve as trails. 	Great Sierra Wagon Road: <ul style="list-style-type: none"> Preserve as trails; mitigate impacts of old roads to meadow hydrology. 	Great Sierra Wagon Road: <ul style="list-style-type: none"> Preserve as trails; mitigate impacts of old roads to meadow hydrology. 	Great Sierra Wagon Road: <ul style="list-style-type: none"> Preserve as trails; mitigate impacts of old roads to meadow hydrology. 	Great Sierra Wagon Road: <ul style="list-style-type: none"> Preserve as trails; mitigate impacts of old roads to meadow hydrology.
15	Existing wilderness center and NPS stable: <ul style="list-style-type: none"> Retain wilderness center and overnight parking. Retain NPS stable. 	Existing wilderness center and NPS stable: <ul style="list-style-type: none"> Combine new, small visitor contact station with existing wilderness center; expand parking. Relocate NPS stable to location #12; use site for expansion of NPS employee housing, if needed. 	Existing wilderness center and NPS stable: <ul style="list-style-type: none"> Combine ranger station with existing wilderness center; expand parking. Relocate NPS stable to location #5; use site for expansion of NPS employee housing, if needed. 	Existing wilderness center and NPS stable: <ul style="list-style-type: none"> Retain wilderness center; expand parking. Retain NPS stable. 	Existing wilderness center and NPS stable: <ul style="list-style-type: none"> Retain existing wilderness center; expand parking. Move NPS stable to location #12; use site for expansion of NPS employee housing, if needed.

Table 8-21.
Site Plan Summary, All Alternatives (continued)

Location	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
16	Existing ranger station and Ranger Camp: <ul style="list-style-type: none"> Retain ranger station and day parking. Retain the SAR cache. Retain aboveground diesel fuel tank. Retain NPS employee housing. 	Existing ranger station and Ranger Camp: <ul style="list-style-type: none"> Retain ranger station and day parking. Retain the SAR cache. Retain aboveground diesel fuel tank for administrative use. Replace NPS employee housing with hard-sided cabins. 	Existing ranger station and Ranger Camp: <ul style="list-style-type: none"> Relocate ranger station function to location #15. Retain the SAR cache. Retain the aboveground diesel fuel tank. Replace NPS employee housing with hard-sided cabins. 	Existing ranger station and Ranger Camp: <ul style="list-style-type: none"> Retain ranger station and day parking. Retain the SAR cache. Relocate the aboveground diesel fuel tank to location #7. Replace NPS employee housing with hard-sided cabins. 	Existing ranger station and Ranger Camp: <ul style="list-style-type: none"> Retain and slightly expand the ranger station; retain day parking. Retain the SAR cache. Relocate the aboveground diesel fuel tank to location #7. Replace NPS employee housing with hard-sided cabins.
17	Bug Camp, Dog Lake/John Muir Trail parking: <ul style="list-style-type: none"> Retain NPS employee housing. Retain day and overnight parking. 	Bug Camp, Dog Lake/John Muir Trail parking: <ul style="list-style-type: none"> Increase day and overnight parking. Eliminate NPS housing. 	Bug Camp, Dog Lake/John Muir Trail parking: <ul style="list-style-type: none"> Increase day and overnight parking. Eliminate NPS housing. 	Bug Camp, Dog Lake/John Muir Trail parking: <ul style="list-style-type: none"> Increase day and overnight parking. Retain NPS employee housing. 	Bug Camp, Dog Lake/John Muir Trail parking: <ul style="list-style-type: none"> Increase day and overnight parking. Replace NPS employee housing with hard-sided cabins.
18	Tuolumne Meadows Lodge: <ul style="list-style-type: none"> Retain lodge and overnight parking. Retain roadside parking along access road. Retain concessioner employee housing. 	Tuolumne Meadows Lodge: <ul style="list-style-type: none"> Demolish and remove lodge, parking, and employee housing; restore area to natural conditions. 	Tuolumne Meadows Lodge: <ul style="list-style-type: none"> Retain lodge at current capacity. Eliminate roadside parking. Relocate concessioner employee housing to location #20. 	Tuolumne Meadows Lodge: <ul style="list-style-type: none"> Retain lodge with reduced capacity. Relocate the three guest tent cabins and all employee tent cabins away from the river. Eliminate roadside parking. Expand concessioner employee housing. 	Tuolumne Meadows Lodge: <ul style="list-style-type: none"> Retain lodge at current capacity; relocate three guest tent cabins, all employee cabins, and possibly the dining hall/kitchen to a location more than 150 feet from the river. Upgrade shower house. Relocate mountaineering school function to the lodge. Eliminate roadside parking. Expand concessioner employee housing.
19	Water treatment facility: <ul style="list-style-type: none"> Retain water treatment facility. 	Water treatment facility: <ul style="list-style-type: none"> Upgrade water treatment facility. 	Water treatment facility: <ul style="list-style-type: none"> Upgrade water treatment facility. 	Water treatment facility: <ul style="list-style-type: none"> Upgraded water treatment facility. 	Water treatment facility: <ul style="list-style-type: none"> Upgrade water treatment facility.
20	Gaylor Pit: <ul style="list-style-type: none"> Retain helipad. Allow undesignated day parking. 	Gaylor Pit: <ul style="list-style-type: none"> Retain helipad. Discontinue undesignated parking. 	Gaylor Pit: <ul style="list-style-type: none"> Add NPS and concessioner employee housing. Retain helipad. 	Gaylor Pit: <ul style="list-style-type: none"> Retain helipad Add day parking 	Gaylor Pit: <ul style="list-style-type: none"> Add NPS employee campsites, vault toilets, and potable water tank. Provide campsites for priority tribal use. Retain helipad.

