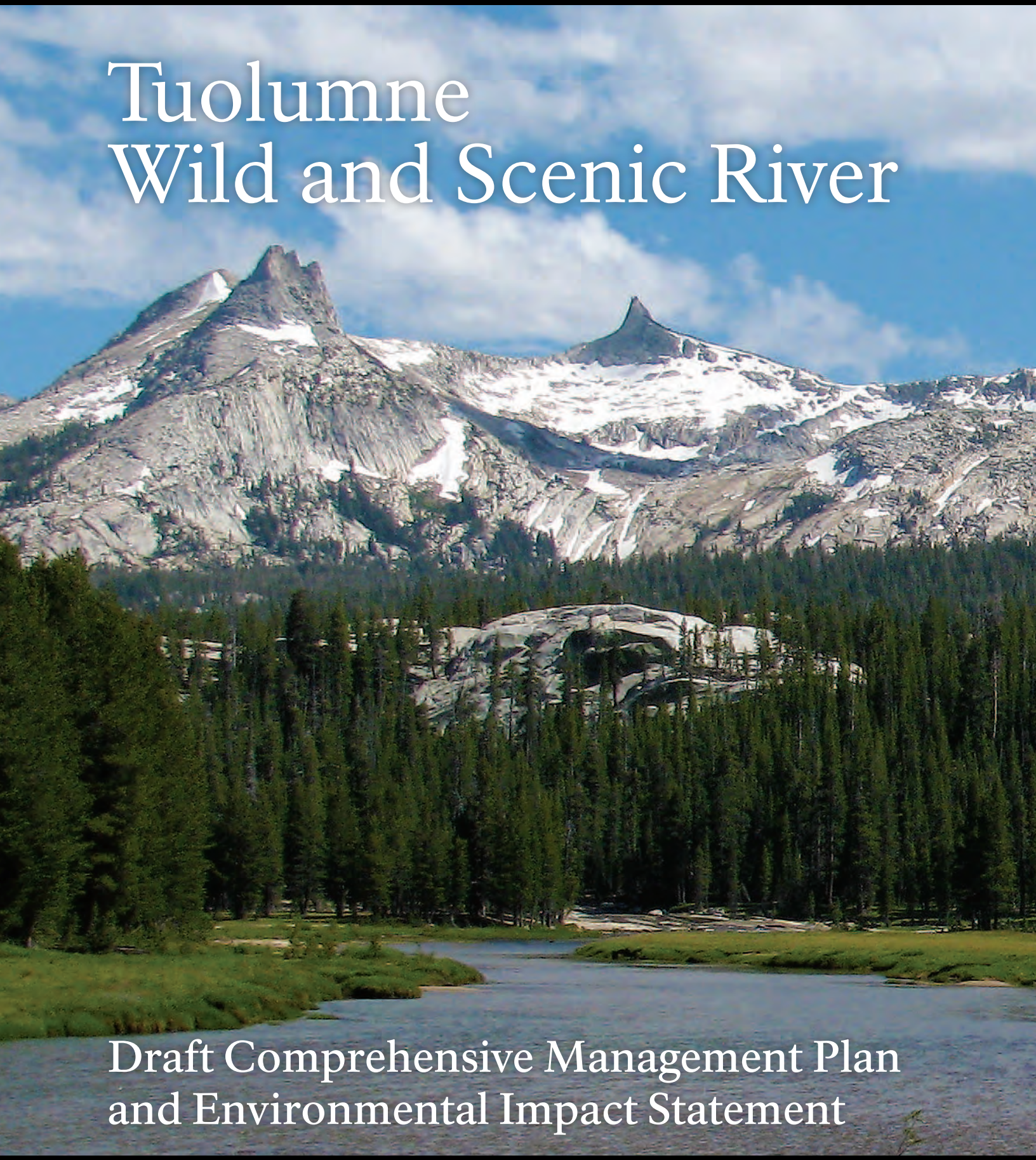
Yosemite National Park

National Park Service
U.S. Department of the Interior

Tuolumne Wild and Scenic River



Draft Comprehensive Management Plan and Environmental Impact Statement

January 2013

Providing Access and Protecting Resources

Volume Three

Yosemite National Park

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Tuolumne Wild and Scenic River Draft Comprehensive Management Plan and Environmental Impact Statement

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Volume Three Contents†

Appendices

† Volume Three is in electronic form only, available on the Internet (and on compact disc by request).

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Appendix A: Existing Facilities Analysis for the Tuolumne Wild and Scenic River Corridor

The Wild and Scenic Rivers Act guidelines state that, "Major public use facilities such as developed campgrounds, major visitor centers and administrative headquarters will, where feasible, be located outside the river area. If such facilities are necessary to provide for public use and/or to protect the river resource, and location outside the river area is infeasible, such facilities may be located within the river area provided they do not have an adverse effect on the values for which the river area was designated."[1]

Pursuant to this guideline, NPS planners evaluated all existing facilities in the river corridor for whether they are necessary for public use or resource protection, feasible to locate or relocate outside the river corridor, and if they have effects on the river values, using the definitions of "necessary," "feasible," and "infeasible" provided below. A summary of the evaluation is presented in table A-1. Where it has been determined that existing developments are causing management concerns (no adverse impacts or degradation are present), the *Tuolumne River Plan* calls for removal, redesign, and/or relocation of those facilities. All impacts identified in the table below are discussed more fully in chapter 5, under the conditions assessment for each river value.

In addition to evaluating the effects of existing facilities on river values, extensive studies and site analyses have been conducted at the primary visitor service areas (Tuolumne Meadows, the Tioga Road corridor, and Glen Aulin) to identify the major site constraints that restrict development, redesign and/or relocation of facilities. Such constraints, include the locations of floodplains, wetlands, meadows, riparian habitat, rare plants, archeological sites, historic structures, and areas of known impact. A summary of that information for Tuolumne Meadows is shown on the Site Analysis map in chapter 7 (figure 7-3).

All the above mentioned studies and analyses, together with river segment classifications, informed the alternative site plans under consideration, particularly in terms of sensitive areas that need to be protected and resilient areas where needed facilities might be located.

In evaluating the facilities, NPS planners were guided by the context for the *Tuolumne River Plan* (see chapters 1 and 2). Tuolumne Meadows has long served as a focal point of visitation to the Yosemite high country; it has long been a primary visitor destination within Yosemite National Park. Consequently, beginning in the 1920s the National Park Service gradually constructed the facilities that it determined were necessary for visitor use and resource protection in the Tuolumne Meadows area. As noted in the historic properties discussion in Chapter 8, central to this planning effort was the creation of a public campground, with treated running water and a sewer system. Complementing the campground was the Tuolumne Meadows Lodge, which was constructed as part of the High Sierra Camp loop. In addition to these services, the NPS constructed a visitor contact station, a wilderness center, and the housing necessary for NPS and concessioner employees who would support the visitor services in the area.

Responding to these developments, the improvements to the Tioga Road in the 1930s and 1960s, California's growing population, and other societal trends, visitation to the Tuolumne Meadows area gradually and

[1] 47 *Federal Register* 173: 39459, Sept. 7, 1982.

continuously grew. By the 1990s, visitation to the area far exceeded available support facilities. Instead of constructing additional facilities to meet increasing visitor demand, however, the NPS actually responded by reducing some development in order to control visitation and its impacts and to improve aspects of the visitor experience. The primary such action (one called for in the 1980 General Management Plan) was to halve the number of sites in the Tuolumne Meadows campground from about 600 (which made this campground the largest in the national park system at the time) to the present 304 sites (it is still one of the largest). Conversely, NPS constructed a new wilderness center to provide a place whereby wilderness travelers could be educated about proper camping techniques and for the NPS to enforce the wilderness trailhead quota system. These actions succeeded in protecting park resources and improving those visitor experiences, but day use has continued to increase, with associated impacts (as discussed in chapter 5). Visitor demand continues to far exceed available facilities (a situation carefully considered during the development of this plan).

Within this context (and for this plan), NPS planners decided that the Tuolumne Meadows area would continue to serve as a primary visitor destination within Yosemite National Park, one with overnight facilities for visitors. This decision is in harmony with the Wild and Scenic Rivers Act, which stipulates that "Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values."[2] In light of this decision, almost all facilities in the Tuolumne Meadows area would be expected to be necessary, as the NPS only developed those facilities that the agency had already determined, at some time between Yosemite National Park's creation in 1890 and the Tuolumne River Wild and Scenic designation in 1984, were necessary for visitor use and resource protection. Similarly, within the context of any given alternative in this plan, most facilities are necessary, though they vary somewhat as regards some structures, largely due to the variations across alternatives in the use levels and visitor experiences envisioned in those alternatives (which adhere to dominant themes in public comment regarding the management of Tuolumne Meadows). Also, as explained in Chapters 5 and 7, the NPS constructed all the action alternatives to protect and enhance river values and to correct past and present adverse impacts or degradation on river values.

This leaves the question of whether it is feasible to locate facilities deemed to be necessary outside of the river corridor or to relocate them if they currently occur within the corridor. As indicated in figure 7-3, there are tight constraints on site development outside of the river corridor—but still within the Tuolumne Meadows area—due to the Yosemite Wilderness boundary and the locations of sensitive natural and cultural resources. The Wilderness Act precludes siting or relocating structures within designated Wilderness unless they are the minimum requirement necessary for administration of the Wilderness, and the Yosemite Wilderness boundaries were drawn very close to the Tioga Road in most areas. While those boundaries do not so closely approach the road in the Tuolumne Meadows area, NPS policy has long prohibited construction in the meadows themselves or on the north side of the Tioga Road, to prevent damage to the meadows (which are an outstandingly remarkable value of the river, see chapter 5) and incursion into the scenic views of the meadows (another outstandingly remarkable value). These constraints, then, leave just a small area suitable for development outside of the river corridor on the south side of the Tioga Road. That area is almost completely occupied by part of the campground. Consequently, there is no available space in the Tuolumne Meadows area that is both outside the river corridor and currently free from already necessary facilities.

The final question, then, is whether any facilities could be relocated elsewhere, such as to the west on the Tioga Road (like White Wolf) or to the east in Lee Vining. The only facilities that could be located in these places are

[2] U.S.C. 16, §1281 (a).

those that do not require proximity to the Tuolumne River and Meadows and the concentrated visitor use area there. A limited range of overnight accommodations at Tuolumne Meadows are needed under every alternative due to the remote location of this major visitor use area, and there are no suitable locations for overnight accommodations outside the corridor within a reasonable driving distance. Therefore, moving them outside of the corridor is not possible. The NPS put these facilities where they are so that visitors could experience and enjoy the Tuolumne River and adjacent meadows. The support facilities necessary to support visitor use include the wastewater and water treatment plants, the maintenance facilities, the visitor contact station, the wilderness center, the store and grill, the picnic area, and the stables. These are all additionally necessary on site for various reasons detailed in the table below. This leaves the housing for both NPS and concessioner employees. While it is theoretically possible to relocate some of this outside the corridor, site constraints at White Wolf preclude such development there (water is very limited) and other locations to the west on the Tioga Road are bound by Wilderness boundaries. To the east, locating such facilities in Lee Vining presents unacceptable management risks (the road is subject to unpredictable, but frequent, closures due to rockslides or snow) and unacceptable financial impacts on Meadows employees, the majority of whom would find housing in Lee Vining to be beyond reasonable commuting distance (many do not even own vehicles).

Within this context, then, NPS planners found the majority of facilities in Tuolumne Meadows to be necessary for visitor use and/or resource protection and infeasible to locate outside of the river corridor. The specific rationale for each structure is included below in Table A-1, which also lists river values currently being affected by existing structures. All of those impacts are corrected by the restoration plan (explained in brief in Chapter 5 and in detail in Appendix H), actions common to all alternatives (chapter 7), specific actions proposed under the four action alternatives (chapter 7), and/or the mitigation measures listed in Appendix N.

Definitions of necessary, feasible, and infeasible follow.

Necessary: For the purpose of this analysis, "necessary" is defined as being essential, indispensable, or requisite. A major facility is necessary in the river corridor if it is essential to support public use, or if it is essential to support NPS efforts to protect natural and cultural resources, as called for in an action alternative within this plan.

Feasible: For the purpose of this analysis, "feasible" is defined as capable of being done, effected, or accomplished. The NPS considered economic and technical considerations as well as resource considerations and hazards in the analysis.

Infeasible: For the purpose of this analysis, "infeasible" is defined as impracticable, incapable of being put into practice with the available means, or unsuitable for practical use or purposes. Impracticability, in the context of facility relocations, involves economic and technical considerations as well as resource considerations and hazards. The Wild and Scenic Rivers Act guidelines state that, "Major public use facilities such as developed campgrounds, major visitor centers and administrative headquarters will, where feasible, be located outside the river area. If such facilities are necessary to provide for public use and/or to protect the river resource, and location outside the river area is infeasible, such facilities may be located within the river area provided they do not have an adverse effect on the values for which the river area was designated."[3]

Pursuant to this guideline, all existing facilities in the river corridor have been evaluated for whether they are necessary for public use or resource protection, feasible to locate or relocate outside the river corridor, and if

[3] 47 *Federal Register* 173: 39459, Sept. 7, 198s.

they have effects on the river values. A summary of the evaluation is presented in table A-1. Where it has been determined that river values are being affected by existing development, the *Tuolumne River Plan* calls for removal, redesign, and/or relocation of those facilities. All impacts identified in the table below are discussed more fully in chapter 5, under the conditions assessment for each river value.

In addition to evaluating the effects of existing facilities on river values, extensive studies and site analyses have been conducted at the primary visitor service areas (Tuolumne Meadows, the Tioga Road corridor, and Glen Aulin) to identify the major site constraints for potential future development, including the locations of floodplains, wetlands, meadows, riparian habitat, rare plants, archeological sites, historic structures, and areas of known impact. A summary of that information for Tuolumne Meadows is shown on the Site Analysis map in chapter 7 (figure 7-3).

All the above mentioned studies and analyses informed the alternative site plans under consideration, particularly in terms of sensitive areas that need to be protected and resilient areas where needed facilities might be located.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) **All facilities noted below are consistent through their modest size and scale with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).					
Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of Need: Is the facility needed for public use or resource protection, and justification.**	**Feasibility Analysis: Is it feasible to relocate the facility outside the corridor, and justification.**
1	Pothole Dome parking	Subalpine meadow/riparian complex	Informal trails from parking areas near Pothole Dome cause trampling of meadow soils and vegetation. Some areas are protected with signage and fencing.	Yes: trailhead parking is needed for visitors while hiking trails	No: topographic constraints require this trailhead to be in its existing location.
2	Tioga Road	Subalpine meadow/riparian complex	Inadequate culverts along Tioga Road cause localized disruptions to sheet flow into and across Tuolumne Meadows.	Yes: road provides access to the area, which is an ORV.	No: due to wilderness boundaries, and massive resource impacts if moved, and economic considerations.
	Shoulder parking	Scenic Subalpine meadow/riparian complex	Shoulder parking along Tioga Road results in informal trails across Tuolumne Meadows and along the banks of the Tuolumne River, causing trampling of soils and vegetation. Lines of vehicles parked along road intrude into views.	Yes: Parking is needed, but not along the roadsides	No: while off-shoulder parking is possible throughout the corridor (as shown in various alternatives), topographic constraints prevent relocation outside the corridor.
	Tioga Road bridge	River flow	Tioga Road bridge abutments may cause the river channel to back up during periods of high flows.	Yes: road must cross the river at some point, and moving the bridge and road would cause unnecessary resource disturbance and impacts to river values.	No: impact on resources from relocating the bridge and the road would be too substantial.
3	Cathedral Lakes trailhead	Subalpine meadow/riparian complex Prehistoric cultural value Rare plants (not part of an ORV, but necessary to protect)	Insufficient parking for the Cathedral Lakes trailhead results in roadside parking and informal trails across the adjacent wet meadow, causing trampling of soils and vegetation. Known archeological resources and rare plants occur in this area. Portable toilets protect water quality from human waste.	Yes: trailhead parking is needed for visitors while hiking trails.	No: topographic constraints require this trailhead to be in its existing location.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued **All facilities noted below are consistent through their modest size and scale with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).					
Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
4	Sprayfield	Water quality Upland area with no sensitive resources or ORVs within developed site	Occasionally saturated conditions at the upland sprayfield pose potential risks to water quality. Water quality is monitored and conditions observed by SFPUC and NPS staff.	Yes: under all alternatives, sufficient visitor use continues to necessitate wastewater treatment.	No: no suitable locations occur outside the corridor, due to wilderness boundaries and other resource constraints (lower use levels in Alternative 1 allow the sprayfield to be located at the site of the existing wastewater plant).
	Wastewater containment ponds	Subalpine meadow/riparian complex Water quality Prehistoric cultural value	Wastewater containment ponds in the upland habitat above the meadow pose a potential risk to water quality and meadow and riparian habitat. Known archeological resources exist at site of uppermost pond.	Yes: under all alternatives, sufficient visitor use continues to necessitate wastewater treatment.	No: no suitable locations occur outside the corridor, due to wilderness boundaries and other resource constraints.
	Sewer line	Subalpine meadow/riparian complex Water quality	The sewer line between the wastewater treatment plant and the wastewater containment ponds runs beneath the meadow and the river. The potential for leakage is a risk to water quality and meadow and riparian habitat.	Yes: under all alternatives, sufficient visitor use continues to necessitate wastewater treatment.	As above, all wastewater locations are in the corridor. For Alts. 2 and 3, which retain sewage treatment at existing site, the sewer line is necessary. For Alt 1, and possibly Alt. 4, which move the treatment to the south side of the road, the line is not necessary.
5	Currently undeveloped area near Budd Creek	Upland area with rare plants identified immediately along Budd Creek ; rest of area contains no sensitive resources	No current adverse effects.	Yes: stock are necessary to supply High Sierra Camps, including those outside of the Tuolumne River Corridor. It is also necessary to be stable NPS stock in the Tuolumne area for wilderness patrol.	No facility currently present at this location. Alternative 2 proposes a stable in this area. It is not feasible to locate this outside the corridor, as stock must be kept near areas/trailheads of use.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued

All facilities noted below are consistent through their modest size and scale with the scenic classification.

Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).

Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		River Value Affected by Facility	Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)	Determination of need: is the facility needed for public use or resource protection, and justification.	Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.
6	Visitor Center, Road Camp, and administrative areas	Upland area with no sensitive resources or ORVs within developed site Known archeological resources near entrance road intersection with Tioga Road.	No effect	Yes. Visitor contact facilities help visitors plan their visit and are the primary place/means for NPS to educate visitors on resource protection.	No: no suitable locations occur outside the corridor, due to wilderness boundaries and other resource constraints.
7	Wastewater treatment plant	Water quality Upland area with no sensitive resources or ORVs within developed site	No immediate threat to river values. Aging wastewater treatment facility is in need of updating to be within state standards.	Yes: under all alternatives, sufficient visitor use continues to necessitate wastewater treatment.	No: no suitable locations occur outside the corridor, due to wilderness boundaries and other resource constraints.
8	Parsons Memorial Lodge and Soda Springs structures and trails	Subalpine meadow/riparian complex Parsons Memorial Lodge	Informal trails around the Soda Springs area cause trampling of soils and vegetation associated with the mineral spring habitat and adjacent subalpine meadow habitat. No effect on Parsons Memorial Lodge	Yes: the lodge is an ORV, the Soda Springs structures are historic and context sensitive, and the trails protect the springs and rare plant habitat in the area.	No: location is integral to ORV designation for the lodge and to its historic designation. Soda Springs structures must be located by Soda Springs.
	Footbridge	River flow	The Parsons Memorial Lodge footbridge abutments may cause the river channel to back up during periods of high flows.	Yes: bridge is integral to the trail that allows visitors access to the Parsons Lodge ORV.	No: bridge is integral to the trail to Parsons Lodge.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued **All facilities noted below are consistent through their modest size and scale with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).					
Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
9	Area near Unicorn Creek: Alt. 1: wastewater treatment facilities Alt. 2: day-use parking	Upland area with no sensitive resources or ORVs within developed site	No current adverse effects.	Wastewater plant: Yes: under all alternatives, sufficient visitor use continues to necessitate wastewater treatment. Day use parking: Yes: all alternatives need off-shoulder day-use parking to support visitor uses such as hiking.	Alt. 1: No: there are no suitable locations outside the corridor. Alt. 2: No: locating outside the corridor not feasible due to other facility requirements and topographic constraints; also, visitors need reasonably convenient parking in order to experience the river
10	Campground A loop and portion of B loop (the only portions of the campground inside the quarter-mile river corridor boundary)	River flow Floodplain Subalpine meadow/riparian complex Rare plants	Boulder riprap installed to protect the campground A-loop road from flooding interferes with the free flow of the river. A-loop access road is in the floodplain. The A-loop campsites and overall access to the river near the shoreline of the Lyell Fork result in informal trails, causing localized trampling of soils and vegetation in riparian habitat. Rare plants mapped in the campground are potentially at risk from proposed campground rehabilitation work.	Yes: Tuolumne Meadows is a major visitor destination, far enough from most visitors' homes to necessitate necessitating camping opportunities.	No: complete relocation is not possible, as wilderness boundaries and other resource constraints preclude development of the amount necessary to completely relocate this much of the campground. However, the alternatives consider various ways of addressing the impacts identified.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued **All facilities noted below are consistent through their modest size and scale with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).					
Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
11	Store and grill	Historic property (does not contribute to the cultural ORV)	No effect	Yes: a campground of 300 sites necessitates at least a basic store, to avoid excessive traffic to and from Lee Vining, Crane Flat, and/or Yosemite Valley.	No: locating outside the corridor not feasible due to other facility requirements and topographic constraints; and impacts to historic character preclude alteration.
	Concessioner employee housing by store and grill	Subalpine meadow/riparian complex	The concessioner employee tent cabins behind the store and grill interrupt sheet flow through a wet meadow area.	Yes: housing for concessioner employees is necessary; viable options for service worker housing outside the corridor do not exist, and such employees are necessary on location or within reasonable commuting distance.	No: no locations exist outside the corridor. All alternatives relocate this housing to other locations also within the corridor.
	Gas station and mountaineering shop	Water quality Historic property (does not contribute to the cultural ORV)	Past impacts from fuel leakage have been mitigated, but potential risk to water quality remains; ongoing monitoring will continue.	For Alternatives 1, 3 and 4: No: visitor use levels under these alternatives are not high enough to justify continued presence of a gas station. For Alternative 2: Yes; visitor use levels under this alternative are the highest of the alternatives, high enough that a gas station would be needed for visitor use. The mountaineering shop and school are not necessary under any alternatives.	For Alternatives 1, 3 and 4: Yes: gas is available in Lee Vining and at Crane Flat, both of which are less than 40 miles away. For Alternative 2: No, no site is available. For the mountaineering shop and school: yes; Lee Vining already contains at least one such store.
	Campground reservation office	Historic property (does not contribute to the cultural ORV)	No effect	Yes: the facility is where visitors check in for their stay at the campground.	No: It is not feasible to relocate the campground reservation office away from the campground, which is in the corridor; additionally, there is insufficient space at the former loop D entrance to locate a campground entrance or reservation office.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued

All facilities noted below are consistent through their modest size and scale with the scenic classification.

Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).

Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		River Value Affected by Facility	Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)	Determination of need: is the facility needed for public use or resource protection, and justification.	Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.
12	Concessioner stable	Water quality Upland area with no sensitive resources or ORVs within developed site	Potential risk to water quality from stock use and manure. Current practices of regular manure removal help prevent impacts to water quality. Ongoing monitoring will continue.	Yes: the facility houses the stock necessary for High Sierra Camp support (even if Glen Aulin is removed, as in Alt. 1, other high camps would remain & need stocking, with the Meadows stable being the only location from which all can be supplied).	No: site constraints preclude relocation outside the corridor, and stock must be kept near their site of use.
13	Lembert Dome parking	Upland area with prehistoric cultural value	Foot traffic impacts known archeological resources in this area.	Yes: trailhead parking is needed for visitors while hiking trails.	No: topographic constraints require this trailhead to be in its existing location.
14	Old Tioga Road/Great Sierra Wagon Road trail	Subalpine meadow/riparian complex Prehistoric cultural value	The historic roadbed locally interrupts sheet flow, and associated foot traffic causes trampling of meadow soils and vegetation. Foot traffic impacts known archeological resources in this area.	Yes; the trail provides critical public access to the meadows and Parsons Memorial Lodge.	No; topographic constraints require this trail to be in its existing location.
15	Wilderness center, ranger station	▪ Upland area with no sensitive resources or ORVs within developed site ▪ Adjacent subalpine meadow/riparian area	Social trails radiate from the wilderness center and John Muir Trail to Puppy Dome (climbing areas) and river access. A nearly continuous social trail extends along Dana Fork from Tuolumne Meadows Lodge to the confluence with the Lyell Fork and Tioga Road.	Yes: facility is used by law enforcement and protection staff. It is necessary for wilderness management and protection, including enforcement of wilderness trailhead quotas.	No: this facility must be within the location of visitor use (Tuolumne Meadows), where no suitable locations exist outside the corridor.
	NPS stable	▪ Water quality ▪ Upland area with no sensitive resources or ORVs within developed site ▪ Historic properties (do not contribute to the cultural ORV)	Stock use and manure pose a potential risk to water quality. Current practices of regular manure removal help prevent impacts to water quality. Ongoing monitoring will continue.	Yes: NPS needs stock to maintain trails and provide visitor protection.	No: site constraints preclude relocation outside the corridor, and stock must be kept near their site of use.
16	NPS housing at Ranger Camp	▪ Upland area with no sensitive resources or ORVs within developed site ▪ Historic properties (do not contribute to the cultural ORV)	No effect	Yes: NPS staff are needed to protect resources, provide public safety, to manage and monitor visitor use of the corridor.	No: housing supply in Lee Vining is very limited, and no feasible locations exist elsewhere within reasonable commuting distance.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segments (Tuolumne Meadows and Lower Dana Fork) - continued **All facilities noted below are consistent through their modest size and scale with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).					
Location and Facility (Location numbers correspond to numbers on Figure 7-2 in chapter 7)		**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
17	NPS housing at Bug Camp, JMT/PCT trailhead parking	▪ Upland area with no sensitive resources or ORVs within developed site ▪ Historic properties (do not contribute to the cultural ORV)	No effect	Yes: NPS staff are needed to protect resources and enhance the recreational ORV.	No: housing supply in Lee Vining is very limited, and no feasible locations exist elsewhere within reasonable commuting distance.
18	Tuolumne Meadows Lodge and associated employee housing	▪ Subalpine meadow/riparian complex ▪ Historic properties (do not contribute to the cultural ORV)	No effect from the lodge. The concessioner employee tent cabins and three guest tent cabins near the river at Tuolumne Meadows Lodge are located in a wet riparian area with social trails along the Dana Fork.	Yes: some level of affordable accommodations are necessary for visitors who choose not to camp or who cannot camp. (Alternative 1 calls for the lodge to be removed, to create a more wilderness-oriented and self reliant visitor experience. Although the lodge is not necessary to the type of visitor experience envisioned in Alternative 1, a lodge that provides modest accommodations is necessary to support the visitor experiences envisioned in the other action alternatives.)	No: locating outside the corridor not feasible due to other facility requirements and topographic constraints.
19	Water treatment facility	▪ River flow ▪ Upland area with no ORVs within developed site	The Dana Fork water intake and diversion has a minimal effect on the free-flowing condition of the river during periods of low flows.	Yes: NPS is required to provide potable water for visitors and park staff.	No: the sole water source in Tuolumne Meadows is the river, and resource or wilderness constraints preclude relocation elsewhere in the meadows.
20	Gaylor Pit: Alt. 1: helipad Alt. 2: Helipad & housing Alt. 3 & 4: Helipad & informal day use parking	▪ Upland area with no known sensitive resources or ORVs	No effect	Helipad: Yes: a helipad is required for public health and safety (e.g., fire suppression, rescues). Housing: Yes: within the context of any alternative, NPS staff are needed to protect resources to manage and monitor visitor use of the corridor. Informal parking: Yes: day use parking is necessary for visitors to enjoy the area.	Helipad: No: no other helipad locations are possible in the area. Housing: No: housing supply in Lee Vining is very limited, and no feasible locations exist elsewhere within reasonable commuting distance. Informal parking: No: other suitable locations exist for such parking, but all are within the corridor.
Mono Pass trailhead (parking lot, vault toilet)		▪ Adjacent to meadow and riparian complex	No effect	Yes: trailhead parking is needed for visitors while hiking trails	No: resource constraints preclude relocation elsewhere.