Table 8-22.
Summary Comparison of Designated Parking, Tuolumne Meadows, All Alternatives

Type of Parking	Current	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Parking Area Description
Day Parking Spaces (in Designated Parking Areas)	16	16	16	16	16	existing parking area at Pothole Dome
	0	0	20	20	20	new parking/viewing area east of Pothole Dome
	0	4	4	4	4	existing roadside pullout south of Pothole Dome
	0	0	58	0	0	new parking area associated with the relocated stables (alternative 2 only)
	50	50	126	113	76	existing parking area at the current visitor center
	0	0	80	0	80	new day parking area west of Unicorn Creek and across Tioga Road from the Parsons Memorial Lodge trailhead
	11	13	13	13	13	existing parking area at the campground office
	11	11	11	11	11	existing parking in the campground for the Elizabeth Lakes trailhead
	0	10	0	0	0	A-loop day use parking (alternative 1 only)
	15	0	15	15	30	existing parking area at the fuel station
	51	50	55	55	55	existing parking area at the store and grill
	58	0	30	58	38	existing parking area at the concessioner stable
	0	0	34	34	55	roadside parking along the road to the concessioner stable ^b
	29	25	50	37	29	existing parking area at the base of Lumbert Dome
	7	7	7	7	7	existing parking area at the ranger station
	25	52	52	45	52	existing parking area at the Dog Lake/John Muir Trail trailhead
	0	0	0	15	5	existing parking area at Gaylor pit
	67	67	71	67	71	existing parking areas in the road corridor east of Tuolumne Meadows, including the Mono Pass and Gaylor Peak trailheads and the Dana Meadows and other pullouts
	340	305	642	510	562	Subtotal, Day parking spaces
Overnight Parking Spaces (excluding cars parked in the Tuolumne Meadows campground)	58	89	86	86	89	existing parking area at the wilderness office
	33	68	59	59	68	existing parking area at the Dog Lakes/John Muir Trail trailhead
	102	0	102	70	102	Tuolumne Meadows Lodge
	-	19	35	32	35	relocated parking area for Cathedral Lakes trailhead
	-	-	58	56	58	roadside parking along the road to the concessioner stable ^b
	193	176	340	303	352	Subtotal, Overnight parking spaces
Total	533^a	481	982	813	914	All Designated Day and Overnight Parking Spaces, Tuolumne Meadows

a In addition to vehicles in these designated parking spaces, an estimated 337 vehicles currently park in undesignated spaces during peak periods.

b Roadside parking along the road to the concessioner stable would be formalized; additional parking, beyond what currently exists informally, would be located between the turnoff to the stable and the stable.

Environmentally Preferable Alternative

Legal Mandates

The Council on Environmental Quality (CEQ) regulations implementing NEPA (*Code of Federal Regulations* 40:1505.2) and the NPS NEPA guidelines require that “the alternative or alternatives which were considered to be environmentally preferable” be identified. *Environmentally preferable* is defined as “the alternative that will promote the national environmental policy as expressed in NEPA section 101. Ordinarily, this refers to the alternative that causes the least damage to the biological and physical environment; it also refers to the alternative that best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ 1981).

Section 101 of NEPA states that:

It is the continuing responsibility of the Federal Government to . . .

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;*
- (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;*
- (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;*
- (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;*
- (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and*
- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.*

Conformance

Alternative 4 would best fulfill the responsibilities of the NPS to select the alternative that has the least amount of impacts to the biological and physical environment; that best protects, preserves, and enhances historic, cultural, and natural resources; and that best supports diversity and variety of individual choice.

The no-action alternative would provide for diversity and variety of individual choice; however, it would not best fulfill any of the other requirements, particularly at Tuolumne Meadows, where increasing amounts of use would continue to adversely affect ecologically sensitive meadow and riparian areas, archeological resources, scenic values, visitor experience, visitor safety, and park operations. Additionally, aging utilities at Tuolumne Meadows and Glen Aulin would continue to pose risks to water quality under the no-action alternative.

All of the action alternatives would fulfill all of the above requirements to some degree. In addition, all of the action alternatives would fulfill these requirements somewhat equally, through continuation of existing wilderness and resource management policies, ecological restoration of fragile meadow and riparian areas, protection of water quality, protection of archeological resources, and conformance with existing requirements under Executive Order 13514 to improve energy efficiency, reduce consumption and waste, and conserve water use to improve sustainability of NPS operations and facilities. The alternatives would vary primarily in water

consumption and related risks to water quality and habitat, protection of historic resources, and diversity of recreational opportunities.

Alternative 1 would demolish and remove significant historic resources at Tuolumne Meadows Lodge and Glen Aulin High Sierra Camp. It would also impose the most restrictions on diversity of visitor use in the most popular portions of the corridor. Alternative 2 would provide outstanding, diverse recreational opportunities in the river corridor. However, the historic setting at Tuolumne would be altered to a greater extent than under any other alternative, and water consumption and associated risks to water quality would remain relatively higher. This alternative would have the greatest potential for requiring future reductions in service, including reducing the capacities at the lodge and/or campground, to ensure that the level of water consumption remained protective of river flows. Alternative 3 would provide outstanding recreational opportunities similar to existing conditions and would retain the historic setting of Tuolumne Meadows, but like alternative 2, it would not reduce risks to water quality to the degree that would occur under alternative 4.

In comparison, alternative 4 would strike a balance between maintaining the historic setting of the river corridor, maintaining a diversity of recreational opportunities, and allowing for extensive natural resource management at Tuolumne Meadows to restore natural ecosystem function to the extent possible. For these reasons, alternative 4 would best promote the national environmental policy per NEPA section 101, and alternative 4 is considered the environmentally preferable alternative.

Alternatives Dismissed from Further Consideration

Keep Tioga Road Open Year-Round

From roughly November to late May or early June, the Tioga Road is closed due to snow and icy conditions. Alternatives that would keep the road open during winter are not considered feasible because the road is not engineered for year-round use. The feasible avalanche control work on both the Tioga Road and Highway 120 East toward Lee Vining Canyon might not be adequate to mitigate hazards to public and park staff. In addition, infrastructure along the road is not adequate to support road clearing operations and visitor protection activities. Costs and resource impacts associated with reengineering and maintaining the road for year-round access would be unreasonable. Also the wilderness boundary poses a constraint on any potential reengineering.