Table A-1. Evaluation of Existing Major Facilities

Wild Segment: Grand Canyon **All facilities noted below are consistent through their trail-only access with the wild classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).				
Location and Facility	**River Value Affected by Facility**	**Current Management Concerns for River Values (no effects are significant enough to be adverse impacts or degradation as defined in chapter 5)**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
Glen Aulin High Sierra Camp tent structures	No known ORVs	No effect	Yes: The High Sierra Camp is essential for providing a diverse and accessible type of experience for visitors who do not or cannot camp.	No: The Glen Aulin High Sierra Camp was not included in Yosemite's designated wilderness. The camp is surrounded by designated wilderness. The Wilderness Act precludes construction of new facilities such as this.
Glen Aulin water treatment system	Scenic quality	Photovoltaic panels on small treatment shed can be seen from some locations in the view corridor.	Yes: consistent with NPS DO-83, NPS must provide treated and filtered water.	No: all suitable locations for this are within the river corridor. The Wilderness Act precludes construction of new facilities such as this
Glen Aulin wastewater treatment	Water quality	Septic tank and mounded leachfield are within 150 feet of Conness Creek. Leach mound is at capacity with the flow currently limited to 600 gpd to protect water quality.	Yes: to protect water quality, NPS must treat wastewater.	No: all suitable locations for this are within the river corridor. The Wilderness Act precludes construction of new facilities such as this.
Glen Aulin corrals	Water quality	Potential risk to water quality from stock use and manure. Current practices of regular manure removal help prevent impacts to water quality; Ongoing monitoring will continue.	Yes: the camp is supplied by packstock, so a means of containing their impacts is necessary.	No: all suitable locations for this are within the river corridor. The Wilderness Act precludes construction of new facilities such as this.
Glen Aulin backpacker campground	Water quality	Composting toilet is undersized for current demand and poses a potential risk to water quality.	Yes: camping is necessary to allow backpackers to experience this part of the river corridor.	No: few suitable camping locations with access to water exist outside of this location.
Footbridges above Glen Aulin, at Glen Aulin, and in Pate Valley	River flow	No effect	Yes: varying water levels require safe river crossings.	No: such bridges are integral to the trails they are located upon.
Trail to Pate Valley	Scenic value	No effect. Trail enhances viewing opportunities.	Yes: the trail is integral to enjoying the ORVs in this area.	No: due to topographic constraints, the trail must be located near the river.

Table A-1. Evaluation of Existing Major Facilities

Scenic Segment: O'Shaughnessy Dam Administrative Area **All facilities noted below are consistent with the scenic classification.** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).				
Location and Facility	**River Value Affected by Facility**	**Current Effect on River Values**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
Dam operation facilities and administrative road	Prehistoric cultural value	One archeological site has been impacted by development.	Yes: the Raker Act allows such facilities to be located in Yosemite.	No: such facilities must be near the dam.
Wild Segment: Poopenaut Valley **No known facilities**				
Wild Segment: Lyell Fork **All facilities noted below are consistent with the wild classification** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).				
Location and Facility	**River Value Affected by Facility**	**Current Effect on River Values**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
John Muir/Pacific Crest Trail	Meadow/riparian complex Prehistoric cultural value Scenic value	Subalpine meadow/communities are impacted by foot and stock traffic in localized areas. Archeological resources are impacted by foot and stock traffic in localized areas. No effect on scenic values. Trail enhances viewing opportunities.	Yes: the trail makes it possible for visitors to enjoy the wilderness recreation ORV.	No: topographic constraints make it necessary to locate this trail near the river.
Footbridges over McClure Creek, & Twin Bridges	River flow	No effect	Yes: safe crossings of the river require bridges at this location.	No: the bridges are integral to the trail through the Grand Canyon of the Tuolumne.
Wild Segment: Upper Dana Fork **All facilities noted below are consistent with the wild classification** Note that all concerns would be corrected by the proposed ecological restoration program, the actions contemplated under the action alternatives (including actions common to all), and/or the mitigation measures (see chapters 5 and 7, and appendix N).				
Location and Facility	**River Value Affected by Facility**	**Current Effect on River Values**	**Determination of need: is the facility needed for public use or resource protection, and justification.**	**Feasibility analysis: is it feasible to relocate the facility outside the corridor, and justification.**
Snow survey instruments	Meadow/riparian complex	No known negative effects	Yes: the facility is an important part of predicting snowmelt runoff and water flow.	No: safe access, particularly in winter, necessitates location of this facility near a road or ski trail.

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Appendix B: The Tuolumne River Corridor in Yosemite National Park: A Brief History of Legislation and Planning

Introduction

The Tuolumne River originates high in the Sierra mountains at the eastern side of Yosemite National Park and flows westward across the park for 62 miles, where it continues into the Stanislaus National Forest, which borders the park on the west. There are two source forks to the river, the Dana Fork and the Lyell Fork, the headwaters of which are on the mountains of the same names. These two forks join at Tuolumne Meadows, the largest subalpine meadow in the Sierra Nevada. The Tioga Road, the only road in the park connecting the eastern and western slopes of the Sierra, parallels the Dana Fork and also passes through Tuolumne Meadows. Rustic facilities for visitors to Yosemite National Park have long been located in the Tuolumne Meadows area. Glen Aulin High Sierra Camp, accessible only by trail, is located on the Tuolumne River northeast of Tuolumne Meadows. Beyond Tuolumne Meadows, the river flows through the steep-walled Grand Canyon of the Tuolumne, and then into Hetch Hetchy Valley, which is now under Hetch Hetchy Reservoir. Below O'Shaughnessy Dam on Hetch Hetchy Reservoir, the river continues for another 6 miles to the park boundary.

Aside from the development associated with the reservoir, Tioga Road, and visitor facilities in Tuolumne Meadows and at Glen Aulin High Sierra Camp, the Tuolumne River in Yosemite National Park is very remote and surrounded by wilderness.

Summary of Legislation, Guidelines, and Plans

Legislation

1890 Yosemite Act

1913 Raker Act

1968 Wild and Scenic Rivers Act

1984 California Wilderness Act

Guidelines

1982 "Final Revised Guidelines for Eligibility, Classification and Management of River Areas" (USDI and USDA 1982)

1999 "The Wild and Scenic River Study Process" (part of the *Wild and Scenic Rivers Act Reference Guide* developed by the Interagency Wild and Scenic Rivers Coordinating Council [IWSRCC 1999])

2009 "Compendium of Superintendent's Orders for Yosemite National Park" (NPS 2009e)

Plans

1979 *Tuolumne Wild and Scenic River Study: Final Environmental Impact Statement and Study Report* (Tuolumne Final Study [USFS and NPS 1979b])

1980 *Yosemite National Park General Management Plan* (NPS 1980b)

1989 *Yosemite National Park Wilderness Management Plan* (NPS 1989b)

1995 *Environmental Assessment for the Tuolumne Meadows Design Concept Plan; Comprehensive Design Plan; and Management of the Tuolumne River Scenic Classified Segments* (NPS 1995a)

Legislative and Planning History

Yosemite Act of 1890

The Yosemite Act of 1890 established what would be become Yosemite National Park. Technically titled, "An act to set apart certain tracts of land in the State of California as forest reservations," the Yosemite Act of 1890 set aside over 1,500 square miles of "reserved forest lands," including the Tuolumne River headwaters and the river corridor through Hetch Hetchy Valley. Yosemite Valley and the Mariposa Grove of Big Trees had previously been set aside in an 1864 grant to the State of California. In 1906, President Theodore Roosevelt signed legislation that brought the state-controlled Yosemite Valley and Mariposa Grove under federal jurisdiction with the rest of the park.

1913 Raker Act

In 1913, the Hetch Hetchy Reservoir Site Act, commonly known as the Raker Act, granted the City and County of San Francisco certain lands in Yosemite National Park, Stanislaus National Forest, and California public lands, for the purpose of building reservoirs and associated infrastructure, in order to generate a municipal water supply and hydroelectric power for the city. The act also gave the City of San Francisco the necessary rights-of-way for the infrastructure associated with the construction and operation of the facilities.

In addition, the Raker Act stipulated sanitary regulations for the reservoir's watershed, which amounts to the Tuolumne River watershed in Yosemite. In particular, the act states that no human excrement, garbage, or refuse may be placed within 300 feet of the reservoir or watercourses that flow into it, all sewage within the watershed must be adequately filtered and purified, and no bathing, washing, watering stock, or other polluting activity may take place in waters within one mile of the reservoir. Park management actions must comply with these regulations. The Raker Act gives the responsibility of the cost of inspections to ensure compliance with these regulations to the City of San Francisco.

The Raker Act also recognizes the prior rights of the Modesto and Turlock Irrigation Districts to receive water from the Tuolumne, and limits the amount of water that can be diverted. A certain volume of water is required to be released from the reservoir, depending on the 'natural daily flow' of the river.

1968 Wild and Scenic Rivers Act

In 1968, Congress enacted the Wild and Scenic Rivers Act (Public Law 90-542), recognizing that the practice of constructing dams and other infrastructure on rivers of the United States needs to be balanced by a policy preserving some rivers or sections of rivers in their free-flowing condition, to protect water quality and to "fulfill other vital national conservation purposes." The act requires that certain selected rivers possessing "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values" be "preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." To be eligible for protection under the act, a river section must be 'free-flowing' and must possess at least one 'outstandingly remarkable value.'

The act identified eight rivers as initial components of the wild and scenic rivers system, identified other rivers as potential additions, and laid out procedures to add rivers to the system. The act mandated that river corridor

boundaries and segment classifications must be established within a year of designation of the river, unless otherwise specified, and that a notice of availability of boundaries and classifications be published in the *Federal Register*. The act states that the study boundaries of a river corridor are generally ¼ mile on either side of the river. If the river is designated, the study boundaries remain in effect until the publication of the final detailed boundaries.

1975 Amendment to the Wild and Scenic Rivers Act

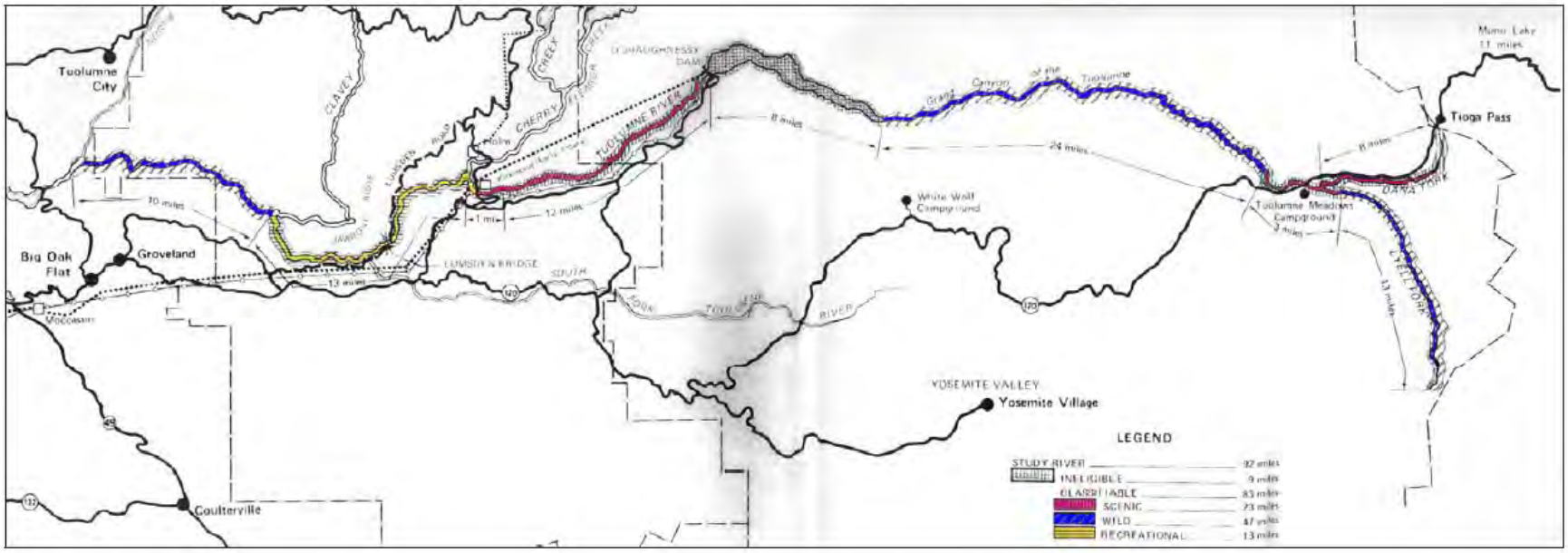
In 1975 Public Law 93-621 amended the Wild and Scenic Rivers Act to add 29 rivers, including the Tuolumne River, to the list of potential additions to the wild and scenic rivers system. The amendment mandated that these rivers be evaluated for inclusion and the reports of these studies be submitted to Congress by October 1979.

1979 Tuolumne Wild and Scenic River Study

A congressionally authorized study was undertaken to evaluate the eligibility and suitability of 92 miles of the Tuolumne River for inclusion in the wild and scenic rivers system. The evaluated portion of the river extended from its headwaters in Yosemite National Park, through Stanislaus National Forest and public lands managed by the Bureau of Land Management, to Don Pedro Reservoir. The U.S. Forest Service and the National Park Service were the lead agencies, with the Bureau of Land Management and the Heritage Conservation and Recreation Service acting as cooperating agencies.

The *Draft Tuolumne Wild and Scenic River Study and Environmental Impact Statement*, prepared by the U.S. Forest Service and the National Park Service, outlined five Wild and Scenic River designation alternatives for the Tuolumne River (USFS and NPS 1979a). The draft EIS was distributed to the public for comment in June 1979. The preferred alternative recommended designation of all eligible segments of the river, a total of 83 miles, 54 of them within the boundaries of Yosemite National Park. Because the Hetch Hetchy Reservoir segment of the Tuolumne River did not meet the 'free-flowing' requirement of a wild and scenic river, it was ineligible for inclusion in the wild and scenic rivers system and was excluded from the recommendation. The study also recommended specific classifications for the river (i.e., 'wild,' 'scenic,' and 'recreational' segments) and defined outstandingly remarkable values for each segment. The study used the standard ½-mile-wide river corridor as the study boundary.

The *Tuolumne Wild and Scenic River Study: Final Environmental Impact Statement and Study Report* was published in October 1979. Since it was not necessary to significantly revise the draft EIS, the final EIS consisted of the draft EIS, public comments and responses, errata and revisions to the draft EIS, and agency consultation correspondence (USFS and NPS 1979b). The final EIS confirmed the preferred alternative as detailed in the draft EIS. The report and EIS were submitted to the president by the secretaries of agriculture and the interior, who then made a recommendation to Congress regarding the potential designation of portions of the Tuolumne River (USFS and NPS 1979b).



MAP 1

1979 Proposed Tuolumne Wild and Scenic River and Suggested Classification

(map source: 1979 Draft Tuolumne River Study and EIS)

River segments classified as 'scenic'

River segments classified as 'wild'

River segments classified as 'recreational'

River segments ineligible for designation

Figure B-1. 1979 Proposed Tuolumne Wild and Scenic River and Suggested Classification. Source: Draft Planning Status Report for the Tuolumne Wild and Scenic River (2001), adapted from Draft Tuolumne Wild and Scenic River Study and Environmental Impact Statement (USDA & USDI 1979a).

1980 Yosemite General Management Plan

In 1980 the National Park Service approved a general management plan for Yosemite National Park. This plan provides guidance for all developed areas in the park, including Tuolumne Meadows. The plan states that facilities in the Tuolumne Meadows area should "continue to provide staging areas for backcountry and high mountain experiences," but that development should be "redesigned to eliminate intrusions on the fragile subalpine ecosystem." Specific goals of the plan include permitting only types and levels of use that do not significantly impair subalpine ecosystems, and orienting development to the lodgepole pine ecosystem. Specific actions prescribed in the plan included relocating or removing roads, trails, a footbridge, parking areas, employee housing, campsites, shops, and stables (NPS 1980b:63-66).

The plan also proposes that the National Park Service seek title to "all city of San Francisco lands except those directly associated with primary day-to-day water and power operations". Were the park to acquire these lands, it would allow up to 240 acres of detached backcountry parcels to be reclassified as wilderness (NPS 1980b:26,28).

1982 Final Revised Guidelines for Eligibility, Classification and Management of River Areas

During the first years of implementing the Wild and Scenic Rivers Act, it became apparent that its mandates and definitions were subject to some differing interpretations by the Departments of the Interior and Agriculture. Because of this, the two departments decided to write guidelines detailing specific requirements concerning the evaluation, classification and management of wild and scenic rivers, in order to have a uniform evaluation and management approach. The first "Guidelines for Evaluating Wild, Scenic and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System under Section 2, Public Law 90-542" were written in 1970. A decade later the guidelines were revised to reflect new laws and regulations, and in response to a 1979 presidential directive to consider river ecosystems in river evaluation and to shorten river study time. The "Final Revised Guidelines for Eligibility, Classification and Management of River Areas," published in the *Federal Register* by the Departments of the Interior and Agriculture in 1982, included clarification on eligibility of free-flowing rivers and river segments, elimination of a minimum length guideline, revision of the definition of sufficient flow, revision of water quality guidelines to allow inclusion of rivers where restoration of high water quality is planned, revised management guidelines, and an accelerated schedule for congressionally authorized studies (USDI and USDA 1982).

1984 California Wilderness Act and Designation of the Tuolumne as a Wild and Scenic River

In 1984 Congress passed the California Wilderness Act (Public Law 98-425), which amended the Wilderness Act by designating over 680,000 acres of land in Yosemite National Park as wilderness (Title I, Section 106).

The California Wilderness Act (Title II, Section 201) also amended section 3(a) subparagraph (53) of the Wild and Scenic Rivers Act to designate all eligible segments of the Tuolumne River (as generally shown in figure B-1) as a unit of the national wild and scenic rivers system. The designation specified that the amendment would not affect the provisions of any previously enacted legislation, including the Raker Act, or any agreements or administrative rulings previously enacted under authority of law. The amendment specified that corridor boundaries and segment classifications for the Tuolumne River must be established within two years of the designation.

1985 Amendment to the Wild and Scenic Rivers Act

A 1985 amendment to the Wild and Scenic Rivers Act required managing agencies of previously designated rivers to complete comprehensive river management plans before 1996, to provide for the protection of river values. Management plans must address "resource protection, development of lands and facilities, user capacities and other management practices necessary or desirable to achieve the purposes" of the act, and may be incorporated into other resource management plans (WSRA 3(d)(1)).

1986 *Federal Register* Notice

In September 1986 the National Park Service announced in a *Federal Register* notice that "in lieu of a specific management plan for the Tuolumne River in Yosemite . . . [it] will be managed in accordance with the 1986 Yosemite Wilderness Stewardship Plan and the forthcoming Comprehensive Design Plan." According to the *Federal Register* notice, the Wilderness Stewardship Plan[1] would provide adequate guidance for management of the 'wild' river segments of the Tuolumne. A comprehensive design plan for Tuolumne Meadows, scheduled to come out in 1989, would provide guidance for management of the 11 miles of 'scenic' river in Tuolumne Meadows. Furthermore, the notice stated that "Pending the completion of the [comprehensive design] plan, development in the Tuolumne Meadows area will be limited to minimal improvements to housing and facilities necessary to meet health, safety and housing codes. There will be no expansion of existing housing or facilities, and no relocation of major facilities."

The notice fulfilled the requirement of the Wild and Scenic Rivers Act to establish segment classifications for the Tuolumne by confirming the segments and classifications proposed in the 1979 Tuolumne Final Study with one exception: It reclassified 5 of the 6 miles of river west of the O'Shaughnessy Dam, which had all previously been classified as 'scenic.' The 5 miles of this segment within wilderness, from 1 mile west of the dam to the park boundary, were reclassified as 'wild.' The 1-mile segment directly west of the dam retained its 'scenic' classification. The notice did not, however, address the Wild and Scenic Rivers Act directive to define a river corridor for the Tuolumne in Yosemite.

1989 Wilderness Management Plan

The 1989 Wilderness Management Plan provides broad guidance for management of the wild segments of Yosemite's wild and scenic rivers by specifying four planning guidelines:

- All wild and scenic river segments within Yosemite wilderness are classified as 'wild.'
- The boundaries for the wild segments coincide with wilderness boundaries.
- Within wilderness a specified river corridor is unnecessary and will not be specified.
- The park will attempt to acquire an 80-acre parcel in the Poopenaut Valley owned by the City of San Francisco, which extends across a wild segment of the Tuolumne River. The parcel is designated as potential wilderness and would become wilderness when acquired by the park (NPS 1989:10).

The plan designates no-camping zones in the watersheds of Parker Pass Creek, the Dana Fork of the Tuolumne, and Gaylor Creek, to protect the Tuolumne Meadows water supply (NPS 1989:15). In addition the plan specifies that footbridges in wilderness should be replaced only where "long tradition and high hazard to wilderness visitor safety requires them" (NPS 1989:34).

[1] The *Federal Register* notice references the 1986 Wilderness Stewardship Plan, however, while this plan was written in 1986, it was not finalized until 1989. The plan should be correctly referenced as the 1989 *Wilderness Management Plan* (see below).

1989 – 1995 Tuolumne Meadows Planning

In 1989 a briefing paper announcing a revised management plan for Tuolumne Meadows was released to the public to gather scoping comments. The briefing paper described the purpose and need, affected environment, objectives, and five alternatives to meet the goals and objectives of the plan. A total of 754 comments were received from the public, organizations, and government agencies. Specific comments suggested the National Park Service protect resources, protect river values, eliminate development, relocate or reduce development, improve services, maintain current level of services, and decrease vehicle use.

In 1990 a second briefing paper described the purpose and need, affected environment, planning objectives, and five alternatives with advantages and disadvantages of each. The alternatives were (1) Status Quo/No Action, (2) Implement the Approved 1980 General Management Plan, (3) Provide Only Minimum Activities and Services - Eliminate Overnight Use, (4) Retain the Present Scope and Range of Facilities and Services but Reduce and Consolidate Them Out of View from the River, and (5) Approach Problem as a Regional Issue, Reduce Impacts by Consolidating Essential Functions on Existing Impacted Sites and Relocate Non-Essential Functions Outside Park.

In 1991 the park management team reviewed the alternatives and scoping comment letters and developed a sixth alternative. A briefing paper was distributed internally that described the planning objectives, six alternatives, and the advantages and disadvantages of each alternative.

In October 1995 the Environmental Assessment for the Tuolumne Meadows Design Concept Plan; Comprehensive Design Plan, NPS Employee Housing Element; and Management of the Tuolumne River Scenic Classified Segments (Draft Tuolumne Meadows Plan) was completed. This plan aimed to resolve a lack of adequate employee housing and visitor facilities due to a significant increase in visitor use of Tuolumne Meadows since the Yosemite General Management Plan was written. The 1986 *Federal Register* notice had put a moratorium on development until a comprehensive design plan for Tuolumne Meadows that addressed wild and scenic river management was completed, and a design concept plan for the area had to be in place before the comprehensive design plan could be finalized. These three related planning efforts were combined in a single document (NPS 1995).

Though copies of the Draft Tuolumne Meadows Plan were circulated to some interest groups and members of the public, a February 1996 press release stated that these copies should be considered "draft" and that the plan was delayed due to "minor inconsistencies and errors within the document." The plan was never released for further public review, approved, or adopted.

1999 Wild and Scenic Rivers Study Process

The Interagency Wild and Scenic Rivers Coordinating Council, established in 1993, periodically issues updates to the *Wild and Scenic Rivers Act Reference Guide*. The "Wild and Scenic Rivers Study Process," added to the guide in 1999, provides managing agencies guidelines for determining a river's outstandingly remarkable values. The study process criteria were used to update and elaborate on the outstandingly remarkable values of the Tuolumne River as part of the *Tuolumne River Plan*.

2009 Superintendent's Compendium

The *Compendium of Superintendent's Orders for Yosemite National Park* (NPS 2009e) is a compilation of designations, closures, permit requirements, and other restrictions made by the superintendent, in addition to systemwide regulations contained in the *Code of Federal* Regulations (36 CFR 1: 1- 7 and 34), and other applicable federal statutes and regulations. The compendium is updated regularly and can be accessed at <http://www.nps.gov/yose/parkmgmt/upload/compendium.pdf>.

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Appendix C: Determination of Extent Necessary for Commercial Services in the Wilderness Segments of the Tuolumne Wild and Scenic River Corridor

Part 1: Introduction

The vast majority of Yosemite National Park (95%) was designated as federally protected wilderness by the California Wilderness Act of 1984.[1] Congress directed that Yosemite's wilderness be set aside for recreational, scenic, scientific, educational, conservation, and historical use purposes. Congress delegated management responsibility for Yosemite Wilderness to the National Park Service (NPS). In furtherance of its wilderness management responsibilities, the NPS has adopted a trailhead quota system to limit overnight visitation, implemented an extensive educational program to teach visitors how to minimize their impacts, promulgated a variety of specific regulations that mandate low impact practices, and instituted numerous monitoring programs to assess wilderness character and track potential threats to that character.

To date, the National Park Service has not determined the extent to which commercial service are necessary in Yosemite's designated wilderness. The need for this type of specialized finding stems from a 2004 decision by the U.S. Court of the Appeals for the Ninth Circuit in the case *High Sierra Hikers Association v. Blackwell*. In the *Blackwell* decision, the Ninth Circuit ruled that agencies that manage wilderness areas must complete a specialized finding of necessity prior to authorizing commercial services in wilderness. This finding must be made after considering the extent to which commercial services are necessary to achieve the purposes for which the wilderness area was set aside. This document evaluates the necessity for commercial services for the portion of the Tuolumne Wild and Scenic River corridor that is located within designated wilderness.

Yosemite National Park has appropriated funding for updating its *Wilderness Stewardship Plan*, and has begun the initial steps in the planning process. When completed, that plan will make a specialized finding of the extent necessary for commercial services within the entire Yosemite Wilderness. The plan, however, will not be ready for public review for several more years. Rather than await the development of a new *Yosemite Wilderness Stewardship Plan*, the NPS elected to analyze commercial services in the designated wilderness portions of the Tuolumne River corridor at this time and to provide the public with an opportunity to comment.

Part 2: Purpose of this Determination of Extent Necessary and Relationship to Other Plans

The purpose of this document is to determine the maximum allowable amount of commercial services in the wilderness portion of the Tuolumne River corridor in accordance with the requirements of the Wilderness Act and NPS wilderness management policies.

As noted above, the NPS is in the early stages of updating the *Yosemite Wilderness Stewardship Plan*. Limits adopted in this Determination of Extent Necessary will be revisited as part of the planning process for the *Yosemite Wilderness Stewardship Plan*, which will determine the extent of commercial services necessary

1 California Wilderness Act, Public Law No. 98-425 (1984)

throughout all of Yosemite's designated wilderness. There will be many opportunities for public involvement in the development of the *Yosemite Wilderness Stewardship Plan,* including the ability to provide additional input on the amount of commercial services that should be authorized.

Under the Wild and Scenic Rivers Act, the NPS must adopt specific, measurable limits on use within the river corridor in order to ensure that the kinds and amounts of visitor use protect and enhance the river's outstandingly remarkable values, free flowing condition, and water quality. The capacity determinations found in chapter 7, Alternatives, of this Plan represent the maximum amount of use that can be allowed without adverse impact to river values. The user capacities that were established in the TRP planning process were incorporated into this Determination of Extent Necessary. Sections 7 and 8 of this appendix determine the extent to which any portion of the TRP's numeric use limits may be allocated to commercial service users in accordance with Section 4(d) of the Wilderness Act. This Determination of Extent Necessary therefore tiers from the capacity determinations in the TRP.

Part 3: Legal Framework for Evaluating Commercial Services in Wilderness

The Wilderness Act

The Wilderness Act was passed in 1964 to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness."[2] Section 4(c) of the Wilderness Act explicitly bars "commercial enterprises within designated wilderness areas."[3] An exception to this ban, subject to limitations, is provided for commercial services such as guides and outfitters in section 4 (d) 6, which states that "commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas."[4] "Wilderness purposes" are defined in section 4 (b) of the Act as "recreational, scenic, scientific, educational, conservation, and historical use."[5]

The National Park Service has not issued regulations or formal policy guidance outlining the process for authorizing commercial services under Section 4(d) of the Act. However, the U.S. Court of Appeals for the Ninth Circuit has issued several decisions interpreting the restrictions on commercial activities found in Sections 4(c) and (d) of the Act. These decisions have informed the analysis in this Determination of Extent Necessary.

In 2003, the Ninth Circuit, ruling *en banc* in *The Wilderness Society v. U.S. Fish & Wildlife Service*, examined the overall structure of the Act and found that the Act's broad mandate to protect wilderness areas was furthered by the prohibition provision found in Section 4(c), which among other things, prohibits commercial enterprises in wilderness. That prohibition, however, is qualified by the introductory language of Section 4(c) which states, "*Except as specifically provided for* in this [Act] … there shall be no commercial enterprise" within any wilderness area (emphasis added). The exceptions to Section 4(c)'s prohibitions are found in Section 4(d), which is entitled "Special Provisions." One exception provides that the agency may allow commercial services. The commercial services exception is limited in scope. Because of the Act's structure, in which there is a broad prohibition on commercial enterprise in Section 4(c) followed by a list of "special provisions" in Section 4(d),

[2] Wilderness Act, 16 USC 1131 (a).

[3] Wilderness Act, 16 USC 1133 (c).

[4] Wilderness Act, 16 USC 1133 (d) (5).

[5] Wilderness Act, 16 USC 1133 (b).

the Ninth Circuit concluded that the exceptions found in Section 4(d) are most properly read as a series of limited and express exceptions to the general prohibition found in Section 4(c) on commercial enterprises in wilderness.[6]

In 2004, the Ninth Circuit issued an opinion, *High Sierra Hikers Assn. v. Blackwell*, interpreting the commercial services exception found in Section 4(d)(6) of the Act. The Court examined the specific language of Section 4(d)(6), and in particular the language stating that commercial services may only be authorized "to the extent necessary," as well as relationship between Section 4(d)(6) and other provisions of the Wilderness Act. The Ninth Circuit held that the phrase "to the extent necessary" imposed a requirement on wilderness managing agencies to make a "specialized" finding of necessity before authorizing commercial services in wilderness. In this specialized finding, the agency must "show that the number of permits [or other authorizations] granted was no more than was necessary to achieve the goals of the Act."[7]

Although it determined that a specialized finding is required, the *Blackwell* Court recognized that the Wilderness Act is "framed in general terms and does not specify any particular form or content" for this finding (see *Wilderness Watch v. U.S. Fish and Wildlife Service)*, 629 *F.3d* 1024, 1036 (9th Cir. 2010) (reaffirming the holding in *Blackwell* that the agency has discretion as to the particular form and content of its analysis of the necessity for commercial services). This Determination of Extent Necessary follows the direction provided by these Ninth Circuit opinions. In the sections that follow, the NPS identifies the types of "activities which are proper for realizing recreational and other wilderness purposes" and then determines the maximum amount of commercial services that may be authorized in order realize these purposes. This specific finding ensures that the amount of commercial services authorized is no more than necessary so that wilderness character will be preserved.

The language of Section 4(d)(6) is permissive, rather than mandatory. It provides that commercial services may, but not shall, be provided. Under the law, NPS may allow some commercial services, but "no more than necessary to achieve the goals of the act" *Blackwell*, 390 *F.3d* at 647. Thus, such services may only be allowed up to a maximum of that amount determined to be necessary for "realizing the recreational or other wilderness purposes" of the Yosemite Wilderness.

Any determination to allow or restrict commercial services by necessity involves a balancing of interests and concerns. As the Ninth Circuit has recognized, wilderness managing agencies are charged with diverse and sometimes conflicting mandates under the Act (see *Blackwell*, 390 *F.3d* at 647-48; *Wilderness Watch*, 629 *F.3d* at 1033). Some reasons that NPS may disallow commercial services in a given location include the different weights (or levels of importance) that may be given to certain purposes. For example, the NPS may choose to give more weight to the conservation purpose in an area with sensitive wildlife, or greater weight to providing opportunities for solitude rather than providing for formal education in especially crowded areas (see *Wilderness Watch*, 629 *F.3d* at 1033-34, 1036, holding that agency acted reasonably in balancing conflicting purposes of the Wilderness Act and determining that the conservation of bighorn sheep took precedence over other wilderness values under the specific facts in that case).

Accordingly, this Plan considers a broad range of alternatives with respect to the amount of commercial services, ranging from none up to the maximum allowable amount as determined by this analysis. The

[6] *The Wilderness Society v. U.S. Fish & Wildlife Service*, 252 *F.3d* 1051, 1062 (en banc) (2003).

[7] *High Sierra Hikers Assn. v. Blackwell*, 390 *F.3d* 630 (9th Cir. 2004) pg 16398.

commercial services provisions for each Alternative are detailed in Chapter 7, Alternatives, and summarized in Table C-1, below.

Table C-1.
Summary Comparison of Management of Commercial Use in Wilderness, TRP/DEIS Alternatives 1-4

Alternative 1	Alternatives 2 and 4	Alternative 3
Discontinue all commercial use (except as needed to allow for disabled access and to supply the High Sierra Camps outside the river corridor) to reduce impacts on subalpine meadow/riparian areas in Lyell Canyon.	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 groups per zone per night and no more than 2 day groups 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 groups having only a recreational purpose would no longer have access to the Glen Aulin zone; groups 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*: Commercial use in the Lyell Canyon zone by groups with only a recreational purpose would be restricted to Monday–Thursday only; groups 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.	Same as alternatives 2 and 4, except this alternative 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.

NPS Wilderness Management Policies

Commercial services must be consistent with the application of the minimum requirement concept and with the objectives of the park's Wilderness Stewardship Plan.[8] See Section 9 of this document for the application of the minimum requirement concept for commercial allocation.

Yosemite Wilderness Management Plan

The 1989 Yosemite Wilderness Management Plan states that commercial packers "…may be restricted to designated park areas."[9]

Part 4: User Capacity in Wilderness

In the Yosemite Wilderness, wilderness character is preserved in part through the use of the trailhead quota system, which limits the amount overnight visitation through the use of a wilderness permit system. In order to preserve wilderness character, NPS must ensure that natural resources are protected from damage that can result from overuse, and that outstanding opportunities for solitude are preserved.

The Yosemite trailhead quota system was developed in the 1970s, prior to wilderness designation.[10] The backcountry area of the park was divided into travel zones. For each zone a capacity was set based on the number of acres and miles of trails and desired sociological densities for campsites and trails. The capacities were then adjusted to protect ecological resources. For example, capacities were adjusted in zones with

8 NPS *Management Policies* 2006 6.4.4.

9 National Park Service, Wilderness Management Plan, 1989, pg. 21.

10 van Wagtendonk, J. W. 1979. A conceptual backcountry carrying capacity model. *Proc. 1st. Conf. Sci. Res. in the Nat'l. Parks*. USDI, Nat'l. Park Serv. Trans. and Proc. Series 5:1033-1038.

ecosystems that were rare or vulnerable (such as those with subalpine meadows), or that exhibit fragility or limited resilience following impacts (such as those with alpine meadows). Zone capacities have been adjusted periodically to reflect new or changed scientific findings regarding ecosystem health and the effect of patterns of visitor use on resources.

In concert with these zone capacities, the NPS has implemented a trailhead quota system. This type of system requires backcountry users to begin a trip at a certain trailhead on a certain day, but otherwise does not restrict travel plans. Since establishing this quota system, park managers have studied visitor travel patterns to determine the relationship between the various trailheads and the travel zones.[11] By studying wilderness visitation travel patterns, managers have been able to determine the percentage of visitors to each zone that are attributable to each trailhead. By limiting the number of individuals who may enter the wilderness from a given trailhead on a given day, managers limit the number of visitors to each zone such that the wilderness character of the zone, including both the physical resources and the outstanding opportunities for solitude, are maintained in accordance with law.

As part of the *Tuolumne River Plan*, the NPS reevaluated the trailhead quotas within the Tuolumne River corridor in light of the Wild and Scenic Rivers' Act mandate to protect and enhance river values. In addition to the use limits set by the trailhead quota system additional limits that relate to wilderness will be in place under this Plan. A capacity on grazing nights for pack stock has been established for the meadows in upper Lyell Canyon. As described in chapter 5, a capacity for day use in wilderness has been established based largely on identifying an acceptable encounter rate along trails. Both of these capacities will help protect wilderness character as well as river values.

Part 5: Definitions

A. Definition of Proper Activities

Section 4(d)(6) of the Wilderness Act allows only those commercial services that are "proper for realizing the recreational or other wilderness purposes of the areas." Not all activities are proper or allowable in wilderness areas. Section 4(c) of the Wilderness Act prohibits public use of motor vehicles, other forms of mechanical transport, motorized equipment, and landing of aircraft.[12] The 2006 *Management Policies* provide additional guidance on the types of activities that are proper in park wilderness areas. NPS policy states that recreational uses in wilderness will be of a nature that:

- Enables the areas to retain their primeval character and influence;
- Protects and preserves natural conditions;
- Leaves the imprint of man's work substantially unnoticeable;
- Provides outstanding opportunities for solitude or primitive and unconfined types of recreation; and
- Preserves wilderness in an unimpaired condition.[13]

These restrictions apply equally to commercial and noncommercial public use. In the Yosemite Wilderness, proper activities are those traditionally associated with wilderness recreation, including hiking, backpacking, stock use, rock climbing, photography, nature study, and others. Improper (and illegal) activities include snowmobiling, mountain biking, skateboarding, and others. For a commercial service to be considered, it must

11 van Wagtendonk, J.W., and J. M. Benedict. 1980. Wilderness permit compliance and validity. *J. Forestry* 78(1): 399-401; van Wagtendonk, J.W., and P. R. Coho. 1986. Trailhead quotas: rationing use to keep wilderness wild. *J. Forestry* 84(11): 22-24.

12 16 USC 1133(c), 1964.

13 NPS *Management Policies* 2006, 6.4.3.

first be related to an activity that is proper in wilderness. Therefore, the only commercial services considered in this document are those related to the types of activities found to be proper in Yosemite wilderness.

The Wilderness Act directs that wilderness areas be administered "so as to provide…for the gathering and dissemination of information regarding their use and enjoyment as wilderness."[14] Therefore, the making of films in wilderness is considered proper for realizing the educational and scenic purposes.

B. Definition of Commercial Services

Before the National Park Service can determine the types of commercial services that are necessary to further wilderness purposes, the agency must first determine which services are commercial in nature and which are not. The Wilderness Act does not define the term "commercial service." When Congress does not include definitions of important terms in a statute, agencies may rely on commonly accepted definitions. The word "commercial" is commonly defined as (1) "[o]f or relating to commerce," *i.e.*, "[t]he buying and selling of goods, esp. on a large scale: business," (2) "[e]ngaged in commerce," (3) "[i]nvolved in work designed or planned for the mass market," or (4) [h]aving profit as a primary aim."[15] The word "service" is commonly defined as, "the organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public" or "the performance of any duties or work for another."[16] Activities that are necessary and proper for realizing wilderness purposes will be evaluated to determine whether they reflect consistent, commonly understood usage of the terms "commercial" and "services."

In addition, this determination as to what constitutes a "commercial service" is guided by an analysis of the primary purpose and effect of each service. This further layer of analysis, focused on purpose and effect, is supported by judicial precedent.[17] While some services are conducted for more than one purpose and may have more than one effect, the focus of this analysis is on ascertaining the primary reason for the service. Incidental or subsidiary purposes and effects do not dictate that a service be categorized as commercial.

Consistent with the ordinary meaning of the terms described above, for purposes of this document a commercial service is one in which any duties or work are provided by one person or entity for another person or entity in exchange for money. It includes, but is not limited to such things as: guiding, packing, cooking, carrying, instructing, demonstrating, providing gear and food, navigating, providing first aid and emergency services, and other services typically provide under the description of "guiding and outfitting." The form of the organization providing the service is not dispositive of whether the organization is offering a commercial service, for example whether it is a non-profit or for-profit. Rather, the definitions above, including an analysis of the activity's purpose and effect, will guide a determination of whether a service is commercial or not.

Commercial services may be authorized under a number of different legal authorities, using a number of different instruments. Of relevance to designated wilderness areas within Yosemite National park are concession contracts, commercial use authorizations, and special use permits.

14 Wilderness Act, (16 USC 1131 (a)).

15 Webster's II New College Dictionary 225 (1995); accord Merriam-Webster's Collegiate Dictionary 230 (2000). See *Wilderness Society v. U.S. Fish and Wildlife Service*, 353 *F.3d*. 1051, 1061 (9th Cir. 2003).

16 Merriam-Webster's College Dictionary, 2000.

17 Wilderness Society v. U.S. Fish and Wildlife Service, 353 F.3d. 1051, 1061 (9th Cir. 2003).

1. Authorization Mechanisms for Commercial Services

a. Concessions Contracts and Commercial Use Authorizations:

Services authorized under concessions contracts and commercial use authorizations are considered commercial services because the entities holding these authorizations are businesses engaged in commerce, they provide a service to the public, members of the public who use these services experience Yosemite wilderness directly as a result of this commercial support, and employees of the concessioner and CUA holder direct and guide the wilderness experience of the trip participants. CUAs holders who lead either stock or hiking trips are considered providers of commercial services, as is the primary park concessioner, which leads stock, hiking, and climbing trips in wilderness.

b. Special Use Permits:

Special Use Permits are used to authorize a wide range of activities, many of which are not commercial. Because Special Use Permits are issued on a case by case basis, it is not possible to evaluate all of the different activities that might be requested in a special use permit in advance; however, commercial filming permits (one type of Special Use Permit) are discussed below. When a request for another type of Special Use Permit in wilderness is received, it will be evaluated in accordance with the criteria above to determine whether the activity constitutes a commercial service. If it does, a permit will only be authorized in accordance with the procedures set out below in Section 8.

2. Application of the Purpose and Effect Analysis

For the majority of traditional wilderness outfitting and guide services, the determination of commerciality is straightforward. However, the commerciality of some uses is not as clear. Those uses are analyzed according to their purpose and effect.

a. Scientific Research:

Scientific research performed by faculty, postdoctoral fellows, or students enrolled in degree-granting programs in accredited colleges and universities or holding appointments with governmental agencies or scientific research institutions, even when accompanied by pack stock support, will typically not be considered commercial. Research trips using pack stock support would normally not be classified as a commercial service trip because the primary purpose and effect of the trip is the enhancement of scientific understanding of park resources, not commercial interests. The NPS will review requests for scientific research permits that involve the support of commercial outfitters to determine whether the trip is commercial. In the event that a research trip is categorized as a commercial service, it will be allowed in accordance with the procedures set out below in Section 8.[18]

b. Commercial Filming and Photography:

The NPS allows commercial filming and photography in national parks provided that there would not be a likelihood of resource damage, an unreasonable disruption of the public's use and enjoyment of the site, or a health or safety risk to the public.[19] Filming involves movement or motion of the subject whereas photography does not. The NPS *Management Policies* define "commercial filming" as "filming that involves the digital or film recording of a visual image or sound recording by a person, business, or other entity for a market audience." All

[18] Some scientific research could involve a commercial component if it contained an element of "bioprospecting." Any such proposals will be reviewed for legality under the Wilderness Act and commerciality under the guidelines noted above.

[19] U.S.C. §460l-6d.

commercial filming is subject to permitting requirements, and is limited to projects that are necessary or proper for providing educational information about wilderness uses, resources or values, or necessary for other wilderness purposes. Still photography is only subject to permitting requirements if it takes place in areas not open to the public, involves the use of models or props that are not part of the location's existing setting, or requires NPS oversight. Based on the NPS policy cited above, all commercial filming and photography will be treated as a commercial service.

c. Trips by Educational Institutions:

Each year, the park receives requests for wilderness trips by student groups from accredited educational institutions that are conducting classes for course credit. These institutions range from elementary, middle, and high schools to colleges and universities. The goal of these trips is to provide environmental education to students and to foster self-reliance and other qualities. In some cases, employees of the educational institution guide the trip. In others, the school retains the services of an institution with expertise in environmental education. Nature Bridge, a park partner whose mission is environmental education, leads many trips of this type. Trips by accredited academic institutions that give course credit for completion, even if accompanied by staff from Nature Bridge or a similar organization, are not considered commercial services for the purposes of this Determination of Extent Necessary. The primary purpose and effect of these trips is fulfilling academic goals for the students involved. The students' experience is guided and shaped by the institution's academic goals. Support services from environmental education organizations like Nature Bridge do not change the essential character of the trip, which is academic, not commercial.

C. Definition of Wilderness Purposes

1. Recreation

All visitors to the Yosemite Wilderness help to realize the recreational purpose. The recreational purpose is realized when people are engaged in proper activities in wilderness. Those activities are described in Section 5.A, above. Hiking, backpacking, horseback riding, fishing, climbing, nature study, and mountaineering are just a few examples of the many ways that visitors help to realize this purpose. Yosemite National Park does not allocate capacity to particular wilderness recreational activities.[20]

2. Education

While many wilderness visitors are engaged in some type of informal, self-directed education, formal education is also necessary to realize the educational purpose. Examples of formal education that realize the educational purpose of wilderness include, but are not limited to the following:

"How to" education on such topics as:

- Equipment selection
- Navigation
- Wilderness first aid
- Travel and camping skills

[20] This approach finds support in a recent district court decision that concluded, "neither fishing nor any other particular activity is endorsed by the Wilderness Act, nor is the enhancement of any particular recreational potential a necessary duty of wilderness area management." *High Sierra Hikers Assn. v. U.S. Forest Service*, 436 *F.Supp.2d* 1117, 1144 (E.D. Cal. 2006).

More advanced "skills" training on such topics as:

- Rock climbing
- Mountaineering
- Backcountry skiing

Coursework on wilderness values, ethics or philosophy including:

- Natural history
- Human or cultural history
- Wilderness values
- Environmental social or political history
- Environmental philosophy

Coursework on scientific aspects of wilderness, such as:

- Biology
- Geology
- Zoology
- Fire ecology

Programs specifically designed to teach residents of urban areas, particularly youth, wilderness skills, including:

- Self reliance
- Survival
- Independence
- Physical fitness and agility
- Mental toughness
- Problem-solving
- Adaptability

Making of educational films about wilderness, including but not limited to those about wilderness:[21]

- Wilderness values
- Natural history
- Human or cultural history
- Famous wilderness defenders such as John Muir
- Endangered species preservation
- Instructional films covering wilderness skills and techniques

Exception:

- Leave No Trace training is considered a fundamental prerequisite for all wilderness visitors and as such will *not* be considered formal education.

[21] Films focused on displaying scenic beauty rather than providing education on a topic may more properly be considered to fulfill the "scenic" purpose described below at Section 5.B.3.

3. Scenic

Wilderness possesses a particular type of scenery: natural and untrammeled. The scenic purpose is realized when visitors observe the natural landscape of wilderness. It is also realized when people take photographs of scenery and share them with others outside of the wilderness. As with the educational purpose, however, there is a more formal appreciation of scenery that is enjoyed by photographers and other artists. Commercial services provide necessary support for this purpose if they offer photography, painting, or even writing workshops that focus on appreciating and interpreting the scenery. Commercial filming, videography, audiography, and photography also realize the scenic purpose if they focus on wilderness scenery and natural soundscapes.

4. Conservation

Conservation means actions that help to maintain the wilderness in a largely natural and untrammeled state, with native biodiversity intact and natural processes uninterrupted.

Examples of activities in wilderness that help to realize the conservation purpose include, but are not limited to:

- Ecological restoration projects
- Trail building and maintenance
- Species preservation activities
- Eradication or removal of non-native invasive species

Realizing the conservation purpose is primarily an agency responsibility. Occasionally a visitor group conducts a "service trip" that includes conservation work. In Yosemite, however, these groups are not able to work independently of NPS control and supervision. They are designated as volunteers. If the primary purpose of the service trip is that of learning through participation in the service activity rather than that of constructing, implementing or maintaining the conservation project itself, then the purpose and effect is non-commercial.

5. Historic

"Historic uses" are defined as those uses which emphasize the wild, untrammeled, and natural character of the land in its historic state. Visitors help to realize the historic purpose when they encounter the land as did those of earlier historical periods. The historic purpose is realized by maintaining the wilderness character of the land, by primitive recreation in the wilderness, by the provision of opportunities for solitude, and by enjoying the scenic wonders of the natural and untrammeled landscape. The realization of this purpose is consistent with the realization of the conservation and recreational purposes.

The courts have directly addressed the meaning of "historic uses" as used in the Wilderness Act, and have uniformly construed "historic use" to mean use of the primeval or ancient wilderness in its natural state. The U.S. Court of Appeals for the 11th Circuit found that "the only reasonable reading of "historical use" in the Wilderness Act refers to experiencing the natural, rather than man made [sic], features."[22] This decision was followed by the district court in *Olympic Park v. Mainella*, which held that:

> *[t]he Park Service references the historic pattern of shelter construction and recreational use in concluding that the "setting, association, and feeling are significant aspects of historic use within the park" (AR 416-17), but while this may be true, this type of usage is in the past and a new value has been placed on the land by the creation of the Olympic Wilderness....a different "feeling" of wilderness*

22 *Wilderness Watch v. Mainella*, 2004, followed by *Olympic Park Associates v. Mainella*, 2005 WL 1871114 (D.Wash. 2005).

> *is sought to be preserved for future generations to enjoy, a place "where the earth and its community of life are untrammeled by man" and which retains "its primitive character and influence."*[23]

Thus, "historic use" refers to preserving the wilderness character of the land so that each visitor may encounter it in its historic state, as undeveloped as it was when the first humans experienced it. No commercial services are necessary for the realization of the historical purpose because its realization is congruent with the realization of the conservation purpose.

6. Scientific

The natural and untrammeled qualities of wilderness make an area valuable to science. Realizing the scientific purpose means allowing scientific research and monitoring to take place in wilderness. Unlike conservation activities, scientific activities fall on a spectrum from administrative to independent: Some are conducted by the agency, some are conducted by academics but sponsored or overseen by the agency, and some are conducted by independent academics or graduate students. Research conducted by or for the NPS is considered administrative, not commercial. On rare occasions, an independent researcher might require commercial services to pack in supplies. However as discussed above in Section 5, the incidental use of pack services to support a research trip typically would not convert a research trip into a commercial service.

In the Yosemite Wilderness, research is reviewed by and limited through an interdisciplinary permit committee and process.[24] This framework, including the application of the minimum requirement concept, provides methods to quantify the impacts and benefits of research, compare costs and benefits, and prioritize research proposals.

Part 6: Commercial Services Extent Necessary Analysis

This section describes the thresholds and methods used to determine limits on commercial services in the wilderness portions of the Tuolumne River corridor. As noted above, no commercial services are needed for the realization of the historic, scientific, or conservation purposes. All proposed commercial trips in wilderness will be assessed to see which purposes they fulfill (see section on the application process, below).

A. Overnight Use

The wilderness portions of the Tuolumne River corridor are overlaid with six wilderness management zones (see Map C-1). Each zone has an established capacity (camping is not allowed in the Mono Parker pass zone) and trailhead limits are enforced. The extent necessary determination for overnight trips analyzes use in each zone by month.

1. Recreational Purpose

Under the Wilderness Act, the NPS can only authorize commercial services in wilderness if they are necessary to "realize" wilderness purposes. Therefore, it is important to quantify the amount of non-commercial use in a zone as a percentage of established capacities. If a wilderness zone is substantially full with noncommercial visitors, then commercial visitors are not "necessary" to "realize" the recreational purpose. To determine whether an area is "substantially full," the following method is used:

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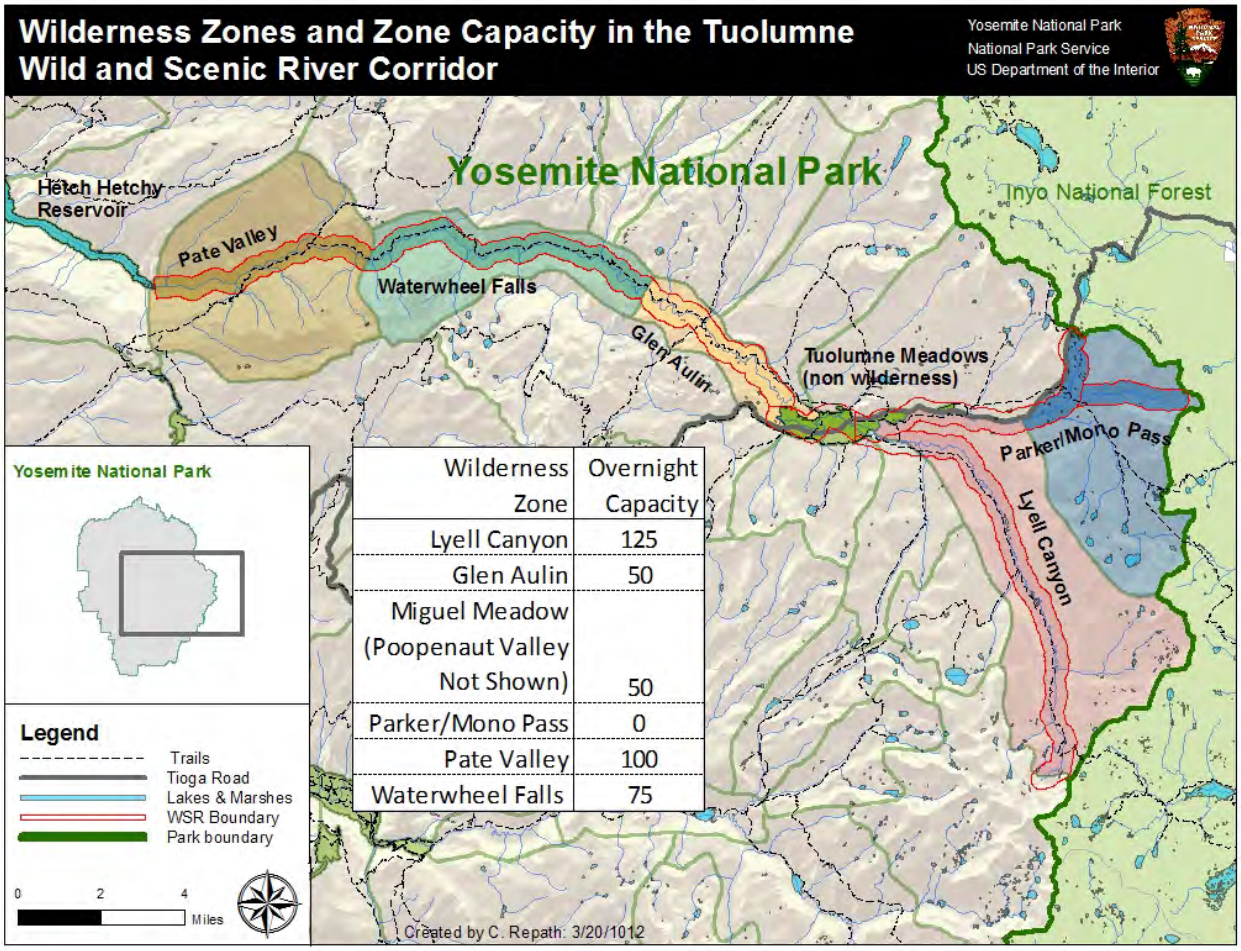
23 *Olympic Park Associates v. Mainella*, 2005 WL 1871114 (D.Wash. 2005).