Closing Tioga Road in the winter does not adversely affect the outstandingly remarkable recreational value of the Tuolumne River. During this time, the recreational value of the Tuolumne Meadows and Lower Dana Forks segments shifts from river access via Tioga Road to a wilderness experience along the river. The snow season is a quiet time to enjoy solitude in the raw elements of winter.

Realign or Eliminate Tioga Road through the Tuolumne Meadows Area

Closing the Tioga Road to through-traffic through the Tuolumne Meadows area was not considered a reasonable alternative. The Tioga Road is one of the few east-west trans-Sierra highways, and its closure would significantly affect regional summer and fall travel patterns across the Sierra. The nearest east-west corridor to the north is along the Sonora Pass (Highway 108); the nearest southerly route is over Walker Pass on California State Highway 178.

Realignment of the road away from the river corridor through Tuolumne Meadows was considered during the early phases of planning. However, a study conducted for the NPS aimed at assessing the effects of the Tioga Road on the hydrologic processes in Tuolumne Meadows (Cooper et al. 2006) found that the Tioga Road does not appear to affect hydrologic conditions in Tuolumne Meadows except in localized areas. Culverts beneath the road channelize water during periods of high spring runoff, thereby creating localized variation in meadow hydrology but not affecting the amount of surface water or groundwater recharge from what would occur if the

road was not there. The role of the road appears to be minimal with respect to conifer encroachment. Consequently, it does not appear that road realignment would enhance the protection of river-related ecological values.

Relocate Park Operations and Housing Functions to Lee Vining

The NPS considered the feasibility of relocating some park operations functions (including a maintenance yard and stable), some administrative offices, and some employee housing to an administrative site in Inyo National Forest (in Lee Vining Canyon), where they could be co-located with similar USFS functions.

After some analysis, the NPS determined that it would not be cost-effective to spend limited public funds to relocate seasonal facilities to Lee Vining, where they could only be used three or four months per year by Yosemite National Park staff (since Tioga Road is closed in the winter).

Furthermore, the NPS determined that a certain amount of employee housing and maintenance and administrative facilities are necessary at Tuolumne Meadows to effectively and efficiently support resource management and visitor use. Necessary facilities were identified for each alternative based on user capacity and the kinds of resource management and visitor use management needed to implement the alternative.

Although some employees could be housed off site if alternative housing was available (which it currently is not), many employees are considered “required occupants” who must be housed on site to respond to visitor and resource safety and operational emergencies. Maintenance functions requiring rapid response or large equipment would be greatly hampered by having to travel over Tioga Road from Lee Vining Canyon. The NPS also determined that frequently trailering the pack stock needed to support routine ranger patrols and maintenance would present a safety hazard if the stable was relocated to Lee Vining Canyon.

For these reasons, the NPS determined that park operations, administrative offices, and housing would be retained in the Tuolumne Meadows area rather than developing a new administrative site on Inyo National Forest land in Lee Vining Canyon.

Close or Reduce the Use of the Backpacker Camp at Glen Aulin

Because Glen Aulin is at the intersection of four popular trails that provide access to large parts of the wilderness, and because of the lack of other low-impact camping areas nearby, removing the backpacker camp or reducing the capacity of the Glen Aulin wilderness zone and related trailhead quotas would cause large changes in visitor use patterns over a large part of the wilderness within the Tuolumne River corridor. This would be better analyzed in the upcoming Yosemite Wilderness Stewardship Plan, which will update the current *Yosemite Wilderness Management Plan*. For this reason, this concept was dismissed from further consideration.

Relocate the Wastewater Treatment Plant to the Site of the Existing Ponds and Sprayfields

Relocating the wastewater treatment plant to the north side of the river (near the existing wastewater ponds and sprayfields) was considered but dismissed for several reasons:

- Conveying the wastewater to this location would require either continuing to use the existing force main (line) under Tuolumne Meadows, or constructing a new line from the Lumbert Dome parking lot west along the gravel road to the ponds. The route across the meadow is undesirable because potential failure of the line could degrade water quality (although the line is currently in good condition) as well as the outstandingly remarkable biological values in Tuolumne Meadows. A new wastewater line along the gravel road could disturb known archeological sites in the area, thus potentially degrading these

outstandingly remarkable cultural values. The same line could also degrade the outstandingly remarkable biological values in Tuolumne Meadows because the gravel road cuts across portions of those meadows and a new wastewater line could disrupt groundwater flow into the meadows. Construction of that line would also pose a threat of disturbance to the mineral spring habitat at Soda Springs. While that habitat is not an outstandingly remarkable value, it is home to several rare plants whose protection the NPS is obligated to ensure.