24 See Landres, P., Fincher, M., Sharman, L., et al, *An Interagency Framework to Evaluate Proposals for Scientific Activities in Wilderness*, 2009 at wilderness.net/toolboxes.



Wilderness Zone	Overnight Capacity
Lyell Canyon	125
Glen Aulin	50
Miguel Meadow (Poopenaut Valley Not Shown)	50
Parker/Mono Pass	0
Pate Valley	100
Waterwheel Falls	75

Map C-1. Wilderness Zones and Zone Capacity in the Tuolumne Wild and Scenic River Corridor

Each zone is accessed by a number of trailheads, each with a daily quota for overnight use (see capacity discussion above in Part 4). For each zone, permit records for all trailheads that provide more than 10% of the overnight visitors to that zone are tallied (minus permits for commercial groups) and compared to the trailhead quotas. The number of days per month that those trailhead quotas are at least 90% full is tallied. Those days are considered "full," with 90% chosen instead of 100% because visitors are frequently turned away before 100% of the quota is reached. For example, if only one spot is left, groups of two or greater will be turned away. On many days reserved permits are cancelled, or groups with a reservation arrive with a smaller group than planned. When this happens late in the day, utilization is slightly less than the quota even though many groups may have been turned away.

This analysis is done by month, using a five year average of wilderness permit data from 2005-2009. If a zone is "full" more than 66% of the days in a month, that zone is considered substantially full, and will be considered a "restricted" zone. Those zones where the trailheads serving the zone are full 33% to 65% of the time are "weekend restricted" zones. Typically the full days fall on weekend nights, with Fridays and Saturdays the most likely to be substantially full.

Webster's Dictionary defines "realized" as "to bring into concrete existence." Realization thus implies a level of "concrete" use beyond the minimum. It is not necessary, however, that a zone be filled to capacity in order for the recreational purpose of that zone to be realized. Many zones are popular destinations with great demand

for access from both the public and commercial outfitters. A zone threshold of 66% for "realization" of the recreational purpose means that all wilderness permits for that zone are issued 4.6 days per week throughout the month. This means that every weekend and holiday as well as many weekdays are filled to capacity for that zone. Additionally, in many popular zones, utilization of backcountry quotas exceeds 80% even those days on which utilization falls below 90%. This means that the overall percentage of a quota utilized for a given month may be significantly higher than the percentage of "full" days. For example, 64% of the days in August are "full" for Lyell Canyon. But overall utilization of the quota for August is 88%. The level at which a purpose is realized necessarily entails an exercise of management judgment. This definition of "realization" balances the competing factors of access for commercial recreational groups against the overall preference expressed in the Wilderness Act for noncommercial recreational visitation.

A zone threshold of 33% to 65% for a "weekend restricted" zone means that this zone is filled to capacity between 10 and 19 days per month. This means that every weekend and holiday is filled to capacity for that zone. Noncommercial public recreational demand is dramatically increased on weekends. The "weekend restricted" designation maintains commercial recreational access to desirable areas by permitting it on weekdays, when it helps realize the recreational purpose, while maximizing noncommercial recreational access on weekends.

The results of the overnight commercial recreational capacity analysis are shown on maps 1 and 2. Overnight commercial groups will be allowed to travel through restricted or weekend restricted zones as long they spend the night outside of such zones.

2. Educational Purpose

The educational purpose is considered realized when there are opportunities for both informal and formal education taking place in the wilderness. Informal education is self-directed learning available to all wilderness visitors, including those who are primarily engaged in recreation. The realization of the "informal" component of the educational purpose can be considered as numerically congruent with the realization of the recreational purpose: All those who are recreating are in some way engaged in informal education. Directed, formal education is also a proper activity in wilderness and also realizes the educational purpose. Formal education presented by a qualified instructor can promote a deeper, more comprehensive understanding of wilderness related subjects. An allocation of 10% of capacity is necessary to ensure that there is sufficient opportunity for formal education and classes, including the making of educational films.

The percent of capacity allocated to formal education is limited to a relatively small proportion for three reasons. First, as stated above, the educational purpose is largely being realized through informal education. NPS *Management Policies* directs that ". . . the service will, to the extent practicable, afford visitors ample opportunity for inspiration, appreciation, and enjoyment through their own personalized experiences-without the formality of program or structure."[25]

For restricted zones, and weekend restricted zones on weekends, formal education conducted by noncommercial entities such as the NPS, and accredited schools, colleges, and universities conducting classes for academic credit, is also realizing the educational purpose, and will first be subtracted from that 10% of capacity. The remaining allocation, if any, will be available for commercial formal education in order to realize the educational purpose.

[25] NPS *Management Policies* 2006 8.2

3. Scenic Purpose

All visitors are engaging in an informal appreciation of wilderness scenery, as are individuals located outside of wilderness who are looking in from a road or other developed area. Formal appreciation of wilderness scenery, such as art and photography workshops, can foster a more structured understanding of scenery and is also necessary to realize a purpose of the Wilderness Act. An allocation of 5 % of capacity is necessary to ensure that there is sufficient opportunity for formal appreciation of wilderness scenery, including the making of films that focus on wilderness scenery.

The percent of capacity allocated to formal appreciation of scenery is small for a number of reasons:

- The scenic purpose is largely being realized through informal appreciation;
- Policy guidance, noted above, that directs that non-formal opportunities be "ample";
- Commercial scenic use in restricted and weekend-restricted zones will displace noncommercial use. Under the overall structure of the Wilderness Act, denial of access to noncommercial visitors in favor of commercial visitors should be minimized.

Art and photography classes offered by accredited schools for course credit are not considered commercial and are not restricted by this allocation (see section 5).

B. Day Use

1. Recreational Purpose

Recreational commercial day use is limited by trail rather than zone. Three trails in the wilderness portion of the Tuolumne River corridor receive significant recreational day use: Lyell Canyon, Soda Springs to Glen Aulin, and Mono/Parker Pass (which crosses the Dana Fork segment). The Lower Gaylor trail and Poopenaut trail receive negligible amounts of day use. The Lembert Dome trail and Cathedral Lake trail are not in wilderness portions of the Tuolumne River corridor. This Plan limits day use based on encounter rates to protect the wilderness recreation ORV and wilderness character. That standard provides that if average encounter rates exceed eight groups per hour more than 80% of the time, management actions will be implemented to reduce use. This encounter rate standard will be used to establish limits for commercial day use.

Encounter rates were recorded for the Lyell Canyon trail and the Mono/Parker Pass trails in 2009 and for the Glen Aulin trail in 2010. An encounter rate of eight groups per hour (see chapter 6, Management Objectives and Ongoing Monitoring for a more complete description) is the standard identified in the Tuolumne Wild and Scenic River Plan for management action. At 66% of the trail capacity (5.28 encounters per hour 80% of the time) the recreational purpose will be considered to be realized, and that trail will be considered substantially full. This trail is designated a "restricted" trail. At 33 % to 65% of that rate (2.64 to 5.27 encounters per hour 80% of the time) trails will be considered "weekend restricted."

Determining when the recreational purpose is "realized" for day use, like that for overnight use, requires the application of professional judgment. The trail threshold of 66% of capacity means that the trail receives substantial pressure from day use, particularly on the weekends.[26] A weekend restricted trail receives pressure on the weekends but receives less use on the weekdays, when commercial use may occur without displacing noncommercial day hikers. This definition of "realization" balances the competing factors of access for

[26] Broom, Theodore, and Hall, Troy, *An Assessment of Indirect Measures for the Social Indicator of Encounters in the Tuolumne Meadows Area of Yosemite National Park*, University of Idaho, May, 2010.

commercial recreational groups against the overall preference expressed in the Wilderness Act for noncommercial recreational visitation.

Both the Lyell Canyon trail and the Glen Aulin trail are designated "restricted" trails. Average encounter rates for Lyell Canyon are 7.37 groups per hour 80% of the time. The Glen Aulin trail has an average encounter rate of 6.8 groups per hour 80% of the time. The Mono/Parker Pass trail is classified as "weekend restricted" with an encounter rate of 3.34 groups per hour. Day use on all other trails in the Tuolumne River corridor is negligible, and commercial day use on those trails is not affected by these restrictions. This includes the Lower Gaylor trail (along the Dana Fork), the White Wolf to Pate Valley trail, and the Poopenaut Valley trail. These designations apply during the peak use months of July and August, based on encounter rates and capacity data. Commercial day use during the months of June, September, and October are not affected by these restrictions.

2. Educational and Scenic Purposes

Some day use satisfies a purpose other than recreation. Examples include day hikes that provide formal education and daytime photography or art workshops that realize the educational and scenic purposes of the wilderness area. In addition to the commercial overnight use described in Section 6.A. for the educational and scenic purposes, a small number of commercial groups providing formal education, or engaging in activities such as art or photography workshops that specifically foster appreciation and interpretation of wilderness scenery are necessary to realize the wilderness purpose of the area. Two such groups per trail per day will be permitted regardless of trail designation as "restricted" or "weekend restricted." The correlation between numbers of hikers and encounter rates is not yet firmly established for these trails so groups per day, rather than users per day, were used to establish the extent necessary. This allocation should minimize the effects of commercial use on crowding and the primitive quality of wilderness character while providing for the realization of the educational and scenic purposes as required by the Wilderness Act. Management of this process is further outlined in Part 8 of this Determination of Extent Necessary document.

C. High Sierra Camps

In 1984, when Congress designated the Yosemite Wilderness, it allowed the continuation of the High Sierra Camps as a non-conforming use and designated the immediate areas of the camps as potential wilderness additions. The only High Sierra Camp in the Tuolumne River corridor is that at Glen Aulin.

The camps are a commercial operation and offer seasonal, rustic accommodations. Under the preferred alternative of the this Plan, the Glen Aulin High Sierra Camp will provide 20 guest beds and offer full meal service to guests and employees. It is typically open from early July to early September. The National Park Service, in conjunction with the concessioner, conducts commercial educational "loop trips" to the High Sierra Camps and provides formal interpretative educational programs to both High Sierra Camp guests and backpackers from nearby campgrounds.

The Glen Aulin High Sierra Camp is a substantial commercial presence and affects the wilderness experience of visitors in the area, as do the visitors, employees, support personnel, and supply trips going to and from the camp. The nature of the camp, with a nonconforming level of development and services, means that the Glen Aulin zone is commercialized compared to those zones that have only more traditional, conforming outfitter and guide services. To prevent further commercialization of this area, the Glen Aulin zone and trail will be managed as "restricted" during July and August when the camp is open, and the commercial formal education provided by the NPS-concession loop trips will be subtracted from the overnight and day use allocations for such use, as well as noncommercial educational use.

D. Disabled Access

NPS *Management Policies* states that the agency must "make available equal opportunities for people with disabilities in all programs and activities."[27] For some people who are mobility impaired, commercial stock services may provide the only reasonable way to access the wilderness. This Determination of Extent Necessary restricts certain types of commercial use in two wilderness management zones (there are 53 such zones in the entire Yosemite Wilderness and 6 in the Tuolumne River corridor) for a portion of the annual season. Like persons without mobility impairments, mobility impaired visitors may not be able to gain access to their preferred destination as part of a commercial trip during the restricted period. However, Yosemite has many other areas where visitors can take stock-assisted trips. As such, there are "equal opportunities" for mobility impaired individuals to use commercial stock trips to visit the Yosemite Wilderness.

E. Other Commercial Use Limits

The Wilderness Act evinces a congressional intent limit commercialization of wilderness. Under the Act, commercial enterprises are proscribed and commercial services may be permitted, but only up to a maximum not to exceed the extent necessary for realization of the wilderness purposes of the Act. In furtherance of this legislative goal, the following policies will be implemented:

- Under the park's current Wilderness Management Plan, off-trail areas are managed to provide outstanding opportunities to enjoy solitude as well as a more pristine natural environment: Group size is limited to eight instead of fifteen to provide enhanced opportunities for solitude, and stock use is prohibited to prevent stock impacts in areas without the protection of properly designed and hardened trails. In addition, off-trail areas in the Tuolumne River corridor zones of the Yosemite Wilderness will be managed as commercial-free areas. No commercial use will be allowed more than ¼ mile from a maintained trail or public access road (as shown on the latest version of U.S.G.S. topographic maps).
- Overnight commercial trips are limited to two per zone per night and commercial day trips are limited to two per trail per day. There are three reasons for such limits:
  - This limit is necessary to protect areas from impacts due to displacement from restricted and weekend restricted zones. Such displacement, if not properly managed, could result in undesirable physical impacts from grazing or from the creation of new campsites large enough to accommodate large commercial groups of 12-15 people, as well as the social impacts of increased numbers of large groups.
  - This limit will help to prevent "harmful spikes in use"[28] and protect the wilderness character of areas to which commercial use may be displaced under the operation of this plan.[29] If three or more large commercial groups are all displaced to the most desirable unrestricted zone, crowding could result, detracting from the wilderness experience of noncommercial visitors sharing a zone with such groups.[30] A limit of two commercial trips per day in unrestricted zones will prevent this from occurring.

27 NPS *Management Policies* 6.4.10

28 *See High Sierra Hikers v. Blackwell*, 390 *F.3d* 630 (9th Cir. 2004): *High Sierra Hikers Association v. Weingardt*, 521 *F. Supp. 2d* 1065 (2007) (holding invalidates the USFS commercial use needs assessment in part because it failed to control harmful spikes in use).

29 For a review of the research demonstrating that harms caused by new impacts to areas not previously impacted are more extensive than harms to previously impacted areas (the "impact curve"), see Hammitt, W. & Cole, D. (1998) *Wildland Recreation: Ecology and Management*, 2d ed., New York: John Wiley.

30 Recent empirical research on visitor experience in the Yosemite Wilderness has documented a visitor preference not to encounter stock parties and large campsites. See Newman, P., Manning, R. E., Dennis, D. F., & McKonly. (2005), "Informing carrying capacity decision making in Yosemite National Park, USA using stated choice modeling," *Journal of Park and Recreation Administration*, 23(1), 75-89.

- This limit will prevent commercial groups from dominating any one area and therefore further the legislative intent of the Wilderness Act to prevent excessive commercialization of wilderness.

These limits apply in all zones at all times in addition to the other restrictions noted above.

Part 7. Extent Necessary Calculations for the Tuolumne River Corridor

The following is an application of the rules in Part 6 to the wilderness portions of the Tuolumne River corridor. They apply only to the Tuolumne River corridor, and do not apply to commercial use associated with the High Sierra Camps. The allocations are summarized in Tables C-2 and C-3. Some trips may realize all three purposes. Such trips will be allocated according to the purpose allocation that is most favorable to the commercial service provider.[31]

A. Limits on All Commercial Use:

- No camping or travel more than ¼ mile from a maintained trail or public access road.
- No camping in the Mono Parker Pass Zone (also applies to noncommercial use).
- No more than two overnight groups per night per zone.
- No more than two day hikes per day per trail.
- All commercial stock trips are limited to a 1:1.5 stock to person ratio. Accordingly, for every multiple of 3 persons (including employees), only two pack animals are allowed in addition to 3 riding stock. See section 8 B.

B. Limits on Commercial Trips that Only Realize the Recreational Purpose:

1. Overnight Use

- Restricted zones (Glen Aulin, July and August only): No overnight commercial use allowed.
- Weekend restricted zones (Lyell Canyon, July and August only): Commercial use allowed on weekdays; but prohibited on weekends and holidays (This means no overnight stays on Friday and Saturday nights or Sunday night before a Monday holiday. July 4th will only be treated as a holiday during years when the federal holiday forms a three day weekend.
- Commercial trips allowed in the Waterwheel Falls, Pate Valley, and Poopenaut zones the entire season.
- Commercial trips allowed in the Lyell Canyon and Glen Aulin zones all months except July and August.

2. Day Use

- Restricted Trails (Lyell Canyon and Glen Aulin, July and August only): No commercial use allowed.
- Weekend restricted Trails (Mono Parker Pass, July and August only): Commercial use allowed on weekdays (Monday-Friday) only.
- Commercial use allowed on all other trails (Lower Gaylor, Pate Valley, and Poopenaut trails) for the entire season. Commercial use allowed on the Lyell Canyon, Glen Aulin, and Mono Parker Pass trails all months except July and August.

[31] Such trips are also favorably evaluated under the minimum requirements analysis described in section 9 below because they help to realize multiple purposes at a lower impact than would multiple trips.

C. Limits on Commercial Trips that Realize the Recreational and Educational Purposes:

1. Overnight Use

- Restricted zones (Glen Aulin, July and August only): Commercial use prohibited because commercial education associated with the High Sierra Camp Loop Trips conducted by the National Park Service exceeds 10% of capacity, which makes it unnecessary to allocate additional capacity for commercial use in support of the educational purpose on this trail corridor. A significant amount of noncommercial formal education is also provided by non-NPS institutions in this zone.
- Weekend restricted zones (Lyell Canyon, July and August only): Commercial use allowed on weekdays; weekend and holiday (as defined above) use limited to 84 use nights per month, calculated as follows: Capacity for Lyell Canyon is 125 people per night. 125 x 8.7 (average number of weekend nights/month) = use nights. 10% of 1088 = 109 use nights. Average noncommercial educational use nights (college classes, etc), from 2009-2010 is 25 use nights. 109 - 25 = 84 use nights available for commercial formal education.
- Commercial trips allowed in the Waterwheel Falls, Pate Valley, and Poopenaut zones the entire season. Commercial trips allowed in the Lyell Canyon and Glen Aulin zones all months except July and August.

2. Day Use

- Restricted trails (Lyell Canyon and Glen Aulin, July and August): Commercial use allowed (non-commercial educational day use on these trails is negligible)
- Weekend restricted trails (Mono Parker Pass, July and August): Commercial use allowed (non-commercial educational day use on this trail is negligible)
- Commercial use allowed on all other trails (Lower Gaylor, Pate Valley, and Poopenaut trails).

D. Limits on Commercial Trips that Realize the Recreational and Scenic Purposes:

1. Overnight Use

- Restricted zones (Glen Aulin, July and August): Use would be limited to 78 use nights per month, calculated as follows: Capacity for Glen Aulin = 50 people per night. 50 x 31 (number of nights/month) = 1550 use nights. 5% of 1550 = 78 use nights. Average noncommercial scenic use nights (NPS workshops, etc) from 2009-2010 = 0 use nights. 78 - 0 = 78 use nights available for commercial scenic appreciation.
- Weekend restricted zones (Lyell Canyon, July and August): Commercial use allowed on weekdays. Use limited to 50 weekend and holiday (as defined above) use nights per month, calculated as follows: Capacity for Lyell Canyon = 125 people per night. 125 x 8.7 (average number of weekend nights/month) = 1088 use nights. 5% of 1088 = 54 use nights. Average noncommercial scenic use nights (NPS workshops, etc) from 2009-2010 = 0 use nights. 54 - 0 = 54 use nights available for commercial scenic appreciation.
- Commercial trips allowed in the Waterwheel Falls, Pate Valley, and Poopenaut zones the entire season.
- Commercial trips allowed in the Lyell Canyon and Glen Aulin zones all months except July and August.

2. Day Use

- Restricted trails (Lyell Canyon and Glen Aulin, July and August): Commercial use allowed (non-commercial scenic day use on these trails is negligible).
- Weekend restricted trails (Mono Parker Pass, July and August): Commercial use allowed. (non-commercial scenic day use on this trail is negligible).
- Commercial use allowed on all other trails (Lower Gaylor, Pate Valley, and Poopenaut trails).

Table C-2.
Commercial Restrictions – Overnight Use and Day Use

Overnight Use			
For commercial groups that realize:	**Other Zones** **Waterwheel Falls, Pate Valley, and Poopenaut** **Lyell Canyon and Glen Aulin, all months except July and August**	**Weekend Restricted Zones** **Lyell Canyon, July and August only**	**Restricted Zones** **Glen Aulin, July and August only**
Only the recreational purpose	No off-trail travel 1:1.5 stock to person ratio Two commercial groups per zone per night	No off-trail travel 1:1.5 stock to person ratio Two commercial groups per zone per night Monday-Thursday nights. No overnight use on weekend and holiday nights.	No overnight use
The recreational and educational purposes	No off-trail travel 1:1.5 stock to person ratio two commercial groups per zone per night	No off-trail travel 1:1.5 stock to person ratio Two commercial groups per zone per night Limited to 84 weekend use nights per month	No off-trail travel No commercial use allowed
The recreational and scenic purposes	No off-trail travel 1:1.5 stock to person ratio Two commercial groups per zone per night	No off-trail travel 1:1.5 stock to person ratio Two commercial groups per zone per night Limited to 54 weekend use nights per month	No off-trail travel Two commercial groups per zone per night Limited to 78 use nights per month
Day Use			
For commercial groups that realize:	**Other Trails**	**Weekend Restricted Trails**	**Restricted Trails**
Only the recreational purpose	No off-trail travel Two commercial groups per trail per day	No off-trail travel Two commercial groups per trail per day Monday-Friday No day use on Friday or Saturday	No day use
The recreational and educational purposes	No off-trail travel Two commercial groups per trail per day	No off-trail travel Two commercial groups per trail per day	No off-trail travel Two commercial groups per trail per day
The recreational and scenic purposes	No off-trail travel Two commercial groups per trail per day	No off-trail travel Two commercial groups per trail per day	No off-trail travel Two commercial groups per trail per day

Table C-3.
Commercial Restrictions Summary for the Tuolumne River Corridor

Tuolumne River Corridor Summary											
	Overnight Use Zone						Trail				
Month	Poopenaut	Pate	Waterwheel	Glen Aulin	Lyell Canyon	Mono-Parker Pass	Poopenaut	Lower Gaylor	Glen Aulin	Lyell Canyon	Mono-Parker Pass
June						No camping					
July				Restricted	Wkend Restrict.	No camping			Restricted	Restricted	Wkend Restrict.
Aug				Restricted	Wkend Restrict.	No camping			Restricted	Restricted	Wkend Restrict.
Sept						No camping					

Part 8: The Commercial Use Application Process

A. Procedures Applicable to All Commercial Services in Wilderness

Implementation of this Determination of Extent Necessary for commercial services will be integrated into Yosemite's CUA and SUP application procedures and concession management operations. All entities, including concessioners, CUA holders, and SUP holders desiring to provide commercial services in the designated wilderness of the Tuolumne River corridor shall do the following:

(1) The concessioner, CUA, or Special Use Permit holder must submit a proposed trip itinerary to the Yosemite Wilderness Office by May 1 or as soon as is feasible. The itinerary must be received prior to any trip entry into the park. The itinerary must provide a schedule of planned trips. For overnight trips, the itinerary must include the dates, point of entry and exit, each night's camping location, and the group size (including employees). Day trips must include the date, group size, trailhead, and destination. Itineraries received prior to May 1 will be used to assign trips for the summer season and may include a second and third choice of trips.

(2) For educational and scenic trips, the applicant must submit an explanation of the manner in which the proposed commercial trip meets the educational or scenic purposes, along with copies of, or Internet links to, all advertising and other promotional materials related to that trip; and submit educational syllabus for trip and documentation showing that employees are trained and qualified to provide such education.

B. The Minimum Requirement Concept

By policy, the National Park Service must apply the minimum requirement concept to decisions about commercial use in wilderness.[32] The minimum requirement concept is a two part process that determines "if administrative actions, projects, or programs undertaken by the Service or its agent and affecting wilderness character, resources, or the visitor experience are necessary, and if so, how to minimize impacts."[33]

As part of the minimum requirement process, the National Park Service weighs the impacts and benefits to wilderness character of proposed actions in wilderness. Commercial trips that realize more than one purpose accrue more benefit to wilderness character than those that only realize one purpose but have the same amount of impact. For this reason, trips that realize a higher number of purposes will receive preference over those realizing a lower number of purposes when allocating access.

Part of a minimum requirement decision is determining whether an activity is wilderness dependent. If an activity is "wilderness dependent" it means that the activity cannot occur outside wilderness without experiencing a significant loss of value. The wilderness dependence criteria will be used during the application screening process. Commercial trips whose primary purpose is teaching a subject that is not wilderness dependent will be treated as recreational rather than educational. Examples of such topics are: weight loss, yoga, and cooking.

Consistent with this concept, when two commercial groups that are realizing the same number of purposes are competing for the same date in the same location, the lower impact trip will be given preference. When comparing otherwise equivalent commercial stock trips preference will be given to the trip with a lower stock-to-client ratio.

C. Process for Allocating Proposed Trips Outside Lyell Canyon

With the exception of Lyell Canyon, as discussed below, in the event that there is more than one entity that desires to provide commercial services on the same date in the same zone, priority shall be determined by the application of the following steps, in order:

(1) Each proposed commercial trip shall be awarded one (1) point for each wilderness public purpose (i.e., recreational, educational, scenic) that it realizes. Priority shall be granted to proposed trips with higher point totals;

(2) Proposed commercial trips that utilize a lower-impact mode of transportation will be given priority over those using higher impact modes of transportation; and

(3) In the case of otherwise comparable stock trips, the trip with the lowest stock-to-client ratio will be given priority.

(4) Any remaining conflicting proposed commercial trips after the application of steps (1) through (3) above will be resolved through a lottery for proposed commercial trips that will be conducted on May 1 of each calendar year.

32 NPS *Management Policies* 2006 6.4.4

33 NPS *Management Policies* 2006 6.3.5

All trips proposed after the May 1 lottery will be allocated on a first-come, first-served basis. With respect to trips requested on the same date, any conflicts over requested dates and trailheads will be resolved by the application of steps (1) through (4) above.

D. Process for Allocating Proposed Trips in Lyell Canyon

Stock use in Yosemite is geographically concentrated such that 90% of the use takes place on only 20% of the trails. One result of this concentration of use is that those trails frequented by stock are built and maintained to withstand such use, while other trails in the park may not be. For this reason, the potential physical impacts to wilderness character of displacing a stock group to an area outside Lyell Canyon are greater than the potential displacement impacts caused by a commercial hiking group.[34] In addition, stock trips displaced to other areas of the park may cause new impacts to infrequently used campsites and meadows.

In contrast, commercial hiking groups have a wider range of resilient locations to travel to within the park's wilderness. If displaced from the Tuolumne River corridor by the operation of this Determination of Extent Necessary appendix, commercial hiking groups are likely to cause less physical impacts elsewhere compared to those associated impacts due to stock displacement. Furthermore, hiking groups have greater opportunities to conduct their trips earlier in the season while stock groups must wait for the designated opening date of a particular area.

For these reasons, the process for allocation of commercial trips in Lyell Canyon shall be the same as that described in Section 8.C. above, except that commercial stock groups will be given priority over commercial non-stock trips in Lyell Canyon for the available dates in the May 1 lottery, and in any first-come, first-served trips allocated after May 1. Proposed commercial stock trips with a higher point total (i.e., those earning 2 points because they are recreational and educational) in step (1) will receive priority over other commercial stock trips with a lower point total (i.e., those receiving only one point because they are purely recreational). Proposed commercial stock trips with a lower stock-to-client ratio will receive priority over proposed commercial stock trips with a higher ratio.

E. Compliance

Wilderness Rangers routinely check on commercial groups in the field in order to ensure compliance with park regulations. An assessment of the extent to which a commercial service provider has met its objective with respect to satisfaction of wilderness purposes will be added to the CUA contact form, for example to evaluate the claim that wilderness education is being provided by qualified personnel in addition to recreation. Failing to provide promised educational or scenic opportunities may be grounds for limiting a commercial service provider's ability to provide future commercial trips in the Yosemite Wilderness.

[34] One of the most persistent findings in the recreation management literature is that new impacts to areas not previously impacted are more extensive than harms to previously impacted areas (the "impact curve"); see Hammitt, W. & Cole, D., 1998 *Wildland Recreation: Ecology and Management*, 2d ed., New York: John Wiley. This is particularly true in the case of stock impacts to sensitive meadow ecology. See Moore & Cole et al., 2000, "Meadow response to pack stock grazing in the Yosemite Wilderness: Integrating research and management" *USDA Forest Service Proceedings* RMRS-P-15, v.5; McClaren & Cole, 1993, *Packstock in Wilderness: Use, Impacts, Monitoring, and Management*, USDA, Intermountain Research Station, Gen. Tech. Rep. INT-301.

Part 9: The Reassessment Process

The limits on commercial use imposed by this plan will be recalculated when significant changes in use patterns occur. Two current actions may affect this process. The first is research on wilderness travel patterns that was completed in 2010. When the results of this study are released, trailhead quotas may be adjusted. As a result, travel patterns may change in a way that would affect the results of a Determination of Extent Necessary. In addition, the National Park Service has taken the initial steps of rewriting the Yosemite Wilderness Stewardship Plan, which will include a Determination of Extent Necessary for commercial services in the entire Yosemite Wilderness. At that time both visitor use patterns and the methodology utilized in Determinations of Extent Necessary may be evaluated.

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Appendix D:
Programmatic Agreements for Complying with Section 106 of the National Historic Preservation Act

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PROGRAMMATIC AGREEMENT AMONG THE NATIONAL PARK SERVICE AT YOSEMITE, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION REGARDING PLANNING, DESIGN, CONSTRUCTION, OPERATIONS AND MAINTENANCE, YOSEMITE NATIONAL PARK, CALIFORNIA.

With October, 2003, Amendment 1

WHEREAS, the National Park Service (NPS) at Yosemite National Park (YOSE) has determined that planning, design, construction, operations and maintenance may have an effect on properties included in, or eligible for inclusion in, the National Register of Historic Places, and has consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to Section 800.13 of the regulations (36 CFR Part 800), implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f; hereinafter NHPA); and

WHEREAS, the NPS, the Council, and National Conference of State Historic Preservation Officers (NCSHPO) executed a Nationwide Programmatic Agreement on July 17, 1995 that establishes a framework for taking historic properties into account and is supplemented by this agreement; and

WHEREAS, the NPS completed a 1980 General Management Plan (GMP) that provides the management direction for YOSE; and

WHEREAS, the NPS, SHPO and Council executed a November 1, 1979, Memorandum of Agreement that is still in effect to cover actions specified in the 1980 GMP; and

WHEREAS, a Concessions Services Plan and a Yosemite Valley Plan exist or are underway to implement proposals of and amend the 1980 General Management Plan; and

WHEREAS, the NPS has on staff or has access to qualified cultural resource specialists who meet, at a minimum, the appropriate qualifications set forth in the Department of the Interior's "Professional Qualifications Standards" (36 CFR Part 61, Appendix A) to carry out programs for cultural resource management. These include cultural resource management advisors described in Stipulation III (C) (3) of the nationwide programmatic agreement; and

WHEREAS, the terms in 36 CFR Section 800.2 "Definitions" are applicable throughout this Programmatic Agreement, including "Historic Property" to mean any prehistoric or

historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places. Historic Properties include artifacts and remains that are related to and located within such properties, cultural landscapes, as defined in National Register Bulletins 18 and 30, and traditional cultural properties, as defined in National Register Bulletin 38. "Indian Tribes" refers to American Indian tribes, bands, organized groups, or communities recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians, and who are culturally affiliated with YOSE lands and resources; and

WHEREAS, YOSE has consulted with Indian Tribes (American Indian Council of Mariposa County, Inc., the Tuolumne Me-Wuk Tribal Council, the Mono Lake Indian Community, the Bridgeport Paiute Tribe, the Chukchansi Nation, the Northfork Mono Rancheria and the Northfork Mono Indian Museum) and has provided these parties the opportunity to participate in the development of, and to concur in the terms of, this Agreement; and

WHEREAS, YOSE has consulted with the National Trust for Historic Preservation (National Trust) and has invited the National Trust to concur in this agreement; and

WHEREAS, YOSE has notified the public of the formulation of this agreement and provided them an opportunity to comment;

NOW, THEREFORE, the NPS, SHPO, and Council agree that YOSE shall carry out its responsibilities under the NHPA, as amended, for those undertakings/actions specified in Stipulation II below.

STIPULATIONS

YOSE shall ensure that the following measures are carried out:

I. POLICY

YOSE shall manage and preserve the historic properties of the park through undertakings and research, consistent with good management and stewardship. These efforts are, and will remain, in keeping with the NHPA, the National Environmental Policy Act of 1969 (NEPA), and other applicable laws, executive orders, regulations and policies. YOSE shall implement its programs with public review and in consultation with other federal agencies, the SHPO, Indian Tribes, city and county governments and their respective authorities, as appropriate.

A. Guidelines, standards, and regulations that are relevant to this Agreement and that shall provide guidance and performance standards for management of historic properties include:

NPS/ACHP	The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act [Section 110 Guidelines]
ACHP	Treatment of Archeological Properties: A Handbook
FHWA	Manual for Uniform Traffic Control Services
NPS	Maintenance Management Program, Operations Manual, Parts 1&2
NPS	Museum Handbook, Parts 1&2
NPS	Director's Order 2: Park Planning
NPS-6	Interpretive and Visitor Services Guidelines
NPS-12	NEPA Compliance Guidelines
NPS-28	Cultural Resource Management Guideline
NPS-38	Historic Property Leasing Guidelines
NPS-76	Housing Design and Rehabilitation Guidelines
USDI	Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines
USDI	The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings
USDI	The Secretary of the Interior's Standards for Historic Preservation Projects with Guidelines for Applying the Standards
USDI	The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes
US	Uniform Federal Accessibility Standards (49 FR 31528-31617)
US	Americans with Disabilities Act Accessibility Guidelines (56 FR 45731-45778)
US	Native American Graves Protection and Repatriation Act Regulations: Final Rule (43 CFR Part 10)

As needed, additional guidelines may be developed for the built or designed landscapes of YOSE. Proposed new guidelines developed by YOSE shall be submitted to the SHPO for review and comment. The SHPO shall have 30 days after receiving the proposed guidelines to respond to specific treatments described in the guidelines.

B. YOSE shall use the following Cultural Resource Identification and Professional or Technical Plans and Studies in management:

NPS	YOSE Hazard Tree Plan
NPS	YOSE Fire Management Plan
NPS	YOSE Wilderness Management Plan
NPS	YOSE Resource Management Plan
NPS	YOSE Archeological Synthesis and Research Design
NPS	Cultural Landscape Report, Yosemite Valley
NPS	Ethnographic Evaluation of Yosemite Valley, the Native American Cultural Landscape

NPS	Historic Resource Study, Yosemite National Park
NPS	List of Classified Structures, YOSE
NPS	Wilderness Historic Resource Study
NPS	Archeological Inventory, Testing, Data Recovery and Monitoring Reports
NPS	Ethnographic Studies
NPS	YOSE Interpretive Prospectus

II. APPLICABILITY

This agreement is applicable to all individual actions relating to:

A. Routine maintenance and park operations

B. Individual actions proposed in the 1980 General Management Plan, that will be attached in Appendix C, and individual actions proposed in implementing plans including, but not limited to:

- 1992 Concessions Services Plan
- Yosemite Valley Plan (in preparation)

C. Design projects

D. Specific management plans

III. SCOPE OF AGREEMENT

A. This Agreement applies to undertakings at YOSE that have not been covered by previous agreements, and that are under the direct or indirect supervision of the NPS including undertakings performed by NPS lessees, permittees, concessionaires, cooperators and park partners.

B. The NPS shall ensure that the lessees, permittees, concessionaires, cooperators and park partners are notified that they are subject to the terms of this Agreement.

IV. RELATIONSHIP TO OTHER PLANS

A. This Agreement incorporates provisions of, but does not supersede, the 1979 MOA executed for the 1980 GMP. Provisions of that agreement will continue to be implemented as written.

B. This Agreement supplements the 1995 Nationwide Programmatic Agreement among the NPS, the Council, and the National Conference of State Historic Preservation Officers.

V. PARTICIPATION OF INDIAN TRIBES

A. YOSE shall consult with Indian Tribes in such a manner as to meaningfully involve them in decisions affecting resources of concern.

B. Within one year of the execution of this Agreement, YOSE shall develop an agreement that sets forth the process by which Indian Tribes will be involved in considering the impacts of undertakings on Historic Properties at YOSE that are of interest to them. This protocol will:

1. Define when consultation between the YOSE and tribes is necessary.
2. Identify individuals or offices directly involved in the consultation process
3. Outline key elements of the consultation process
4. Outline the process to be followed in case of inadvertent discovery of human remains or other items subject to the NAGPRA

C. Until this agreement is in place, YOSE shall continue to consult with Indian Tribes according to 36 CFR Part 800 and, when appropriate, the provisions of NAGPRA.

VI. PUBLIC PARTICIPATION

A. YOSE shall consult with the signatories to this Agreement and with other Interested Parties or Persons to determine if there are organizations or individuals that may be concerned with actions described in Stipulation VIII below, and shall provide notice to the public of the undertakings subject to the stipulations of this Agreement through the public participation process of the National Environmental Policy Act (NEPA) and its implementing regulations set forth in 40 CFR Parts 1500-1508. Any member of the public may participate as an Interested Person in the consultation for a particular action upon notifying YOSE of their interest. YOSE, SHPO and Council, if participating, shall jointly determine when such Interested Persons shall be invited to participate as a consulting party for individual undertakings in accordance with 36 CFR Section 800.5(e)(1)(iv). YOSE shall take into account the views of such parties regarding any adverse effect of an undertaking described in Stipulation VIII below.

B. Documentation regarding identification and National Register evaluation of historic properties, when not subject to confidentiality concerns, will be available for inspection at YOSE, SHPO, or NPS Pacific West Regional Office.

VII. CONSIDERATION OF HISTORIC PROPERTIES

Pursuant to the NHPA and in the earliest stages of the planning process, YOSE shall identify, evaluate, determine effects to, and treat historic properties in conformance with all applicable regulations, policies and guidelines listed in Stipulation I above.

A. Identification

1. YOSE shall consult with Indian Tribes and Interested Persons, as appropriate, on activities to locate and inventory Historic Properties, in accordance with Section 110 of the NHPA, and 36 CFR Section 800.4 .

2. If no Historic Properties are identified, YOSE shall maintain documentation of the inventory for purposes of review under Stipulation XVIII and no further action will be necessary.

3. If Historic Properties are identified, and consistent with any confidentiality protocols provided by the Tribe(s) and/or described in Section 304, NHPA, all final reports resulting from the Historic Properties surveys stipulated above shall be submitted to SHPO.

B. National Register Evaluation

1. YOSE, in consultation with SHPO, shall follow the procedures in 36 CFR Section 800. 4 (c) (1 through 3) to evaluate the historical significance of all properties that may be affected by an undertaking. If YOSE and SHPO do not agree on the National Register eligibility of any property, or if the Council so requests, YOSE shall obtain a formal determination of eligibility from the Keeper of the National Register pursuant to 36 CFR Section 800.4 (c) (4). If SHPO does not respond within the review period described in Stipulation IX below, YOSE may assume SHPO concurrence with YOSE determinations.

2. As part of the 1980 GMP planning process, NPS evaluated and SHPO concurred in National Register eligibility determinations of certain properties in Yosemite. These determinations are itemized in the Case Report accompanying the 1979 MOA (summary list to be appended within six months). In addition, subsequent studies have evaluated properties under National Register criteria. These determinations will be reviewed, on a case by case basis by YOSE cultural resource staff or advisors, for new information or changed circumstances. Previous National Register determinations will be revisited by YOSE staff or cultural resources advisors if new information, such as recognition of new property types (e.g. cultural landscapes and traditional cultural properties) or change in historic context(s), is forthcoming or if SHPO so requests.

3. If traditional cultural properties are identified through the process outlined in Stipulation VII (A), YOSE shall seek the participation of all Indian Tribes (or other groups as appropriate) who ascribe traditional cultural values to those properties

in applying the National Register criteria. Except as provided by any confidentiality protocols developed by Indian Tribes, and/or those described in Section 304, NHPA, YOSE shall ensure that documentation of determinations, including the SHPO's comments, are made available for inspection according to provisions stated in Stipulation VI.

C. Assessment of Effect

YOSE shall determine the effect of any undertaking subject to this Agreement using the Criteria of Effect and Adverse Effect (36 CFR Part 800). YOSE may consult with the signatories to this Agreement or with other Interested Persons regarding effect determinations for individual undertakings.

1. Repetitive, Low Impact Activities

Repetitive, low impact activities defined in *Stipulation IV B of the 1995 Service-wide programmatic agreement will be undertaken* with no additional review by YOSE cultural resource staff. The project proponent shall maintain records of actions for inspection according to Stipulation XVII below.

2. Actions Having No Effect or No Adverse Effect

Activities determined by YOSE to have "No Effect" or "No Adverse Effect" to Historic Properties, as defined in 36 CFR Part 800, may be implemented and will be documented for purposes of this Agreement by YOSE without further review by the Council or SHPO, provided:

a) that the undertaking is not subject to provisions of Stipulation VIII(B);

b) that the applicable YOSE management office has submitted a proposed undertaking to the YOSE Section 106 Coordinator for review and concurrence.

c) that the YOSE Section 106 Coordinator has reviewed the undertaking to ensure that identification and evaluation of Historic Properties in the area of potential effect has been completed according to Stipulation VII (A) and (B) above, and that adequate information has been compiled to identify and evaluate the effects of proposed undertakings on Historic Properties;

d) that YOSE ensures that decisions regarding proposed undertakings are made and carried out in conformance with the standards and guidelines in Stipulation I above;

e) that YOSE shall ensure that recovery of archeological data is based on the existing YOSE Archeological Research Design and Archeological Synthesis and Revised Research Design;

f) that YOSE has consulted with the appropriate Indian Tribe(s) regarding possible effects to Native American archeological or traditional cultural properties;

g) that YOSE has determined that the proposed action either does not affect or does not adversely affect Historic Properties based on the criteria of adverse effect found in 36 CFR Section 800.9; and

h) Monitoring, when appropriate, shall be summarized in a brief letter report. If Historic Properties are discovered during implementation, a detailed monitoring report shall be prepared. Large-scale ground disturbing activities shall be monitored in accordance with a monitoring plan. The monitoring plan shall include, at minimum, the following elements:

i. a detailed summary of properties that may be exposed during construction activities, based on archival research;
ii. treatment strategies (i.e. documentation, data recovery excavations, protection, etc.) for anticipated property types;
iii. specific guidelines for any necessary work stoppages;
iv. the locations of Historic Properties to be avoided and the means by which they will be avoided;
v. specific areas and phases of construction which will be monitored;
vi. a schedule for submitting progress reports of monitoring activities to the SHPO;
vii. a process for dealing with types of properties not anticipated in the monitoring plan, including names of individuals or offices to be contacted in the event of discovery
viii. reporting requirements, to be followed upon project completion
ix. specific procedures to be followed in the event of discovery of human remains
x. Indian tribal monitoring procedures

VIII. RESOLUTION OF ADVERSE EFFECTS

YOSE shall make every reasonable effort to avoid adverse effects to Historic Properties identified according to Stipulation VII (A) through project design, facilities' location, or other means. Avoidance alternatives will be documented during the NEPA process.

When avoidance of a Historic Property is not feasible or prudent, and the undertaking does not involve properties or actions described in (B) below, YOSE, as part of its examination of treatment options, may decide to implement one or more Standard Mitigating Measures (SMM) described in (A) below. YOSE shall notify the following parties in writing of the decision to implement SMM:

- the SHPO
- Indian Tribe(s) (when American Indian properties are involved)
- members of the public who have made their interest in the undertaking known according to provisions outlined in Stipulation VI.

Consultation with the Council will not be undertaken when YOSE decides to implement SMM. If the SHPO, any Indian Tribe or any Interested Person does not object, within 14 calendar days of the notification, to YOSE's decision to treat the adverse effect according to the SMM, YOSE will proceed without further involvement of these parties. Should the SHPO, Indian Tribe, or Interested Person(s) object to the implementation of SMM as set forth above, YOSE shall make every effort to resolve the objection. If YOSE decides not to implement SMM, or YOSE and the objecting party are unable to resolve the objection, YOSE shall consult in accordance with (B) below, Required Consultation.

A. Standard Mitigating Measures

1. Recordation

a) Individual, nationally significant Historic Properties will be documented according to the standards of the Historic American Buildings Survey or Historic American Engineering Record, as appropriate. The level of documentation for these Historic Properties shall be determined by the NPS. Copies of documentation will be deposited in the YOSE archives, SHPO, and Library of Congress.

b) The following categories of structures, whether significant at the national, state, or local level, will be documented by black and white 5 x 7 photographic prints, and a Historic Record that includes narrative history and original drawings where available. Copies of documentation will be deposited in the YOSE archives and with SHPO:

- Contributing elements in a historic district (unless individually eligible)
- Individual elements of linear resources, such as ditches, roads, trails
- Minor elements of a complex (e.g. sheds, garages)

- Individual elements of cultural landscapes
- Individual Historic Properties of state and local significance

2. Salvage

   If a Historic Property will be demolished, YOSE historical architect, curator and/or preservation specialist will conduct a documented inspection to identify architectural elements and objects that may be reused in rehabilitating similar historic structures or that may be added to the YOSE museum collection.

3. Interpretation

   YOSE will ensure that the story of human interaction with nature and changes in that interaction is a central theme in the interpretation of the Yosemite story. This interpretation will include a history of alteration of the human environment and reasons for that change.

4. National Register Reevaluation

   Within 120 working days after adverse alteration, relocation, or demolition of a Historic Property, YOSE shall consult with SHPO regarding the Property's continued eligibility for the National Register. The results of this consultation, with accompanying documentation, shall be forwarded to the Council and Keeper of the National Register. Should YOSE and SHPO disagree, YOSE shall seek a determination from the Keeper in accordance with 36 CFR Section 800.4 (C)(4).

B. Required Consultation

YOSE shall consult, according to 36 CFR Section 800.5(e) with the SHPO, Indian Tribe(s) (as appropriate) and Interested Persons as defined and identified under Stipulation VI (as appropriate), and shall invite the Council's participation regarding any action that:

1. may affect a National Historic Landmark, *or properties of national significance listed on the National Register of Historic Places*
2. may affect a human burial
3. adversely affect a traditional cultural property
4. generates significant public controversy
5. involves a disagreement among YOSE, the SHPO, any Indian Tribe, or any Interested Persons regarding proposed use SMMs

IX. REVIEW PERIODS

A. YOSE shall submit the results of all identification efforts, NRHP eligibility determinations, discovery plans, and treatment plans to SHPO, Indian Tribes, and Council (as necessary) for a 30 calendar day review and comment period, unless otherwise agreed to. Opportunity for review by Interested Persons is as identified in Stipulation VI. This period shall begin upon receipt of adequate documentation by the reviewing party. If any reviewing party does not respond to YOSE within 30 calendar days of receipt of adequate documentation, YOSE may assume that that party does not object to the findings and recommendations as detailed in the submission. If any party does not respond, does not object, or proposes changes that YOSE accepts, no further review by that party will be required and YOSE may proceed according to its findings and recommendations.

B. Should any party object to findings or recommendations in any submittal within the time period specified in (A) above, YOSE shall consult with the objecting party to resolve the objection. If the objection is not resolved, YOSE shall consult according to Stipulation XIV, Dispute Resolution.

X. DISCOVERY

A. Native American Human Remains

1. YOSE shall ensure that any Native American burials or Native American human remains, funerary objects, sacred objects and objects of cultural patrimony discovered during implementation of an undertaking, archeological fieldwork, or other actions, are treated with appropriate respect and according to federal law, including, but not limited to, the Native American Graves Protection and Repatriation Act, Public Law 101-601 (NAGPRA) and its implementing regulations (43 CFR Part 10, Native American Graves Protection and Repatriation Act Regulations). Actions described herein do not constitute compliance with provisions of NAGPRA.

2. If objections are raised by any Indian Tribe regarding treatment of human remains or cultural items as defined under NAGPRA, the objection shall be resolved in accordance with NAGPRA. YOSE shall notify SHPO and Council of any such dispute if so requested by involved tribes.

B. Other Historic Properties

YOSE shall notify the SHPO and Indian Tribe(s), as appropriate, as soon as practicable if it appears that an undertaking will affect a previously unidentified property that may be eligible for inclusion in the National Register, or affect a known Historic Property in an unanticipated manner. YOSE shall stop all potentially harmful activities (if ongoing) in the vicinity of the discovery and shall take all reasonable steps to avoid or minimize harm to the property until YOSE concludes

consultation. If the newly discovered property has not previously been included in or determined eligible for listing in the National Register, YOSE may assume that the property is eligible for purposes of this Agreement. YOSE shall notify the SHPO at the earliest possible time and consult with the SHPO to develop actions that will take the effects of the undertaking into account. YOSE will notify SHPO of any time constraints, and YOSE and SHPO will mutually agree upon time frames for this consultation. YOSE shall provide the SHPO (and Indian Tribe[s], as appropriate) with written recommendations that take the effects of the undertaking into account. If the SHPO does not object to YOSE's recommendations within the agreed upon time frame, YOSE will implement the recommendations. If SHPO or the Indian Tribe(s) object to the proposed treatment, and these objections cannot be resolved, YOSE shall follow procedures outlined in Stipulation XIV, Dispute Resolution.

XI. NATURAL DISASTERS

In the past YOSE has experienced major floods, fires, earthquakes, wind damage from storms, earth slides, and other natural disasters/emergencies which are likely to recur in the future. For a period not exceeding 45 days after the conclusion of the emergency (plus any extension agreed upon by YOSE, SHPO and Council) YOSE will proceed as follows:

A. YOSE will, without SHPO consultation, undertake emergency actions pursuant to the terms of this Agreement to stabilize Historic Properties and prevent further damage.

B. YOSE cultural resource specialists shall work closely with the emergency operations team, participate in discussions regarding emergency response activities and monitor work that has the potential to affect Historic Properties.

C. YOSE staff shall consult with the appropriate Indian Tribe(s) regarding emergency actions.

D. All work having the potential to affect Historic Properties shall be documented.

E. Every effort will be made to avoid known or discovered Historic Properties during emergency response activities. However, in those rare cases where this is impossible or could impede emergency responses, photographic and written documentation of affected Historic Properties shall be completed.

F. All such emergency measures shall be undertaken in a manner that does not foreclose future preservation or rehabilitation, unless YOSE determines that integrity has been permanently lost.

G. Within 90 days after the conclusion of the disaster or emergency period, YOSE shall submit to the SHPO, Council and the Federal Preservation Officer, NPS a report that documents how any effect of disaster or emergency response operations on Historic Properties were taken into account.

XII. EMERGENCY REPAIRS

A. In the event that damage to or failure of park infrastructure poses an immediate threat to life or health, YOSE will undertake emergency repairs with on-site monitoring by appropriate cultural resource specialists.

B. Should Historic Properties be discovered during emergency repair activity, all work that could result in adverse effects shall cease provided the Superintendent or designated representative determines work cessation will not impede emergency repairs. If the work stoppage at the discovery site will impede emergency repairs, emergency repair will continue and YOSE officials shall immediately notify the SHPO by telephone and provide the following information:

1. finding of a required emergency
2. description of the emergency and steps necessary to address the situation
3. description of the discovery and its apparent significance
4. description of the emergency and potential effect on the discovery feature
5. efforts to consider Historic Properties

C. Repairs and emergency treatment of any discovered properties shall be documented by YOSE on a Preservation Assessment Form or its equivalent. This form, along with a description of the emergency situation, signed by the requesting park official and the cultural resource specialist accomplishing the monitoring, shall be provided to the SHPO within 15 days of the emergency repair.

XIII. PERMITS

A. Permits and other legal agreements including, but not limited to, special use permits, leases, concessions, contracts and easements (hereinafter "Permits") for use of lands or structures in YOSE reflect a diversity of utilities and uses. All such Permits shall contain terms and conditions YOSE deems appropriate to protect and preserve Historic Properties.

B. YOSE shall require that any undertaking proposed and implemented by a permittee/licensee, which may affect a Historic Property, shall meet the guidelines and standards set forth in Stipulation I above, and is reviewed by YOSE in accordance with Stipulation VII (c). Any permittee/licensee who proceeds with an undertaking without project review and approval, and who forecloses the obligation

of YOSE to fulfill terms of this agreement, may be subject to appropriate sanctions in accordance with the terms of the permit/license.

XIV. DISPUTE RESOLUTION

A. Should SHPO or Council object within 30 calendar days to any matter submitted by YOSE for review pursuant to this Agreement, YOSE shall consult with the objecting party to resolve the objection. If after 30 calendar days YOSE or the objecting party determines that the objection cannot be resolved, YOSE shall forward all documentation relevant to the dispute to the Council. Within 30 calendar days after receipt of all pertinent documentation, the Council will either:

   1. provide YOSE with recommendations, which YOSE shall take into account in reaching a final decision regarding the dispute; or

   2. notify YOSE that it will comment pursuant to 36 CFR Section 800.6(b), and proceed to comment. Any Council comment provided in response to such a request shall be taken into account by YOSE in accordance with 36 CFR Section 800.6(c)(2) with reference only to the subject of the dispute; YOSE's responsibility to carry out all actions under this Agreement that are not the subjects of the dispute will remain unchanged.