- Building the wastewater treatment plant in this area would either mean that all untreated wastewater would use the existing force main (line) under Tuolumne Meadows, or that the flow from the campground, Road Camp, the store/grill area, and the visitor center would have to be reversed, to move east and cross the river under the Tioga Road bridge, before it then turned northwest to flow in a new main that would have to be laid along the dirt road to the wastewater ponds. Either option would effectively quadruple the amount of completely untreated wastewater crossing the river, since at least four times as many people stay overnight at the campground or use the flush toilets at the visitor center and grill as stay at the lodge and in the Ranger and Bug Camp housing areas. Quadrupling such flow would increase the risk, while minor, of contaminating the Tuolumne River, compared to the existing situation.
- Reconstruction of the wastewater plant at the existing wastewater treatment plant site will involve upgrading to tertiary treatment. The product of a tertiary plant is often drinkable; thus, the risk to contaminating the Tuolumne River water from the force main under the meadow will be eliminated (were it to break, the river would be receiving water that is drinkable). Retaining the wastewater treatment operation on the south side of the road, where the existing plant is, effectively minimizes the risk to water quality, given the geography of Tuolumne Meadows development and the fact that the upgraded plant will produce water of drinkable or near-drinkable quality.
- The existing wastewater ponds are visible from Lembert Dome. Constructing an entirely new wastewater treatment plant at this location would constitute an unacceptable new intrusion into the area's scenic views and an outstandingly remarkable scenic value of the river.
- The Wilderness boundary was drawn very close to the existing ponds and sprayfields, thus leaving little room for new construction of any kind. The space necessary for a full treatment plant means that it could not be sited by the ponds without violating the wilderness boundary.

In conclusion, the possibility of relocating the wastewater treatment plant to the site of the existing ponds and sprayfields was dismissed because it would degrade several outstandingly remarkable values, could violate the wilderness boundary, would increase the risk to water quality, could harm sensitive plant habitat, and would present a new incursion into the scenic integrity of Tuolumne Meadows. Furthermore, the concerns about pumping wastewater beneath the river, from the existing plant site on the south side of the road to the containment ponds on the north side, would be largely eliminated by upgrading the treatment plant to tertiary treatment.

Relocate Visitor Services to a Site in the Tuolumne Meadows Area Outside the River Corridor

The feasibility of relocating the facilities necessary for visitor use to areas outside the river corridor boundary is severely constrained by the boundaries of the Yosemite Wilderness, which generally overlap into the scenic segments of the corridor. Changing the Wilderness boundary would require an act of Congress and is considered infeasible for the purposes and timeframe of this plan. The site most suitable for development that is outside both the river corridor and the designated Wilderness is currently occupied by the campground B–G loops. The option of locating a visitor contact station and possibly a store and grill at the site currently occupied by the campground D loop was considered but dismissed because of the potential for impacts on Unicorn

Creek and adjacent wetlands, and because of the number of campsites that would have to be either eliminated or redistributed to other campground locations. Redistributing these sites was dismissed because it would not be cost-effective and it would increase the site density within the campground.

Adapt the Historic Fuel Station Structure for Visitor Contact

The NPS analyzed the feasibility of retaining the historic fuel station structure and adapting it for use as a visitor contact station in the preferred alternative. This action would avoid the adverse effect of demolishing this historic structure as a consequence of eliminating the public fuel station function from the river corridor. However, the analysis concluded that the structure would be too small to accommodate the visitor contact functions necessary for the level of use prescribed under either alternative 2 or the preferred alternative.