B. Should any Indian Tribe object to the manner in which the terms of this Agreement are implemented, YOSE shall take the objection into account and consult with the objecting party for 30 calendar days. If YOSE determines that the objection cannot be resolved, YOSE shall refer the objection to the Council according to Section A of this Stipulation.

C. Should any Interested Persons or a member of the public object to the manner in which this Agreement is implemented, YOSE shall take the objection into account and consult with the objecting party for 30 calendar days. If YOSE determines that the objection cannot be resolved, YOSE shall refer the objection to the Council in accordance with Section A of this Stipulation.

D. Should the subject of an objection pertain to the eligibility of a property for listing in the National Register, YOSE shall consult with the objecting party for a 30-day period. If the objection is not resolved within those 30 calendar days, YOSE shall refer the matter to the Keeper of the National Register for a final determination.

XV. FUTURE AGREEMENTS

Programmatic agreements or memoranda of agreement may be negotiated by YOSE, SHPO, and the Council, as appropriate, and may supplement this Agreement.

XVI. AMENDMENTS

Any signatory may request that this Agreement be amended, whereupon the parties will consult in accordance with 36 CFR Section 800.13. Where the parties cannot agree on executing an amendment, the matter shall be addressed pursuant to Stipulation XIV, Dispute Resolution. Any amendment agreed upon will be executed in the same manner as the original Agreement.

XVII. FAILURE TO CARRY OUT AGREEMENT

In the event YOSE does not or cannot carry out the terms of this Agreement, YOSE shall comply with the NPS Nationwide Programmatic Agreement with regard to individual undertakings covered by this Agreement.

XVIII. REVIEW OF AGREEMENT

A. On or before November 15 of each year for two years and biannually thereafter, so long as this Agreement is in effect, YOSE shall prepare and provide to the signatories and all parties invited to concur with this Agreement and the NPS Federal Preservation Officer a report describing how YOSE is carrying out its responsibilities under this Agreement. The report shall include, at a minimum, a list of "no effect and "no adverse effect" actions carried out in accordance with Stipulation VIII (B) , above; efforts to identify and/or evaluate potential Historic Properties; monitoring efforts, and treatment of Historic Properties. YOSE shall ensure that this report is made available for public inspection pursuant to Stipulation VI, that potentially Interested Persons and members of the public are made aware of its availability, and that interested members of the public are invited to provide comments to the Council and SHPO as well as to YOSE. The SHPO, Council, and Indian Tribes may review the annual report and provide comments to YOSE. At the request of any party to this Agreement, YOSE shall supplement this process through meeting(s) to address comments and/or questions.

B. The SHPO and the Council may monitor activities carried out pursuant to this Agreement, and the Council will review such activities if so requested. YOSE shall cooperate with the SHPO and the Council in carrying out their monitoring and review responsibilities.

XIX. TERMINATION

YOSE, SHPO, or Council may terminate this Agreement by providing 30 calendar days' written notice to the other parties provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the NPS shall comply with 36 CFR Sections 800.4 through 800.6 for individual undertakings covered by this Agreement.

XX. EXPIRATION

This Programmatic Agreement shall be null and void fifteen (15) years from date of execution of this Agreement by the Council.

Execution and implementation of this Programmatic Agreement evidences that YOSE has satisfied its Section 106 responsibilities for all individual undertakings referenced in this Agreement.

PROGRAMMATIC AGREEMENT AMONG THE NATIONAL PARK SERVICE (U.S. DEPARTMENT OF THE INTERIOR), THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS FOR COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

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PROGRAMMATIC AGREEMENT AMONG THE NATIONAL PARK SERVICE (U.S. DEPARTMENT OF THE INTERIOR), THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS FOR COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

WHEREAS, the National Park Service (NPS) plans for, operates, manages, and administers the National Park System (System) and is responsible for identifying, preserving, maintaining, and interpreting the historic properties of the System unimpaired for the enjoyment of future generations in accordance with the 1916 National Park Service Organic Act, the NPS Management Policies (2006), and applicable NPS Directors Orders; and

WHEREAS, the operation, management, and administration of the System entail undertakings that may affect historic properties (as defined in 36 CFR Part 800), which are therefore subject to review under Sections 106, 110(f) and 111(a) of the National Historic Preservation Act as amended (NHPA) (16 USC 470 *et seq.*) and the regulations of the Advisory Council on Historic Preservation (ACHP) (36 CFR Part 800); and

WHEREAS, the NPS has established management policies, director's orders, standards, and technical information designed for the identification, evaluation, documentation, and treatment of historic properties consistent with the spirit and intent of the NHPA; and

WHEREAS, the NPS has a qualified staff of cultural resource specialists to carry out programs for historic properties; and

WHEREAS, the purpose of this Programmatic Agreement (PA) is to establish a program for compliance with Section 106 of the NHPA and set forth a streamlined process when agreed upon criteria are met and procedures are followed; and

WHEREAS, signature and implementation of this PA does not invalidate park-, Region-, or project-specific memoranda of agreement (MOA) or programmatic agreements negotiated for Section 106 purposes prior to the effective date of this PA; and

WHEREAS, Federally recognized Indian Tribes are recognized by the U.S. government as sovereign nations in treaties and as unique political entities in a government-to-government relationship with the United States; and

WHEREAS, the NPS has conducted a series of "listening" meetings with Indian Tribes, has requested the input of a number of Native Advisors in the process of preparing this PA, and has held consultation meetings with Federally recognized Indian Tribes, Native Hawaiian organizations, and other parties on the content of the PA; and

WHEREAS, 36 CFR 800.2 (c)(2)(i)(A) and (B) provide for consultation with Indian Tribes on the same basis as the State Historic Preservation Officer (SHPO) when an undertaking will occur on or affect historic properties on tribal lands; and

WHEREAS, in accordance with 36 CFR 800.14(b)(2)(iii), a PA shall take effect on tribal lands only when the designated representative of the tribe is a signatory to the agreement; and

WHEREAS, for those parks located partly or wholly within tribal lands, the NPS has invited the applicable Tribal Historic Preservation Officer (THPO) or Indian Tribe to sign this PA as an Invited Signatory; and

WHEREAS, the NPS has consulted with the NCSHPO and the ACHP regarding ways to ensure that NPS operation, management, and administration of the Parks provide for management of the Parks' historic properties in accordance with the intent of NPS policies, director's orders and Sections 106, 110, 111, and 112 of the NHPA.

NOW, THEREFORE, the NPS, the NCSHPO, the ACHP, and the signatory tribes mutually agree that the NPS will carry out its Section 106 responsibilities with respect to operation, management, and administration of the Parks in accordance with the following stipulations.

PURPOSE AND NEED

NPS park operations, management, and administration require a large number of low-impact or repetitive activities on a daily basis that have the potential to affect properties listed in or determined eligible for the National Register of Historic Places and require consultation under Section 106. This PA provides an efficient process for compliance with Section 106 for daily NPS park operations, management, and administration activities. It establishes two processes for Section 106 review: a "streamlined" review process for designated undertakings that meet established criteria and a "standard" review process for all other undertakings. This PA also provides programmatic procedures and guidance for other activities related to the Section 106 compliance process, including identification of resources, consultation, and planning.

The NPS shall ensure the following measures are implemented.

I. RESPONSIBILITIES, QUALIFICATIONS, AND TRAINING

The following sections list the responsibilities and required qualifications for those individuals responsible for implementing this PA.

A. Responsibilities

1. Director, National Park Service

The Director has policy oversight responsibility for the agency's historic preservation program. The Director, through the Deputy Director for Operations, executes this PA for the NPS and provides policy level oversight within the NPS to ensure that stipulations of the PA are met.

2. Associate Director for Cultural Resources

The Associate Director for Cultural Resources (ADCR) provides national leadership for policy implementation through establishing standards and guidance for managing cultural resources within the Parks. The ADCR works with the NPS regions and parks to ensure and support compliance with the stipulations of this PA and provides accountability to the signatories of this PA with regard to its implementation. The ADCR is responsible for working with Regions and Parks to develop and fund training needs related to Section 106 and the implementation of the PA. The ADCR in cooperation with the regions and parks, is responsible for issuing a guidance document for this agreement within 12 months of its execution. At the time of execution of this PA, the ADCR also holds the title of Federal Preservation Officer (FPO).

3. Regional Directors

The Regional Director is the line manager for all Superintendents within his/her region. The Regional Director is responsible for policy oversight, strategic planning, and direction for parks and programs within the region and reports to the Director through the NPS Deputy Director for Operations. Review and support of Park and Superintendent implementation of this PA and training to achieve Section 106 compliance is the responsibility of the Regional Director.

4. Regional Section 106 Coordinators

The Regional Section 106 Coordinators work with parks and other NPS offices to provide support for Section 106 compliance and implementation of this PA. The Regional Section 106 Coordinators provide guidance materials and technical assistance for implementing the PA and assist the parks to meet the training, reporting, and consultation requirements of the PA.

5. Superintendents

Superintendents are the responsible agency officials as defined in 36 CFR 800.2(a) for purposes of Section 106 compliance and the implementation of this PA.

Each Superintendent shall do the following within his/her park:

a. Designate a Park Section 106 Coordinator and a Cultural Resource Management (CRM) Team meeting the necessary qualifications;
b. Develop and maintain relationships with Federally recognized Indian Tribal governments and Native Hawaiian organizations (if applicable);
c. Develop and maintain relationships with SHPOs/THPOs;
d. Ensure early coordination among the Section 106 Coordinator, the CRM Team, and other park and regional staff, concessioners, park partners, neighboring communities, groups affiliated with park resources, and others in the planning of projects and activities that may affect historic properties;
e. Ensure that Section 106 consultation with the SHPO/THPO and other consulting parties is initiated early in the planning stages of any given undertaking, when the widest feasible range of alternatives is available for consideration;
f. Ensure that the Park Section 106 Coordinator, CRM Team Members and the park cultural resources staff receives the NHPA training needed to carry out their responsibilities. Provide opportunities for other involved staff to receive NHPA training as funding and opportunities permit.

6. Park Section 106 Coordinator

The Park Section 106 coordinator provides day-to-day staff support for Section 106 activities and serves as liaison among park personnel, the NPS Regional Office, NPS Centers, and others involved in undertakings. The coordinator makes recommendations to the Superintendent regarding the appropriate course of action under this PA, including whether a project constitutes a Section 106 undertaking.

7. Cultural Resource Management (CRM) Team

The CRM Team shall provide expertise and technical advice to the Superintendent and the Park Section 106 Coordinator for purposes of Section 106 compliance and implementation of this PA.

B. Qualifications

1. Park Section 106 Coordinator

The Superintendent shall designate at least one (1) person to act as the park's Section 106 Coordinator, whose Section 106 responsibilities are specified, as appropriate. The designee may be chosen from the park staff, other NPS parks, NPS archeological and preservation centers, and the NPS Regional Office. The Park Section 106 Coordinator shall have an appropriate combination of professional training and/or experience to effectively carry out the responsibilities of the position.

2. Cultural Resource Management (CRM) Team

The Superintendent shall designate a CRM Team with expertise to fulfill and implement the requirements of this PA, whose Section 106 responsibilities are specified, as appropriate.

a. Subject matter experts chosen must be appropriate to the resource types found in the park. Therefore, the number of individuals who comprise the CRM Team is not static and will be appropriate to include all necessary disciplines. Multi-disciplinary reviews of proposed undertakings are recommended.
b. CRM Team members may be on the park staff or in other parks, or from NPS Regional Offices, NPS Centers, Federally recognized Indian Tribes, Native Hawaiian organizations, or elsewhere in the public or private sector.
c. CRM Team members who are federal employees shall meet the qualifications for the applicable discipline as defined in Appendix E to NPS-28: Cultural Resource Management Guideline. CRM Team members who are representing Federally recognized Indian Tribes may be traditional cultural authorities, elders, and others experienced in the preservation of tribal culture. All other CRM team members, who are not federal employees or representing a Federally recognized Indian Tribe, must meet the Professional Qualification Standards in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

C. Training

Periodic training on Section 106 compliance issues and the provisions of this PA is needed to maintain an understanding of the requirements of each. Such training may be accessed through the NPS, the ACHP, SHPOs/THPOs, Indian Tribes, Native Hawaiian organizations, other Federal or state agencies or private industry. Training may be in a classroom setting, electronic media, meetings, or other formats that allow for the conveyance of information. The NPS Washington Office, in consultation with the NPS parks, regions, and training centers, will work with the ACHP and NCSHPO to establish options for training in accordance with this PA, within 12 months from the time of execution of this PA.

1. All Superintendents and Section 106 coordinators will be notified of the opportunity to receive training on the provisions of this programmatic agreement once it has been made available by the NPS Washington Office. The NPS ADCR will work with the Regional 106 coordinators to accomplish this training throughout the Regions and parks within 12 months of its availability.

2. Superintendents will report on Section 106 training received by Superintendents and park staff as part of the biennial report (Section VIII.B of this agreement).

II. CONSULTATION

A. Consultation with Federally Recognized Indian Tribes and, THPOs, and Native Hawaiian Organizations

Government-to-government consultation with Federally recognized Indian Tribes and consultation with Native Hawaiian organizations shall occur at the Superintendent level and be initiated during planning and prior to undertaking an activity, program or project that may affect historic properties of significance to Federally recognized Indian tribes or Native Hawaiian organizations. Maintaining an on-going consultative relationship with THPOs and/or staff of Federally recognized Indian Tribes and Native Hawaiian organizations is essential.

1. Consultation on Undertakings off Tribal Lands

   Superintendents shall identify, compile a list of, and consult with Federally recognized Indian Tribes, THPOs and Native Hawaiians that are known to have aboriginal lands within the park boundaries, assert an interest in historic properties within the park boundaries, or have lands or interest in lands adjacent to the park.

   a. Such consultation will be in accordance with 36 CFR 800.2(c)(2)(ii), NPS Director's Order 75A: Public Engagement and Public Involvement, and with Sections III and IV of this PA.
   b. Each Superintendent, with the assistance of park and Regional Office ethnographers, will be responsible for identifying aboriginal lands within the park boundary, working cooperatively with the appropriate Federally recognized Indian Tribes and Native Hawaiian organizations.
   c. Superintendents, in consultation with the Park Section 106 Coordinator and the CRM Team, shall establish a process and develop consultation agreements, where appropriate, that provide for early coordination between the park and Federally recognized Indian tribes, THPOs, and/or Native Hawaiian organizations in identification and evaluation of historic properties and the planning of projects and activities that may affect historic properties.
   d. Identification and evaluation of historic properties on aboriginal lands must be based upon consultation with the appropriate traditionally associated communities.

2. Consultation on Undertakings on Tribal Lands

   For those undertakings that either occur on tribal lands or will otherwise have the potential to affect historic properties on tribal lands, including cumulative impacts from collectively significant actions taking place over a period of time, the Superintendent shall consult with that tribe on the same basis as he or she consults with the SHPO.

a. Where the Tribe has assumed the SHPO's responsibility for Section 106 pursuant to Section 101(d)(2) of the NHPA, the Superintendent shall consult with the THPO in lieu of the SHPO, except as provided for in Section 101(d)(2)(D)(iii).
b. Where the Tribe has not assumed the SHPO's responsibility for Section 106, the Superintendent shall consult with the Tribe's designated representatives in addition to and on the same basis as the SHPO. The Tribe shall have the same rights of consultation and concurrence as the SHPO.

3. Applicability of this PA on Tribal Lands

When a park is located partly or wholly within the boundaries of tribal lands, and the tribe has not signed this PA as an Invited Signatory, any undertaking that may occur on those tribal lands shall require consultation with the Tribe and/or THPO in accordance with 36 CFR Part 800, and the provisions of this PA are not applicable.

A tribe may sign this PA by written notification to the Director of such intent, signed by the THPO, Indian tribe, or a designated representative of the tribe. Once such a written and signed notification is received by the Director, the provisions of this PA will be applicable to undertakings occurring on those lands where a park is located partly or wholly within the boundaries of that particular tribe's tribal lands.

4. Development of Agreements to Facilitate Government-to-Government Consultation with Federally recognized Indian Tribes and Consultation with Native Hawaiian Organizations

Development of consultation protocols, memoranda of agreement and programmatic agreements is encouraged. Such agreements may be negotiated between Superintendents and Federally recognized Indian Tribes, THPOs, or Native Hawaiian organizations and may be independent of or supplement this PA. For example, such agreements may be specific to a project, plan, or park activity, or may set forth specific consultation protocols between the park and a specific tribe or group of Native peoples. Superintendents will provide an informational copy of all agreements to the Regional Section 106 Coordinator and to the ACHP and appropriate SHPO/THPO in accordance with 36 CFR 800.2(c)(2)(ii)(E).

B. Consultation with SHPOs

Consultation with SHPOs on projects reviewed in accordance with the Standard Review Process will occur in accordance with the procedures set forth in Section IV of this PA. Consultation with SHPOs on implementation of this PA will occur biennially in accordance with Section VIII of this PA.

C. Consultation with Local Governments and Applicants for Federal Assistance, Licenses, Permits, and Other Approvals

Where appropriate, the Superintendent shall actively seek the views and comments of local governments and certified local governments. Those seeking Federal assistance, licenses, permits, or other approvals are entitled to participate as a consulting party as defined in 36 CFR 800.2(c)(4) and will be consulted, as applicable.

D. Consultation with the Public

Superintendents will consult with interested members of the public.

E. General Consultation Provisions

1. Section 110 Inventory of Historic Properties

   The parks implement a program to identify, evaluate, and, when appropriate, nominate historic properties to the National Register of Historic Places in accordance with Section 110(a)(2)(d) of the NHPA. Research and testing of all types of historic properties for purposes of identification and evaluation must be limited to the minimum necessary to obtain the required inventory and evaluative information. Early coordination on the identification and evaluation of historic properties should be undertaken with Federally recognized Indian Tribes or Native Hawaiian organizations, as appropriate, utilizing tribal knowledge and expertise wherever applicable. Knowledge and data from appropriate sources of expertise should be utilized, including SHPOs, local governments, Indian Tribes, Pacific Islanders, and national and local professional and scientific organizations. Inventory records should be periodically reviewed and updated, as necessary, to ensure data on historic properties, including condition information, is current, and any previous evaluations of significance remain accurate.

2. Information Sharing: Historic Property Inventories

   Parks, NPS Regional Offices, NPS Centers, and SHPOs will share information with each other regarding inventories of historic properties and historic contexts developed, as well as other reports and research results related to historic properties in the parks, whenever such studies become available. In addition, parks, NPS Regional Offices, and NPS Centers will make such information available to interested Federally recognized Indian Tribes, THPOs, and Native Hawaiian organizations. Federally recognized Indian Tribes who are signatories to this PA will, likewise, make such information available to NPS parks and Regional Offices, as appropriate. Information will be shared with the understanding that sensitive information will be withheld by the recipient of the information from public disclosure pursuant to Section 304 of NHPA and other applicable laws. Procedures for information sharing and format for information (i.e. electronic, hard copy, etc.) should be agreed upon between the parties.

3. Notification of Park Section 106 Coordinator

   The National Park Service will provide contact information on Section 106 coordinators to Indian Tribes, SHPOs/THPOs, and Native Hawaiian organizations for each park through the Regional Office from the Regional 106 Coordinator within six months of this PA and updated biennially.

4. Review and comment on guidance and training documents

   The ADCR will consult with the ACHP and NCSHPO in the development of training materials and guidance for this PA.

F. Development of Agreements to Facilitate Consultation

Development of consultation protocols, memoranda of agreement, and programmatic agreements is encouraged. Such agreements may be negotiated between Superintendents and organizations or governments and may be independent of or supplement this PA. For example, such agreements may be specific to a project, plan, or park activity, or may set forth specific consultation protocols between the park and a specific group, state, or local government. Superintendents will provide an informational copy of all agreements to the Regional Section 106 Coordinator and to the ACHP and appropriate SHPO/THPO in accordance with 36 CFR 800.2(c)(2)(ii)(E).

III. STREAMLINED REVIEW PROCESS

Where the Park Section 106 Coordinator determines the following criteria are met for a proposed undertaking, no further consultation is required unless otherwise specifically requested by the SHPO/THPO, Federally recognized Indian Tribe(s) or Native Hawaiian organization(s), or the ACHP.

A. Criteria for Using the Streamlined Review Process

All of the following criteria must be met in order to use the Streamlined Review Process:

1. The proposed undertaking must be an activity eligible for streamlined review, listed in Section III.C of this PA. These undertakings shall be known as "streamlined activities" for purposes of reference and replace the term "nationwide programmatic exclusions" set forth in the 1995 Programmatic Agreement between the NPS, the ACHP, and the NCSHPO; and

2. Identification and evaluation of all types of historic properties within the project area of potential effect (APE) must have been previously undertaken, sufficient to assess effects on those resources (with the exception of V.C (16)). Identification and evaluation of historic properties of religious and cultural significance to Indian tribes and Native Hawaiian organizations must be based upon consultation

with those entities. All properties within the APE must have previously been evaluated for eligibility to the National Register of Historic Places and the SHPO/THPO must have concurred with the eligibility determination. Inventory records should be periodically reviewed and updated, as necessary, to ensure data on historic properties, including condition information, is current, and any previous evaluations of significance remain accurate; and

3. The Section 106 Coordinator, in consultation with appropriate members of the CRM Team must have reviewed the project and certified that the effects of the proposed undertaking on historic properties on or eligible for the National Register will ***not be adverse*** based on criteria in 36 CFR 800.5, including consideration of direct, indirect, and cumulative effects. The Effect Finding must be "No Historic Properties Affected" or "No Adverse Effect".

B. Streamlined Review Process

1. *Evaluate Whether the Proposed Undertaking is Eligible for Streamlined Review:* The Park Section 106 Coordinator, in consultation with appropriate members of the CRM Team, determines whether the proposed undertaking is an activity listed as an undertaking eligible for streamlined review in Section III.C of this PA. If not, compliance for the undertaking must be accomplished through the Standard Review Process, outlined in Section IV of this PA.

2. *Identify the Undertaking's Area of Potential Effect (APE):* The Park Section 106 Coordinator, in consultation with members of the CRM Team with expertise in the appropriate discipline(s), determines the project's APE, taking into account direct, indirect, and cumulative effects.

3. *Identify Historic Properties within APE:* The Park Section 106 Coordinator, in consultation with members of the CRM Team with expertise in the appropriate discipline(s), identifies the location, number, and significance of historic properties within the APE. If properties are located within the APE that have not yet been documented or evaluated for eligibility for the National Register of Historic Places, or if the SHPO/THPO has not yet concurred with the eligibility determination, compliance for the undertaking must be accomplished through the Standard Review Process, outlined in Section IV of this PA.

4. *Evaluate Effect of Undertaking on Historic Properties in APE:* The Park Section 106 Coordinator, in consultation with members of the CRM Team with expertise in the appropriate discipline(s), evaluates the effect of the proposed undertaking and cumulative effects on historic properties, applying the Criteria of Adverse Effect set forth in 36 CFR 800.5(a)(1)

5. *Document Streamlined Review Process:* If, after following steps one through four (1-4) listed above, the Park Section 106 Coordinator determines no historic properties are within the APE, or the proposed undertaking would result in a

determination of "no historic properties affected" or "no adverse effect", no further consultation is required. The Park Section 106 Coordinator shall document the determination as follows:

a. The Streamlined Review process will be documented using the NPS "Assessment of Actions Having an Effect on Cultural Resources" form, or another appropriate format. Parks are encouraged to use Servicewide automated project planning and tracking systems, such as the NPS Planning, Environment and Public Comment (PEPC) system, to track and document Section 106 compliance activities.
b. Documentation will include the comments of each member of the CRM Team involved in the review process and the signature of the Superintendent. Electronic signatures are acceptable.
c. Documentation will be permanently retained by the Park Section 106 Coordinator for review by consulting parties and to facilitate the preparation of the Annual Report.
d. Annual Report: An annual report of all undertakings reviewed using the Streamlined Review process will be prepared by the Park Section 106 Coordinator, using existing and readily available data sources and reporting systems such as the NPS Planning, Environment and Public Comment (PEPC) system, for transmittal to the SHPO/THPO.

C. Undertakings Eligible for Streamlined Review

1. Preservation Maintenance and Repair of Historic Properties: The Streamlined Review Process is intended to be used for:

- Mitigation of wear and deterioration of a historic property to protect its condition without altering its historic character;
- Repairing when its condition warrants with the least degree of intervention including limited replacement in-kind;
- Replacing an entire feature in-kind when the level of deterioration or damage of materials precludes repair; and
- Stabilization to protect damaged materials or features from additional damage.

Use of the Streamlined Review Process is limited to actions for retaining and preserving, protecting and maintaining, and repairing and replacing in-kind, as necessary, materials and features, consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) and the accompanying guidelines.

Emergency stabilization, including limited replacement of irreparably damaged features or materials and temporary measures that prevent further loss of historic

material or that correct unsafe conditions until permanent repairs can be accomplished, may use the Streamlined Review Process. For archeological sites and cultural landscapes, the Streamlined Review Process may also be used for work to moderate, prevent, or arrest erosion.

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

The Streamlined Review Process may be used for routine repairs necessary to continue use of a historic property, but it is not intended to apply to situations where there is a change in use or where a series of individual projects cumulatively results in the complete rehabilitation or restoration of a historic property. If an approved treatment plan exists for a given historic property (such as a historic structure report, cultural landscape report, or preservation maintenance plan), the proposed undertaking needs to be in accordance with that plan. This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. Removal of non-historic debris from an abandoned building.
b. Cleaning and stabilizing of historic structures, features, fences, stone walls, plaques, and cannons using treatment methods that do not alter or cause damage to historic materials.
c. Repainting in the same color as existing, or in similar colors or historic colors based upon an approved historic structure report, cultural landscape report, or a historic paint color analysis.
d. Removal of non-historic, exotic species according to Integrated Pest Management principles when the species threatens cultural landscapes, archeological sites, or historic or prehistoric structures.
e. Energy improvements limited to insulation in the attic or basement, and installation of weather stripping and caulking.
f. In-kind repair and replacement of deteriorated pavement, including, but not limited to, asphalt, concrete, masonry unit pavers, brick, and stone on historic roads, paths, trails, parking areas, pullouts, etc.
g. Repair or limited in-kind replacement of rotting floorboards, roof material, or siding. Limited in-kind replacement refers to the replacement of only those elements of the feature that are too deteriorated to enable repair, consistent with the Standards.
h. In-kind replacement of existing gutters, broken or missing glass panes, retaining walls, and fences.

2. Rehabilitation and/or Minor Relocation of Existing Trails, Walks, Paths, and Sidewalks: The Streamlined Review Process may be used for undertakings proposed on existing non-historic trails, walks, paths, and/or sidewalks that are

located within previously disturbed areas and do not exceed the depth of the previous disturbance. The Streamlined Review Process may also be used for undertakings proposed on existing historic trails, walks, paths, and/or sidewalks, provided that the proposed undertaking is conducted in accordance with an approved treatment plan (such as a historic structure report, cultural landscape report, or preservation maintenance plan).

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. In-kind regrading, graveling, repaving, or other maintenance treatments of all existing trails, walks and paths within existing disturbed alignments.
b. Minor realignment of trails, walks, and paths where the ground is previously disturbed as determined by a qualified archeologist.
c. Changing the material or color of existing surfaces using materials that are recommended in an approved treatment plan or in keeping with the cultural landscape.
d. Construction of water bars following the recommendations of an approved treatment plan or in keeping with the cultural landscape.

3. Repair/Resurfacing/Removal of Existing, Roads, Trails, and Parking Areas:

The Streamlined Review Process may be used as follows:

a. Existing roads, trails, parking areas, and associated features that have been determined not eligible for the National Register in consultation with the SHPO/THPO, may be repaired or resurfaced in-kind or in similar materials as long as the extent of the project, including staging areas, is contained within the existing surfaced areas. The repair or resurfacing cannot exceed the area of the existing road surface and cannot exceed the depth of existing disturbance.
b. Existing roads, trails, parking areas, and associated features, that have been determined eligible for the National Register in consultation with the SHPO/THPO, may be repaired or resurfaced in-kind. The project, including staging areas, cannot exceed the area of the existing surface and cannot exceed the depth of existing disturbance.
c. Existing surfaced areas may be expanded or new surfaces constructed if the extent of new surfacing can be demonstrated to occur on land that has been disturbed by prior excavation or construction and has been shown not to contain buried historic properties. New or expanded surface may not be

an addition to, or continuation of, existing surfaces that are listed in or eligible for the National Register and all project activities, including staging areas, must be located in non-historic areas to be eligible for streamlined review.

d. Existing surfaced areas may be removed if the surfaced area is not a historic property, it is not located within a historic property and all project activities, including staging areas, will occur on land that has been disturbed by prior excavation or construction and has been shown not to contain buried historic properties.

4. Health and Safety Activities: The Streamlined Review Process may be used for health and safety activities that do not require the removal of original historic elements or alteration of the visual character of the property or area.

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. Sampling/testing historic fabric to determine hazardous content, e.g. lead paint, asbestos, radon.
b. Limited activities to mitigate health and safety problems that can be handled without removal of historic fabric, surface treatments, or features that are character-defining elements, or features within previously disturbed areas or areas inventoried and found not to contain historic properties.
c. Testing of soil and removal of soil adjacent to buried tanks, provided the project does not exceed the area of existing disturbance and does not exceed the depth of existing disturbance, as determined by a qualified archeologist.
d. Removal of oil or septic tanks within previously disturbed areas or areas inventoried and found not to contain historic properties.
e. Removal of HAZMAT materials within previously disturbed areas or areas inventoried and found not to contain historic properties.
f. Safety activities related to black powder regulations.
g. Replacement of septic tanks and systems in previously disturbed areas, or areas inventoried and found not to contain historic properties.
h. Common pesticide treatments.
i. Removal of both natural and anthropogenic surface debris following volcanic activity, tropical storms, hurricanes, tornados, or similar major weather events, provided removal methods do not include ground disturbance or otherwise cause damage to historic properties.

5. Routine Grounds Maintenance: The Streamlined Review Process may be used for routine grounds maintenance activities. If an approved treatment plan exists for a given historic property (such as a historic structure report, cultural landscape report, or preservation maintenance plan), the proposed undertaking needs to be in accordance with that plan.

   If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

   This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

   a. Grass replanting in same locations with approved species.
   b. Woodland and woodlot management (including tree trimming, hazard tree removal, thinning, routine removal of exotic species that are not a significant component of a cultural landscape, stump grinding).
   c. Maintaining existing vegetation on earthworks, trimming trees adjacent to roadways and other historic roads and trails.
   d. Routine maintenance of gardens and vegetation within cultural landscapes with no changes in layout or design.
   e. Routine grass maintenance of cemeteries and tombstones with no tools that will damage the surfaces of stones (i.e. weed whips).
   f. Trimming of major specimen trees needed for tree health or to address critical health/safety conditions.
   g. Routine roadside and trail maintenance and cleanup with no ground disturbance.
   h. Planting of non-invasive plant species in non-historic areas.
   i. Removal of dead and downed vegetation using equipment and methods that do not introduce ground disturbance.
   j. Replacement of dead, downed, overgrown, or hazard trees, shrubs, or other vegetation with specimens of the same species.
   k. Replacement of invasive or exotic landscape plantings with similar non-invasive plants.
   l. Routine lawn mowing, leaf removal, watering, and fertilizing.
   m. Routine orchard maintenance and pruning.

6. Battlefield Preservation and Management: The Streamlined Review Process *may be used only if* the park has approved planning documents (General Management Plan, cultural landscape report, treatment plan) that specify preservation and management protocols for the subject battlefield.

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

Consistent with that plan(s), activities include:

a. Maintenance and preservation work limited to retaining, protecting, repairing, and replacing in-kind materials and features that contribute to the National Register significance of the battlefield landscape.
b. Earthworks maintenance to prevent erosion and ensure preservation of existing profile, based on current and accepted practices identified in "Sustainable Military Earthworks Management" found on the NPS Cultural Landscape Currents website.
c. Removal of hazard trees with no ground disturbance and with use of stump grinding provided the grinding is limited to the diameter of the stump and a depth of no greater than 6 inches.
d. Repairing eroded or damaged sections of earthworks in-kind following archeological documentation and recordation in appropriate NPS inventory and management databases resulting in complete, accurate, and reliable records for those properties.
e. Maintaining a healthy and sustainable vegetative cover.

7. Hazardous Fuel and Fire Management: The Streamlined Review Process *may be used only if* the park has an approved fire management plan or forest management plan.

If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

Following completion of activities under this section, post-burn inspection and monitoring should be conducted by a qualified archeologist to ensure no archeological sites were impacted or previously unknown sites revealed.

Consistent with the approved fire management plan or forest management plan, this streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. Removal of dead and downed vegetation, outside of historic districts, cultural landscapes, and archeological sites, using equipment and methods that do not introduce ground disturbance beyond documented natural or historic disturbance.

b. Removal of dead and downed vegetation, as well as trees and brush located within historic properties, if the vegetation does not contribute to the significance of the historic property and equipment and methods are used that do not introduce ground disturbance beyond documented natural or historic disturbance.
c. Forest management practices, including thinning of tree stands, outside of historic districts, cultural landscapes, and archeological sites, using equipment and methods that do not introduce ground disturbance beyond documented natural or historic disturbance.
d. Restoration of existing fire line disturbances, such as hand lines, bulldozer lines, safety areas, helispots, and other operational areas.
e. Slope stabilization, to include reseeding with native seeds, replanting with native plants and/or grasses, placement of straw bales, wattles, and felling of dead trees when the root ball is left intact and in situ.

8. Installation of Environmental Monitoring Units: The Streamlined Review Process may be used for the placement of small-scale, temporary or permanent monitoring units, such as weather stations, termite bait stations, water quality, air quality, or wildlife stations, in previously disturbed areas, as determined by a qualified archeologist, or areas inventoried and found not to contain historic properties. Borings must be limited to pipes less than 2 inches in diameter and surface samples to less than 12 inches in size and minimal in number.

9. Maintenance or Replacement of Non-Historic Utility Lines, Transmission Lines, and Fences: If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. Maintenance or replacement of buried linear infrastructure in previously disturbed areas. The area of previous disturbance must be documented by a qualified archeologist and must coincide with the route of the infrastructure in its entirety.
b. Replacement of non-historic materials, provided the undertaking will not impact adjacent or nearby historic properties and is not located in a historic property, or visible from an above-ground historic property.
c. Maintenance or replacement of infrastructure, such as old water distribution systems, that has been determined to be not eligible for the National Register, in consultation with the SHPO/THPO.
d. Maintenance of above-ground infrastructure.

e. Replacement of above-ground infrastructure provided the undertaking is not located in a historic property or visible from an above-ground historic property.
f. Enhancement of a wireless telecommunications facility, including the updating of mechanical equipment, provided the activities do not involve excavation nor any increase to the size of the existing facility.

10. Erection of Signs, Wayside Exhibits, and Memorial Plaques: If an approved treatment plan exists for a given historic property (such as a historic structure report, cultural landscape report, or preservation maintenance plan), the proposed undertaking needs to be in accordance with that plan. If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

This streamlined activity includes the following undertakings, as well as others that are comparable in scope, scale, and impact:

a. Replacement of existing signage in the same location with similar style, scale and materials.
b. New signs that meet NPS standards, e.g. at entrance to the park or related to the park's interpretive mission, provided the sign is not physically attached to a historic building, structure, or object (including trees) and the sign is to be located in previously disturbed areas or areas inventoried and found not to contain historic properties.
c. Replacement of interpretive messages on existing signs, wayside exhibits, or memorial plaques.
d. Small developments such as paved pads, benches, and other features for universal access to signs, wayside exhibits, and memorial plaques in previously disturbed areas or areas inventoried and found not to contain historic properties.
e. Temporary signage for closures, repairs, detours, safety, hazards, etc. in previously disturbed areas or areas inventoried and found not to contain historic properties.
f. Memorial plaques placed within established zones that allow for such placement.

11. Culvert Replacement: The Streamlined Review Process may be used when culvert replacement will occur within existing cut and fill profiles, and:

a. The existing culvert and/or associated road, rail bed, or cultural landscape has been determined not eligible for the National Register, either individually or as a contributing element to a historic district or cultural landscape, in consultation with the SHPO/THPO; or

b. The existing culvert is less than 50 years old.

12. Reburial of Human Remains and Other Cultural Items Subject to the Native American Graves Protection and Repatriation Act (NAGPRA): The Streamlined Review Process may be used for the reburial of human remains and other cultural items subject to NAGPRA. The Streamlined Review Process may only be used when:

a. The reburial is in previously disturbed areas and does not introduce ground disturbance beyond documented disturbance; or
b. The reburial is in previously inventoried areas found to not contain historic properties.

Any reburial in NPS-administered areas must be in conformance with NPS policies on cemeteries and burials including cultural resource policies.

13. Meeting Accessibility Standards in Historic Structures and Cultural Landscapes: The Streamlined Review Process may only be used for the following undertakings intended to meet accessibility standards:

a. Reconstruction or repair of existing wheel chair ramps and sloped walkways provided the undertaking does not exceed the width or depth of the area of previous disturbance.
b. Upgrading restroom interiors in historic structures within existing room floor area to achieve accessibility, unless the historic features and/or fabric of the restroom contribute to the historic significance of the structure.

14. Mechanical, Electrical and Plumbing Systems: The Streamlined Review Process may be used as follows for activities related to mechanical, electrical, and plumbing systems. Such systems may include HVAC systems, fire detection and suppression systems, surveillance systems, and other required system upgrades to keep park lands and properties functional and protected.

a. Park areas, landscapes, buildings, and structures that have been determined not eligible for the National Register in consultation with the SHPO/THPO, may undergo installation of new systems or repair/ upgrading of existing systems in accordance with the Streamlined Review Process.
b. Properties that have been determined eligible for the National Register in consultation with the SHPO/THPO may undergo limited upgrading of mechanical, electrical, and plumbing systems. However, the Streamlined Review Process may not be used for the installation of new systems or complete replacement of these systems. If proposed activities include the removal of original historic elements or alter the visual character or the property's character-defining materials, features, and spaces, then the Streamlined Review Process may not be used.

c. If the project activities include ground disturbance, archeological monitoring may be appropriate throughout the ground disturbing activities, in accordance with any recommendation of the CRM Team. When monitoring is recommended, members of any appropriate Federally recognized Indian Tribes or Native Hawaiian organizations may be invited to participate in monitoring.

15. Acquisition of Lands for Park Purposes: The Streamlined Review Process may be used for the acquisition of land for park purposes, including additions to existing parks. The second criterion for use of the Streamlined Review Process (identification and evaluation of all types of historic properties within the project APE; see Section III.A.2) does not apply to this activity, provided the acquisition does not include any further treatment or alteration of properties, since access to land for inventory and evaluation prior to NPS acquisition may be limited. Any known or potential historic properties on the land acquired should be protected from demolition by neglect. Pursuant to 36 CFR 800.5(a)(2)(vi), demolition by neglect constitutes an adverse effect. If any undertakings are proposed in conjunction with the acquisition that have the potential to affect historic properties, the Streamlined Review Process may not be used.

16. Leasing of Historic Properties: The Streamlined Review Process may be used provided all treatment of historic properties proposed in relation to the leasing action is consistent with undertakings eligible for Streamlined Review, set forth in Section III.C of this PA. The Streamlined Review Process may not be used where there is a change of use or where a series of individual projects cumulatively results in the complete rehabilitation or restoration of a historic property.

D. Adding to List of Undertakings Eligible for Streamlined Review

Any proposed additions or revisions to the list of undertakings eligible for streamlined review must be developed through a region-, state- or park-specific Programmatic Agreement and pursuant to 36 CFR 800.14(b). The Regional Director or Superintendent, as appropriate, will develop such agreements with SHPOs/THPOs, in consultation with Federally recognized Indian Tribes and the ACHP or others, as appropriate. If such an agreement is developed by the Superintendent, s/he will notify the Regional Director. Regional Directors will report the development of supplemental, region-, state-, or park-specific programmatic agreements to the Director on an annual basis. The NPS FPO will maintain records on supplemental agreements and provide annual notification of any such agreements to all signatories to this agreement.

IV. STANDARD REVIEW PROCESS

All undertakings that do not qualify for streamlined review as described in Section III above, will be reviewed in accordance with 36 CFR Part 800. Superintendents are responsible for compliance with these regulations. Compliance may also be accomplished through park- and/or project-specific programmatic agreements. Specific activities required will be undertaken by the

Park Section 106 Coordinator, in consultation with appropriate members of the CRM Team. Parks are encouraged to use Servicewide automated project planning and tracking systems, such as the NPS Planning, Environment and Public Comment (PEPC) system, to track and document Section 106 compliance activities and to make such automated systems accessible to compliance partners, including SHPOs/THPOs, Federally recognized Indian Tribes, Native Hawaiian organizations, and/or the ACHP. If a park executes a MOA or PA with consulting parties to resolve adverse effects, the Superintendent will provide an informational copy of the agreement to the Regional Section 106 Coordinator.

V. NATIONAL HISTORIC LANDMARKS

The NHPA provides heightened protection for designated National Historic Landmarks (NHLs) through Section 110(f) and the NHPA's implementing regulations (36 CFR 800.10). Specifically, the NHPA requires that Federal agencies shall, to the maximum extent possible, undertake planning and actions necessary to minimize harm to any NHL that may be directly and adversely affected by an undertaking.

Where the other criteria as listed in Section III.A are met, proposed undertakings that may affect a designated NHL may follow the Streamlined Review Process. Where preliminary planning activities indicate that a proposed undertaking has the potential to have an adverse effect on an NHL, prior to initiating a formal consultation process, the Superintendent will initiate an internal review process in accordance with NPS Management Policies to determine alternatives to avoid or minimize the adverse effects and to assess the possibility of impairment.

VI. INADVERTENT DISCOVERIES

In the event that historic properties are inadvertently encountered during an undertaking for which review has been previously conducted and completed under Section III or Section IV of this PA, or through other events such as erosion or animal activity, the Superintendent will notify the SHPO/THPO, Federally Recognized Indian Tribe(s), and or Native Hawaiian organization, as appropriate, within 48 hours, or as soon as reasonably possible. The Superintendent in consultation with the Section 106 Coordinator and the appropriate members of the CRM Team, will make reasonable efforts to avoid, minimize, or mitigate adverse effects on those historic properties in consultation with the SHPO/THPO, Federally recognized Indian Tribe (s), and/or Native Hawaiian organization (s), as appropriate. If human remains or other cultural material that may fall under the provisions of NAGPRA are present, the Superintendent will comply with NAGPRA and ARPA. The Superintendent will ensure that any human remains are left in situ, are not exposed, and remain protected while compliance with NAGPRA, ARPA, or other applicable federal, state, and/or local laws and procedures is undertaken.

VII. EMERGENCY ACTIONS

Emergencies are those actions deemed necessary by the Superintendent as an essential and immediate response to a disaster or emergency declared by the President, a tribal government, or the Governor of a State, or another immediate threat to life or property. Emergency actions are only those actions required to resolve the emergency at that time and they are limited to undertakings that will be started within thirty (30) days after the emergency has been declared. Such emergency actions will be consistent with the NPS Environmental Safeguards Plan for All-Hazards Emergencies and any other approved servicewide emergency response plans. The Superintendent will notify the SHPO/THPO within 24 hours of the declared emergency or as soon as conditions permit.

VIII. REVIEW AND MONITORING OF PA IMPLEMENTATION

The purpose of the PA review and monitoring process is to ensure NPS protection of historic properties in its stewardship. This is accomplished through the review of undertakings that were completed during the reporting period, review of programmed undertakings, review of implementation of the PA, and review of completion of training requirements.

A. Superintendents Biennial Review and Monitoring Meeting

In order to foster cooperative relations, each Superintendent will, at a minimum, invite consulting parties to a review meeting every two years (biennial), with the first meeting initiated within six months of the signing of this PA by all parties. If all parties agree that such a meeting is not necessary at that time, the meeting may be waived. However, Superintendents shall remain responsible for initiating biennial meetings in subsequent years. More frequent meetings may be appropriate based on specific park circumstances and therefore an alternative meeting schedule may be established, if mutually agreed upon by the parties.

1. Meetings may be conducted in any mutually agreeable location and/or format, including in- person, video conferencing or teleconferencing.

2. The primary invitees to each park's biennial review and monitoring meeting will include the applicable SHPO/THPO, Federally recognized Indian Tribes, and Native Hawaiian organizations with an interest in that park's properties. Superintendents may also consider inviting other interested parties, including Pacific Islanders, concessioners, lessees, friends groups, historic societies, or gateway communities, as appropriate.

3. Superintendents may instead choose to meet individually with some parties, particularly those that have strong interest in specific historic properties.

4. Attendance and meeting minutes will be recorded and distributed to all invited parties after the conclusion of the meeting.

5. Specific discussion items may include the following:

   a. Any documentation pursuant to this PA.
   b. Any inventories of historic properties developed in the previous two years, or opportunities for future inventory and research, as well as other reports and research results related to historic properties.
   c. Programmed undertakings that are scheduled, or are likely to be scheduled, for the next two fiscal years.
   d. Provisions of this PA as well as any project- or program-specific Memoranda of Agreement or Programmatic Agreements.
   e. Training received by park staff during the reporting period and opportunities for cooperative training arrangements.
   f. Names of and contact information for the Park Section 106 Coordinator and the CRM Team Members.

B. Superintendents Reporting to NPS Regional Directors

In order to inform park program review and potential ACHP evaluation of PA implementation, Superintendents will report biennially to Regional Directors on implementation of the PA. The Biennial Report shall include the streamlined review data prescribed in Section III B of this PA, training completed and basic data demonstrating compliance with the provisions of this PA as outlined in the guidance document for this agreement (Section I.A.2). ACHP, SHPOs, or THPOs may request hard copies of biennial reports.

C. Park Section 106 Program Review by NPS Regional Directors, SHPOs, THPOs, and the ACHP

1. The Regional Director may, at his/her discretion, initiate a review of a park's implementation of this PA. The ACHP, either at its own discretion, or upon request of a Federally recognized Indian Tribe, SHPO/THPO, or Native Hawaiian organization, may at any time raise with the appropriate Regional Director any programmatic or project matters where they wish the Regional Director to review a Park Superintendent's Section106 decisions. The Regional Director will consult with the ACHP, and the Regional Director shall provide a written response to the ACHP, and where applicable, the SHPO or THPO, that documents the outcome of the consultation and the resolution. The Regional Director has the option to suspend a park's use of this PA, and subsequently reinstate it as appropriate.

2. Documentation of NPS Section106 reviews not already provided to SHPOs, THPOs, and the ACHP will be available for review by the ACHP and the appropriate SHPO/THPO upon request. Individual SHPOs/THPOs who wish to review this documentation are responsible for specifying scheduling, frequency, and types of undertakings of concern to them.

D. NPS Regional Directors Reporting to the Director of the NPS

Regional Directors will report biennially to the Director on implementation of this PA within his/her region. Each Regional Biennial Report will be submitted within six (6) months following receipt of Park Biennial Reports by the Regional Director as required in Section VIII.B of this PA. A hardcopy of the biennial reports will be sent to the ACHP and upon request from a SHPO or THPO.

IX. SUBSEQUENT AGREEMENTS

A. Upon execution of this PA, Superintendents are encouraged to evaluate their park's programs and discuss with SHPOs/THPOs, Federally recognized Indian Tribes, Native Hawaiian organizations, and/or the ACHP ways to develop supplemental programmatic agreements for park undertakings that would otherwise require numerous individual requests for comments.

B. Development of programmatic agreements specific to a project, plan, or park may be negotiated between Superintendents and SHPOs/THPOs, Federally recognized Indian Tribes, Native Hawaiian organizations, the ACHP, and/or other consulting parties where appropriate, pursuant to 36 CFR 800.14(b), and may be independent of or supplement this PA. Superintendents will provide an informational copy of all agreements to the Regional Section 106 Coordinator.

C. Memoranda of agreement developed to resolve adverse effects for specific projects shall be negotiated between Superintendents and SHPOs/THPOs, Federally recognized Indian Tribes, Native Hawaiian organizations, and/or the ACHP, pursuant to 36 CFR 800.6(c), and shall be independent of this PA Superintendents will provide an informational copy of all agreements to the Regional Section 106 Coordinator.

X. DISPUTE RESOLUTION

A. Should disputes arise, the Superintendent, SHPO/THPO, and/or the ACHP will consult with the objecting parties to resolve the objection. All work that is the subject of the dispute will stop until the dispute is resolved in accordance with the procedures in this section. If the dispute cannot be resolved, all documentation relevant to the dispute will be forwarded to the parties named above. If the SHPO/THPO objects to a Park Superintendent's decision, the information will be forwarded to the Regional Director. If the National Park Service objects to the SHPO/THPO's opinion, the information will be forwarded to the ACHP. If the Regional Director cannot resolve a SHPO/THPO objection, the Regional Director will forward to the ACHP relevant documentation not previously furnished to the ACHP and notify the Director of the dispute. Within thirty (30) days after receipt of all pertinent documentation, the ACHP will either:

1. Provide the Regional Director with a recommendation, with an information copy provided to the Director, which the Regional Director will take into account in reaching a final decision regarding the dispute; or

2. Notify the Regional Director that it will comment to the Director pursuant to the provisions of 36 CFR 800.7 and proceed to comment. Any ACHP comment provided in response to such a request will be taken into account by the NPS with reference to the subject of the dispute.

B. In the event the ACHP does not respond within thirty (30) days of receipt of all pertinent documentation, the Regional Director may proceed with his or her recommended resolution.

C. At the request of any individual, agency, or organization, the ACHP may provide the NPS with an advisory opinion regarding the substance of any finding, determination, or decision made in accordance with this PA or regarding the adequacy of the NPS' compliance with Section 106 and this PA.

XI. MONITORING AND TERMINATION

A. The NPS will convene a meeting of the signatories to this PA within two (2) years of execution of the PA and as needed thereafter, to review implementation of the terms of this PA and determine whether revisions or amendments are needed. Meetings may be conducted in any mutually agreeable location and/or format, including in-person, video conferencing, or teleconferencing. If revisions or amendments are needed, the parties will consult in accordance with 36 CFR 800.14.

B. This PA may be amended when such an amendment is agreed to in writing by all signatories. When major revisions are proposed to NPS policies that will affect the manner in which the NPS carries out its Section 106 responsibilities, the signatories shall consult to determine whether an amendment to this PA is needed. Any amendments will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

C. Any party to this PA may terminate it by providing ninety (90) days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Termination by any Federally recognized Indian Tribe signatory will be limited to termination of this PA on the tribal lands of the subject tribe. In the event of termination, the NPS will comply with 36 CFR Part 800 with regard to individual undertakings otherwise covered by this PA.

XII. SEVERABILITY

A. If any section, subsection, paragraph, sentence, clause, or phrase in this PA is, for any reason, held to be unconstitutional or invalid or ineffective, such decision shall not affect the validity or effectiveness of the remaining portions of this PA.

B. If any section, subsection, paragraph, sentence, clause, or phrase in this PA is, for any reason, held to be unconstitutional or invalid or ineffective, the signatories shall consult to determine whether an amendment to this PA is needed.

XIII. ANTI-DEFICIENCY ACT STATEMENT

The stipulations of this Agreement are subject to the provisions of the Anti-Deficiency Act (31 U.S.C. 1341 (1998). If compliance with the Anti-Deficiency Act alters or impairs NPS ability to implement the stipulations of this Agreement, NPS will consult in accordance with the dispute resolution, amendment or termination stipulations as specified in Sections X and XI of this PA.

ADVISORY COUNCIL ON HISTORIC PRESERVATION

BY: _____ DATE: 11/14/08
CHAIRMAN

NATIONAL PARK SERVICE

BY: Mary A. Bomar DATE: 11/14/08
DIRECTOR

NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS

BY: Jay D. Vogt DATE: 11-14-2008
PRESIDENT

Appendix E: Specific Amendments to the 1980 Yosemite General Management Plan Resulting from the *Tuolumne River Plan*

The Wild and Scenic Rivers Act requires river managing agencies to prepare comprehensive management plans for each Wild and Scenic river. The Act generally provides that river management plans "shall be coordinated with and may be incorporated into resource management planning for affected adjacent Federal lands" (16 USC 1274).

The Tuolumne Wild and Scenic River Comprehensive Management Plan (*Tuolumne River Plan*) will revise portions of the 1980 *General Management Plan* for Yosemite National Park. The *Tuolumne River Plan* provides management direction for the 54 miles of the Tuolumne Wild and Scenic River under the jurisdiction of the NPS. No development or park use of lands in the river corridor shall be permitted that is inconsistent with the Wild and Scenic Rivers Act designation of the Tuolumne River, with this plan, or with the *General Management Plan*.

Accordingly, the *Draft Tuolumne River Plan* would result in the following amendments to the *General Management Plan*.

- The *Tuolumne River Plan*'s river corridor boundaries, segment classifications, Outstandingly Remarkable Values, and corresponding management objectives revise the *General Management Plan* by establishing more detailed land-use prescriptions that must be applied in future site-specific planning.
- The *Tuolumne River Plan*'s Section 7 determination process (as called for in the Wild and Scenic Rivers Act) is a tool that augments the goals of the *General Management Plan*. The Section 7 process will establish specific guidelines for determining appropriate actions within the bed and banks of the Tuolumne River that do not constitute a direct and adverse effect on the river's free-flowing condition, water quality, or other values.
- The *Tuolumne River Plan*'s specific programs, including user capacity, ecological restoration, and ongoing monitoring revise and augment the previous broad direction provided in the *General Management Plan*.
- The *Tuolumne River Plan*'s management actions and site planning for Tuolumne Meadows would revise previous site planning actions proposed in the *General Management Plan*.

Management Goals

The *General Management Plan* sets forth the purposes of the park and the important resources and values that guide resource management, visitor use, and park operations (NPS 1980: 5-10). The *General Management Plan* establishes five broad goals for managing Yosemite National Park (NPS 1980: 1-4):

- Reclaim priceless natural beauty
- Allow natural processes to prevail
- Promote visitor understanding and enjoyment
- Markedly reduce traffic congestion
- Reduce crowding

The *Tuolumne River Plan* was developed to be in keeping with the five broad goals of the *General Management Plan,* however its overarching goals are also in keeping with the mandates of the Wild and Scenic Rivers Act. Specifically, the *Tuolumne River Plan* defines what the Wild and Scenic Rivers Act calls "outstandingly remarkable values" for the river. These are the unique, rare, and exemplary characteristics of the river that make it stand apart from all other river in the nation. These outstandingly remarkable values—along with water quality and the river's free-flowing condition—are central to the overarching purpose of wild and scenic river management: to protect and enhance these values while allowing public enjoyment, education, and recreation now and in the future. The *Tuolumne River Plan* augments the park's *General Management Plan* by articulating important river-related biological, cultural, and recreation values for the Tuolumne Wild and Scenic River corridor.