Replace the Tuolumne Meadows Lodge with a More Permanent Facility

Replacing the Tuolumne Meadows Lodge with a larger and more permanent facility was not considered reasonable for several reasons:

- Any new construction in a wild and scenic river corridor must be necessary for visitor use and resource protection and infeasible to locate outside the river corridor. A new lodge is not necessary, given the presence of the existing Tuolumne Meadows Lodge, which is functional and appealing to many.
- A new lodge would result in adverse effects on the Tuolumne Meadows Historic District. The Tuolumne Meadows Lodge and High Sierra Camp was recommended eligible for listing on the National Register of Historic Places as a historic district in 1989 and 2004 (Kirk and Palmer 2004). The building and structures are designed to be as simple as possible, with no architectural ornamentation. The most distinctive feature of the area (established in 1916) is the village-like clustering. Replacing part of the lodge (for example, half the tent cabins) with a new lodge would heavily affect the rustic, village-like character of the lodge, thus causing an adverse effect on the historic district.
- If a new lodge included rooms with private baths (as it most likely would because such rooms are the norm in contemporary hotel construction), water withdrawals from the Dana Fork would likely increase because the ready access to domestic water in the hotel rooms would likely lead to greater per capita water consumption. As noted in chapter 5, water withdrawals from the Dana Fork are already near capacity, so construction of a new lodge would most likely cause water withdrawals that exceed NPS regulations.
- A persistent theme in public scoping was to keep the development in Tuolumne Meadows like it is now: rustic. Commenters were mostly opposed to the idea of building a modern new lodge in the area.
- Any construction of a new lodge in Tuolumne Meadows would be prohibitively expensive due to the area's remoteness and heavy snow loads. Such costs would be passed along to the visitor, thereby resulting in considerably higher lodging costs than the lodge currently charges. Providing affordable lodging is a common request heard in public comments in Yosemite; a new lodge would not address this concern.

In conclusion, based on wild and scenic river management regulations, interests and concerns raised during scoping, resource concerns, and high construction costs, the idea of constructing a new, permanent lodge at Tuolumne Meadows was dismissed from further consideration.

Increase Use Beyond the Level Considered in Alternative 2

A user capacity even higher than that considered in alternative 2 was considered but rejected for several reasons.

First, the maximum water withdrawals from the Dana Fork have, on one or two days in several of the past five years, already exceeded the management standard, and alternative 2 would require water conservation

measures to avoid exceeding these maximum withdrawals more frequently. Even with the water conservation measures included in all the action alternatives, a user capacity above what is proposed in alternative 2 might demand more water from the Dana Fork than the river could provide without affecting the river's free-flowing character, and it would increase the probability that additional actions would be needed to protect the free-flowing character of the river if global climate change caused a reduction in the duration or intensity of low river flows.

Additionally, the parking and infrastructure necessary for additional use would be difficult to construct without affecting the scenic or subalpine meadow and riparian values of the river corridor. Also, with the designated Wilderness boundary closely approaching the road and the meadows, there is insufficient space to construct parking lots much larger than those proposed in alternative 2.

For these reasons, the idea of accommodating a higher user capacity than what is proposed in alternative 2 was dismissed from further consideration.

Allow Boating on the Tuolumne River in the Meadows Area

Allowing boating on the Tuolumne River in the meadows area was considered but dismissed for several reasons:

- Most importantly, the riverbanks in the meadows area currently have less willow vegetation than would be expected under natural conditions and are a priority for ecological restoration (as discussed in chapter 5). The riverbanks are able to accommodate only low levels of unconfined use without causing damage to sensitive riparian vegetation. Boating take-outs would require site hardening and additional trails to mitigate the effects of foot traffic, and this would be inconsistent with other actions to remove facilities and minimize human-caused stresses on these areas.
- While alternatives 2 and 4 provide for a very limited amount of boating below the meadows, most boaters would have to take out at the northwestern end of the meadows and hike (with their boats) back to the lodge area (where they would presumably have put in their boats). This would increase visitor use on the Glen Aulin trail, which is already high.
- The stretch of water in the Tuolumne Meadows area is deceptively swift, much more so than the Merced River in Yosemite Valley. If boating was allowed, more inexperienced boaters would need to be rescued, thus adversely affecting the limited park operations function in this remote area.

For these reasons, the idea of boating on the river in the meadows area was dismissed from further consideration.

Allow Boating on the Lyell Fork

Allowing boating on the Lyell Fork was considered but dismissed because of the potential for several concerns:

- The subalpine meadow and riparian habitat along the Lyell Fork contributes to one of the outstandingly remarkable values of the river. Boating would increase foot traffic on and near the riverbanks in these sensitive habitats, leading to possible trampling and additional social trails and meadow fragmentation.
- Visitor use along this river segment already fills the overnight trailhead quotas. Introducing a new recreational activity would increase competition for available overnight permits, and if people chose to pack in boats for day trips, it might trigger additional management to ensure that day use remained within the management standard.

Allow Boating on the Tuolumne River below O'Shaughnessy Dam

Allowing boating on the Tuolumne River below O'Shaughnessy Dam was considered but dismissed for several reasons:

- The stretch downstream of Poopenaut Valley goes through a highly confined canyon, with granite domes going straight down into the water. There is no trail in this section, and rescues even by helicopter would be difficult or impossible.
- Poopenaut Valley would likely serve as either a take-out or put-in for some parties. The trail in the valley is not well defined, so kayaking would likely lead to proliferation of social trails and/or a need to define the trail better. Additionally, the parking lot for Poopenaut Valley has room for only 4 vehicles.
- Poopenaut Valley's wetlands are an outstandingly remarkable value of the river. These wetlands support a diversity of bats equal to that of Yosemite Valley (which is to say, the highest in the state), and a high bird diversity. Boaters landing to scout the river downstream of Poopenaut Valley, or putting in or taking out, could trample the wetlands and/or disrupt the bats.
- The parking lot at the dam, while larger than that at Poopenaut Valley, still fills on busy spring weekends (put-in would require carrying boats down the access road from the Hetch Hetchy parking area).

Provide a Bike Path along Tioga Road and Provide a Bicycle Rental

The Tuolumne Meadows area is not conducive to circulation by bicycle due to the general lack of wide, paved trails and a safe bicycling lane along Tioga Road. The provision of improved trails and a bicycle rental was considered but dismissed for several reasons:

- It would not be feasible to widen Tioga Road to accommodate a separate bicycle lane; therefore a parallel trail would have to be constructed adjacent to the road. The amount of new ground disturbance to accommodate this trail and other trails needed to provide a usable bicycle circulation system would cause an unacceptable level of impact. Specifically, the subalpine meadow and riparian habitat and the prehistoric archeological landscape (two outstandingly remarkable values) would likely be affected by new trail construction; and construction of a new bike trail bridge across the Tuolumne River could affect free flow and would be subject to the section 7 determination process described in chapter 4. Even if the trail were to be constructed on the south side of Tioga Road (to minimize impacts on meadow and riparian habitat), it would be difficult to avoid impacts to wetlands.
- Construction of a bike trail would not contribute to the traditional experience envisioned in the preferred alternative, as it would add a new use not currently present (in a significant amount) in the meadows area.
- The Tuolumne River Plan strives to limit commercial facilities to those determined to be necessary for river-related recreation. A new commercial bicycle rental was not considered necessary within the river corridor.

Provide a Separate Stock Trail to Serve the Glen Aulin High Sierra Camp

The provision of a separate trail dedicated to stock use to serve the Glen Aulin High Sierra Camp would require construction of a new trail alignment either parallel to the existing trail or extending from Tioga Road west of Pothole Dome to Glen Aulin. In either case, new trail construction would trigger a minimum-requirement analysis, which would show that a new trail would not be a minimum requirement because a trail to Glen Aulin already exists. The new limitations on stock use to support the Glen Aulin High Sierra Camp proposed in the preferred alternative will serve to address many of the concerns about conflicts between hikers and stock use on the Glen Aulin Trail.

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