Management Objectives

The *General Management Plan* sets forth a number of Management Objectives that guide resource management, visitor use, and park operations (NPS 1980: 5-10). The *Tuolumne River Plan* amends the *General Management Plan* by providing additional detailed guidance to park managers on how to achieve management objectives for the Tuolumne River corridor.

Management elements in the *Tuolumne River Plan* include boundaries, classifications, a definition of outstandingly remarkable values, a Wild and Scenic Rivers Act Section 7 determination process, a user capacity program, an ecological restoration program, an ongoing monitoring program, and management actions needed to protect and enhance river values. Taken together, these elements further guide resource management, visitor use, and park operations within the Tuolumne River corridor.

For example, projects within the river corridor must protect and enhance outstandingly remarkable values and be consistent with the other elements of the *Tuolumne River Plan*. Projects adjacent to the river corridor must protect outstandingly remarkable values, and depending on location, may need to undergo a Section 7 review if they affect the bed or banks of the river.

As a result of the above, the following is to be inserted on page 5 of the 1980 *General Management Plan,* after the first paragraph under "Management Objectives:"

The management objectives for the Tuolumne River corridor focus on protecting and enhancing river values. These objectives, which are worded as conditions to be achieved and maintained over time, are as follows in table E-1.

Table E-1.
Management Objectives for Free Flow, Water Quality, and Outstandingly Remarkable Values

River Value	Management Objectives
Free-Flowing Character	All Segments Above O'Shaughnessy Dam, natural hydrologic processes are preserved and the river remains free of new unnatural impoundments. Below O'Shaughnessy Dam, science-based dam releases mimic to the extent feasible the variation of the seasonal hydrology in order to sustain the aquatic and riparian ecosystems upon which native wildlife species depend.
Water Quality	All Segments Water quality is exceptional. Management of visitor use may be intensive, if necessary, to maintain and protect the integrity of this value.
Biologic Value Subalpine riparian/meadow complex	Segments: Dana Fork (Scenic), Lyell Fork (Wild) , Tuolumne Meadows (Scenic) The subalpine riparian and meadow complex has high ecological integrity. Management of resources and visitor use may be intensive, if necessary, to restore and protect the integrity of this value. The subalpine riparian and meadow complex is sustained by natural hydrologic and biological processes to the extent feasible. The ecological restoration objectives for the meadows are to Protect, maintain, and restore natural hydrologic function of the Tuolumne River and tributaries. Protect, maintain, and restore the function, structure, diversity, and productivity of native riparian and meadow plant communities and wildlife habitat. (See Chapters 5, 7, and Appendix H)
Biologic Value Low-elevation riparian and wetland habitat	Segment: Poopenaut Valley (Wild) The ecological integrity of the riparian and wetland habitat in Poopenaut Valley is as high as possible considering its location below O'Shaughnessy Dam. Management of resources and visitor use may be intensive, if necessary, to restore and protect the integrity of the low-elevation riparian and wetland habitat.
Geologic Value Extensive example of stairstep river morphology	Segment: Grand Canyon (Wild) The character of the Tuolumne River through the Grand Canyon of the Tuolumne is shaped by the extensive stairstep morphology without human interference. Multiple cascades and waterfalls are sustained by natural processes.
Cultural Value Archeological landscape	All Segments Outstandingly remarkable archeological sites are protected at their current levels of integrity, with minimal additional human-caused disturbance. Management of resources and visitor use may be intensive, if necessary, to protect the integrity of this value.
Cultural Value Parsons Memorial Lodge	Segment: Tuolumne Meadows (Scenic) Parsons Memorial Lodge is preserved at its current level of integrity. Elements contributing to the Soda Springs Historic District are protected and restored if necessary to enhance visitor enjoyment and understanding. Historic views are maintained without disrupting the integrity of the natural ecosystem or other biological values or river processes.
Scenic Value Dramatic views and landscape features	Segments: Lyell Fork (Wild), Grand Canyon (Wild) In wild segments, the scenery of the Tuolumne River and the environment through which it flows is shaped by natural processes without human interference. Segments: Dana Fork (Scenic), Tuolumne Meadows (Scenic) In scenic segments (nonwilderness), scenery is shaped by natural processes. Identified vista points are enhanced in a manner that is protective of ecological conditions and archeological values at each viewpoint.
Recreational Value Wilderness-oriented recreation	Segments: Lyell Fork (Wild), Grand Canyon (Wild) Wilderness travelers along the Tuolumne River engage in a variety of activities in an iconic High Sierra landscape, where opportunities for primitive and unconfined recreation, self-reliance, and solitude shape the experience.
Recreational Value Access to high-elevation section of the Tuolumne River afforded by Tioga Road.	Segments: Dana Fork (Scenic), Tuolumne Meadows (Scenic) The quality of the visitor experience is protected by providing safe and efficient access, while protecting other river values from visitor use related impacts

Land Management Zoning

The 1980 *General Management Plan* divided the park into several zones based on management objectives, significance of the resources, and legislative constraints. The zoning plan described the land use policies that management would work to achieve over the life span of the plan.

Much of the Tuolumne River corridor exists within what are referred to as *natural zones (*including Wilderness Subzone, Environmental Protection Subzone, Outstanding Natural Feature subzone, Natural Environment Subzone, etc.). The *Tuolumne River Plan* establishes boundaries and classifications for the river in accordance with the Wild and Scenic Rivers Act. While no additional zoning was established as a management tool in this plan, the management guidance provided in this *Tuolumne River Plan* would remain consistent with the guidance established in these zones.

Policies and Programs

The 1980 *General Management Plan* established a visitor carrying capacity that was based on the capacity of facilities and infrastructure in the park at that time (NPS 1980: 15-19). The plan recommended changes to the kinds and levels of development to fulfill and support the plan's objectives.

Understanding of visitor uses and capacities has expanded and changed since the *General Management Plan* was published; similarly, the Wild and Scenic Rivers system has also expanded to include the Tuolumne (and Merced) Rivers in Yosemite. Subsequent litigation on the Merced Wild and Scenic River Comprehensive Management Plan has resulted in additional directives regarding the establishment of "specific numerical limits" as part of the Wild and Scenic Rivers Act mandate to address user capacity.

For these reasons, the visitor use limits and rationale proposed in the 1980 *General Management Plan* have been revised. The *Tuolumne River Plan* proposes a user capacity program that establishes the kinds and amounts of visitor use that can be permitted while protecting and enhancing river values in the Tuolumne River corridor, including a maximum number of people. The *Tuolumne River Plan* also establishes a program of indicators and standards to assess the condition of river values over time.

This new user capacity program will guide each new planning effort undertaken in the Tuolumne River corridor and will therefore amend the *General Management Plan* for areas within the Tuolumne corridor as regards user capacity. The following specific sections are added to page 15 of the 1980 *General Management Plan:*

- The first paragraph under "Park Policies and Programs" shall have this addition:

  Parkwide policies and programs with respect to visitor use, Indian cultural programs, park operations and visitor protection described in this section have been amended by the Tuolumne River Plan *for all areas within the Tuolumne River corridor.*

- The first paragraph under "Visitor Use" shall have this addition:

  The sections below that address appropriate activities, visitor use levels, visitor facilities and services, overnight accommodations, concessions, regional cooperation, transportation, interpretation, and provisions for special populations will be guided by the management elements of the Tuolumne River Plan. *Visitor use levels and activities are further guided by, and must comply with, the management elements of the* Tuolumne River Plan. *In the event of a conflict between Parkwide Policies and Programs in the* General Management Plan *and specific elements of the* Tuolumne River Plan, *the* Tuolumne River Plan *will control.*

- The first paragraph under "Visitor Use Levels" shall have this addition:

  The section below that addresses visitor use levels, visitor facilities and services, overnight accommodations, and transportation for the Tuolumne River corridor in Tuolumne Meadows is amended by the Tuolumne River Plan. *Specifically,* General Management Plan *visitor use levels for the Meadows are no longer in effect. These visitor use levels are superseded by the user capacity management program in the* Tuolumne River Plan.

In addition, this sentence on page 24 shall be struck from the *General Management Plan*: "A new field office will be developed at Tuolumne Meadows."

Developed Area Plans

The *General Management Plan* contained a Developed Area Plan for the Tuolumne Meadows area, within the Tuolumne River corridor (NPS 1980: 62-65). Future plans for the Tuolumne Meadows area must comply with the management elements of the *Tuolumne River Plan* (boundaries, classifications, Outstandingly Remarkable Values and their protection, Section 7 determination process, user capacity program, restoration program, monitoring program, and management actions). Therefore, the development concepts presented in the *General Management Plan* (pages 62-65) have been amended by the *Tuolumne River Plan*.

The *Tuolumne River Plan* will provide guidance for any future development or redevelopment activities within the Tuolumne River corridor, including the development concepts as described in the 1980 *General Management Plan.* While many of the *General Management Plan's* site planning goals for Tuolumne Meadows are compatible with those established in the *Tuolumne River Plan*, the river plan's range of site planning alternatives has been established for Tuolumne Meadows with particular focus on the protection of river values. To the extent that any development concept presented in the *General Management Plan* would not comply with the elements of the *Tuolumne River Plan*, that development concept is superseded by the *Tuolumne River Plan*. Therefore, the specific actions called for in the Tuolumne Meadows section of the *General Management* Plan are replaced by those management actions called for in the *Tuolumne River Plan*, which has ensured that all actions protect and enhance river values. Actions adjacent to the river corridor but outside of the river boundary must also protect the Tuolumne River's established Outstandingly Remarkable Values.

For this reason, the following paragraph is to be inserted on page 63 of the *General Management Plan*, after the first paragraph under the subheading "Tuolumne Meadows:"

> *Future plans for the Tuolumne Meadows area must comply with the management elements of the* Tuolumne River Plan *(river boundaries, river classifications, Outstandingly Remarkable Values, Section 7 determination process, user capacity management program, ecological restoration program, monitoring program, and management actions). To the extent that any development concepts presented in the* General Management Plan *do not comply with the elements of the* Tuolumne River Plan*, that development concept would be superseded by the* Tuolumne River Plan. *Actions adjacent to the river corridor but outside of the river boundary must also protect the Tuolumne River's established Outstandingly Remarkable Values.*

Backcountry

The Tuolumne Wild and Scenic River and Yosemite Wilderness were both established in 1984, four years after the publication of the park's *General Management Plan*. Although the area was not designated as wilderness at the time, backcountry management objectives were established, along with zones, capacities, and visitor use management strategies.

The *Tuolumne River Plan* would continue to manage the wild segments of the river in accordance with provisions of the Wilderness Act and overarching goals for backcountry management as articulated in the *General Management Plan*. An upcoming Wilderness Stewardship Plan will provide further guidance on wilderness activities in the river corridor.

The *Tuolumne River Plan* would revise and augment management of commercial stock use in upper Lyell Canyon through the establishment of a determination of extent necessary process for commercial use in wilderness (appendix C), grazing capacities (counted in use nights), designated commercial stock camps and approach routes, and a methodology for opening dates.

Appendix F:
Revisions to Outstandingly Remarkable Value Statements, 1984-2012

Outstandingly remarkable values were first considered for the Tuolumne River as part of the development of the 1979 *Tuolumne Wild and Scenic River Study Final Environmental Impact Statement and Study Report* (Tuolumne Final Study). That report, prepared cooperatively by the National Park Service and the U.S. Forest Service, established the eligibility of the Tuolumne River for inclusion in the National Wild and Scenic Rivers System. The Tuolumne was designated a wild and scenic river in 1984 based in part on the statements of outstandingly remarkable values included in the Tuolumne Final Study.

Since the completion of the Tuolumne Final Study, the Interagency Wild and Scenic Rivers Coordinating Council (Interagency Council) has issued guidance for identifying and defining a river's outstandingly remarkable values. As part of the comprehensive planning for the river, the National Park Service has followed the Interagency Council's guidance and used the most current scientific and scholarly information available to reevaluate the statements of Tuolumne River outstandingly remarkable values.

Draft outstandingly remarkable value (ORV) statements presented in the 2006 "Tuolumne Wild and Scenic River Outstandingly Remarkable Values Draft Report," and the initial revisions of those statements included in the 2007 Tuolumne Planning Workbook, were based on relatively broad, inclusive interpretations of the criteria that an outstandingly remarkable value must be river related and rare, unique, or exemplary. As the planning for the Tuolumne River progressed, the planning team concluded that the statements were too broad to guide the management decisions that needed to be made, to guide long-term monitoring, and ultimately to ensure that planned management would be effective in protecting and enhancing river values. The Interagency Council confirmed the need to reassess the initial statements using a stricter interpretation of the outstandingly remarkable value criteria. Based on that guidance, the Tuolumne planning team revised the statements to describe a set of specific, generally mappable and measurable, outstandingly remarkable values that met stricter interpretations of being river related and unique, rare, or exemplary. The specific differences in the two sets of statements are shown below in table F-1.

Table F-1.
Revision History of Outstandingly Remarkable Value (ORV) Statements 2007-2012

Draft Outstandingly Remarkable Value (ORV) Statement from the 2007 Tuolumne Planning Workbook	Revised ORV Statement(s) in the Draft Tuolumne River Plan	Reason for Change
ECOSYSTEM ORVS	*BIOLOGICAL ORVS*	
Exemplary Ecosystems Providing Habitat for a Remarkable Diversity of Species The following biological resources contribute to this value:	None	Statement was too broad and too inclusive to be useful in guiding river management.
▪ Alpine (above 10,500 feet) habitat along the Lyell and Dana Forks, characterized by relatively high plant diversity, is important for numerous plant and animal species, including migratory bird populations and special status plant, amphibian, and small mammal species.	None	Under a tighter interpretation of the ORV criteria, alpine habitat was not considered river related or rare, unique, or exemplary.
▪ Mineral springs habitat for localized populations of special status plant species occurs in Lyell Canyon and Tuolumne Meadows.	None	Under a tighter interpretation of the ORV criteria, rare mineral spring habitat was not considered river related or dependent.
▪ The *subalpine* (8,000 to 10,500 feet) meadow systems at Tuolumne Meadows, Dana Meadows, and the meadows along the Lyell Fork sustain an exceptional diversity of river-related habitat types for plant and animal species, including migratory bird populations and special status plant, amphibian, and bat species.	None	Subalpine meadows were redundant in the earlier ORV statements (see below).
▪ Intact river-dependent habitat types, such as pools, riffles, and steep cliffs, between Tuolumne Meadows and Hetch Hetchy Reservoir support a diverse assemblage of species, including special status bird and bat species.	None	Under a tighter interpretation of the ORV criteria the plants and animal communities in the canyon were not considered unique, rare, or exemplary.
▪ Largely intact low-elevation (below 4,000 feet) riparian and meadow communities provide habitat for an exceptionally diverse assemblage of bird species and several special status bat species at Poopenaut Valley, one of the few undeveloped low-elevation meadow/wetland complexes in the region.	**Poopenaut Valley contains a type of low-elevation riparian and wetland habitat that is rarely found in the Sierra.**	The previous description emphasized the bird diversity. It is instead the wetland habitat that is unusual and most directly linked to the river.
Some of the Most Extensive Subalpine Meadow and Riparian Complexes in the Sierra Nevada	**In Tuolumne Meadows, Dana Meadows, and along the Lyell Fork, the Tuolumne River sustains one of the most extensive Sierra complexes of subalpine meadows and riparian habitats with relatively high biological integrity.**	The revised description places more emphasis on the attributes of the meadows that make them an ORV: their relatively high biological integrity and size.
GEOLOGIC ORV		
Exceptionally Well-Preserved Evidence of Glacial Processes The following geologic resources contribute to this value:	None	Statement was too broad and too inclusive to be useful in guiding river management.
▪ The Tuolumne River corridor represents one of the most extensive examples of stairstep river morphology in the Sierra Nevada.	**Between Tuolumne Meadows and Pate Valley, the Tuolumne River demonstrates classic stairstep river morphology, repeatedly transitioning from calm stretches to spectacular cascades.**	Description was rewritten to emphasize those components most integral to this ORV.

Draft Outstandingly Remarkable Value (ORV) Statement from the 2007 Tuolumne Planning Workbook	Revised ORV Statement(s) in the Draft Tuolumne River Plan	Reason for Change
GEOLOGIC ORV, CONTINUED		
▪ The geomorphology of Lyell Canyon provides a textbook example of a meandering river through a glaciated U-shaped valley.	None	Under a tighter interpretation of the ORV criteria the glacial topography was not considered to be unique, rare, or exemplary.
▪ Unusual glacial kettle ponds are located along the Dana Fork.	None	Under a tighter interpretation of the ORV criteria the glacial topography was not considered to be river related.
▪ Dramatic evidence of glaciation along the Dana Fork, Tuolumne Meadows, and the Grand Canyon of the Tuolumne includes glacial erratics, moraines, roches moutonnées, striations, hanging valleys, and some of the best examples of glacial polish in the United States.	None	Under a tighter interpretation of the ORV criteria the glacial topography was not considered to be river related.
▪ Poopenaut Valley contains some of the lowest elevation evidence of glaciation found anywhere in the western Sierra Nevada.	None	Under a tighter interpretation of the ORV criteria the glacial topography was not considered to be river related.
HYDROLOGIC ORVS		
Exceptional Water Quality	None	As addressed by the Wild and Scenic Rivers Act, water quality is a river value that is independent of the ORV criteria and should be addressed separately.
Exemplary Diversity of Hydrologic Features The following hydrologic resources contribute to this value:	None	As addressed by the Wild and Scenic Rivers Act, hydrologic processes, principally the fact that the river is free-flowing, is a river value that is independent of the ORV criteria and should be addressed separately.
▪ One of the most extensive examples of stairstep river morphology in the Sierra Nevada creates a series of spectacular cascades and waterfalls between Tuolumne Meadows and Hetch Hetchy Reservoir.	None	Stairstep morphology was redundant in the earlier ORV statements (see above).
▪ A classic and well-known example of an alkaline spring occurs at Soda Springs.	None	Under a tighter interpretation of the ORV criteria, rare mineral spring habitat was not considered river related or dependent.
PREHISTORIC AND AMERICAN INDIAN CULTURAL ORVS	CULTURAL ORV	
Regionally Significant Archeological Evidence of Prehistoric Travel, Trade, Land Use, and Settlement The following archeological sites, eligible for listing on the National Register of Historic Places, contribute to this value:	**The rich archeological landscape along the Tuolumne River reflects thousands of years of travel, settlement, and trade.**	Description was rewritten to be inclusive of all elements related to this ORV.
▪ The oldest known sites in the river corridor, which are found along the Dana Fork, provide evidence of continuous human use and possible environmental change in the region over millennia.	See above	The value of archeological sites throughout the river corridor was combined into a single ORV statement (see above).
▪ Tuolumne Meadows and the Grand Canyon of the Tuolumne are flanked by concentrations of prehistoric archeological sites with excellent integrity and data ORVs. The remote canyon sites retain a level of integrity that is uncommon in the region.	See above	The value of archeological sites throughout the river corridor was combined into a single ORV statement (see above).

Draft Outstandingly Remarkable Value (ORV) Statement from the 2007 Tuolumne Planning Workbook	Revised ORV Statement(s) in the Draft Tuolumne River Plan	Reason for Change
PREHISTORIC AND AMERICAN INDIAN CULTURAL ORVS	CULTURAL ORV	
▪ Prehistoric archeological sites in the low-elevation flats represent possible year-round use by groups of American Indian people.	See above	The value of archeological sites throughout the river corridor was combined into a single ORV statement (see above).
HISTORIC ORV	CULTURAL ORV	
Nationally or Regionally Significant Evidence of Historic Trade, Travel, Recreation, and Early Conservation Activism The following historic resources contribute to this value:	None	Statement was too broad and too inclusive to be useful in guiding river management.
▪ Historic sites along the Lyell and Dana Forks attest to their status as regionally important trade and travel routes between the eastern and western Sierra.	None	Under a tighter interpretation of the ORV criteria these sites were not considered to be river related or unique, rare, or exemplary.
▪ Historic sites at the Soda Springs Historic District in Tuolumne Meadows commemorate the significance of this area as a place inspiring conservation activism on a national scale. Parsons Memorial Lodge is a national historic landmark.	**Parsons Memorial Lodge, a national historic landmark sited near the Tuolumne River, commemorates the significance of this free-flowing segment of the river in inspiring conservation activism and protection of the natural world on a national scale.**	The revised description places more emphasis on Parsons Memorial Lodge, which best fits the unique, rare, or exemplary criterion, of all the Tuolumne Meadows historic sites.
▪ Rustic accommodations at Tuolumne Meadows and Glen Aulin represent the development of a nationally distinctive kind of high-country touring.	None	Under a tighter interpretation of the ORV criteria rustic accommodations were not considered to be river related or unique, rare, or exemplary.
TRADITIONAL CULTURAL ORV		
Resources Important for Maintaining the Cultural and Religious Traditions of American Indian People	See above	The archeological value and traditional cultural value of sites were determined to be so closely related, that they were combined into the single ORV statement above.
SCENIC ORV		
Magnificent Scenery with a Character Unique to the Tuolumne River Corridor The following scenic resources contribute to this value:	None	Statement was too broad and too inclusive to be useful in guiding river management.
▪ The largest glacier on the western flank of the Sierra Nevada is part of the spectacular high-country views from the Lyell Fork.	**Lyell Canyon offers remarkable and varied views of lush meadows, a meandering river, a U-shaped glacially carved canyon, and surrounding peaks.**	Description was rewritten to emphasize those components most integral to this ORV.
▪ Breathtaking views along the Lyell Fork, Dana Fork, and Tuolumne Meadows encompass the meandering river, adjacent meadows, glacially carved domes, and rugged mountain peaks.	**Dana and Tuolumne Meadows offer dramatic views of a meandering river, adjacent meadows, glacially carved domes, and the Sierra Crest.**	Description was rewritten to emphasize those components most integral to this ORV.
▪ The low-relief topography at Tuolumne Meadows and Dana Meadows allows for magnificent skyward views, including some of the best views of dark night skies in the Sierra Nevada.	None	Under a tighter interpretation of the ORV criteria, dark night skies were not considered to be river related.
▪ Views within the Grand Canyon of the Tuolumne include steep canyon walls, hanging valleys, and dramatic cascades of falling water.	**The Grand Canyon of the Tuolumne offers views of a deep, rugged canyon with vast escarpments of granite, hanging valleys, and tall cascades of falling water.**	Description was rewritten to emphasize those components most integral to this ORV.

Draft Outstandingly Remarkable Value (ORV) Statement from the 2007 Tuolumne Planning Workbook	Revised ORV Statement(s) in the Draft Tuolumne River Plan	Reason for Change
SCENIC ORV, CONTINUED		
▪ The stretch of river below Hetch Hetchy Reservoir offers stunning views of verdant meadows, a glacially carved bedrock valley, large river pools, dramatic canyon walls, and a constricted slot canyon.	None	Under a tighter interpretation of the ORV criteria these views were not considered to be unique, rare, or exemplary.
RECREATIONAL ORV		
Outstanding Opportunities for Experiences Characterized by Primitive, Unconfined Recreation The following recreational resources and opportunities contribute to this value:	**Wilderness travelers along the Tuolumne River engage in a variety of activities in an iconic High Sierra landscape, where opportunities for primitive and unconfined recreation, self-reliance, and solitude shape the experience.**	The recreational ORV was rewritten to express the recreational value of the wilderness river setting rather than specific kinds of activities, which would not necessarily be river-related or unique, rare, or exemplary.
▪ The Pacific Crest Trail, which follows the Lyell Fork and the Tuolumne River through Tuolumne Meadows, offers opportunities to travel one of the country's eleven national scenic trails.	None	See above.
▪ The Grand Canyon of the Tuolumne offers exceptional opportunities for backcountry excursions through a deep, rugged, and seldom-traveled gorge.	None	See above.
▪ The recreational opportunities below Hetch Hetchy Reservoir are unusual due to the relative rarity of low-elevation designated wilderness elsewhere in the Sierra Nevada.	None	See above.
Outstanding High-Elevation Recreational and Educational Opportunities that Are Accessible to People of Various Ages and Abilities The following recreational resources and opportunities contribute to this value:	**The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.**	The recreational ORV was rewritten to express the recreational value of the front-country river setting rather than specific kinds of activities, which would not necessarily be river-related or unique, rare, or exemplary.
▪ A wide range of recreational opportunities attract people of various ages and abilities to Tuolumne Meadows, where many individuals, families, and groups establish traditional ties with the area. The National Park Service and other organizations focus on the river and adjacent meadows as a centerpiece of nature interpretation and education in the Sierra Nevada.	None	See above.
▪ The rustic high-country lodging available at the Tuolumne Meadows Lodge and the Glen Aulin High Sierra Camp is associated with the development of a nationally distinctive High Sierra recreational opportunity.	None	See above.

Draft Outstandingly Remarkable Value (ORV) Statement from the 2007 Tuolumne Planning Workbook	Revised ORV Statement(s) in the Draft Tuolumne River Plan	Reason for Change
SCIENTIFIC ORVS		
Invaluable Opportunities to Examine Natural, Cultural, and Sociological Resources with High Research Value The following resource conditions contribute to this value:	None	The category of 'scientific' ORVs was determined to be redundant with the other categories, such as the biologic and geologic ORVs. Although the specific term *scientific features* is used in section 10(a) of the Wild and Scenic Rivers Act (in the context of giving primary emphasis to protecting "aesthetic, scenic, historic, archaeologic, and scientific features," this category is not included in the ORV-related eligibility criteria developed by the Interagency Wild and Scenic Rivers Coordinating Council.
▪ Relatively intact Sierran river ecosystems provide crucial baseline data and basic information on how components of natural and social systems interact and respond to perturbation (e.g., climate change).	None	See above.
▪ The entire river corridor is either in or surrounded by designated wilderness, which is critical to protecting the integrity and maintaining the scientific value of these resources.	None	See above.
▪ Some of the best evidence of glacial processes in the Sierra Nevada occurs along the river corridor.	None	See above.
▪ Well-preserved prehistoric and historic archeological resources within the river corridor provide outstanding opportunities to research trade, travel, subsistence, and technological change that occurred over thousands of years.	None	See above.
▪ Previous and ongoing human interaction with and visitation to the Tuolumne River and its environs provides outstanding opportunities for social science inquiry.	None	See above.

Appendix G:
Characterizing Visitor Use of the Tuolumne Wild and Scenic River

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Introduction

The Tuolumne River passes through the northern, high-country portion of Yosemite National Park. Its setting is shaped by tall peaks, granite domes and meadows (Figure 1). The primary means of access to the river are by vehicle via the Tioga Road and on foot or horseback from other parts of the park and its surrounding backcountry areas. Visitor activities associated with the Tuolumne tend toward the wilderness end of the recreation opportunity spectrum with only some amenities provided in the Tuolumne Meadows area of the corridor. The following is a summary of visitors and their use of the Tuolumne River.

Figure 1. Backpacker in Tuolumne Meadows (NPS Photo)

Visitor Demographics

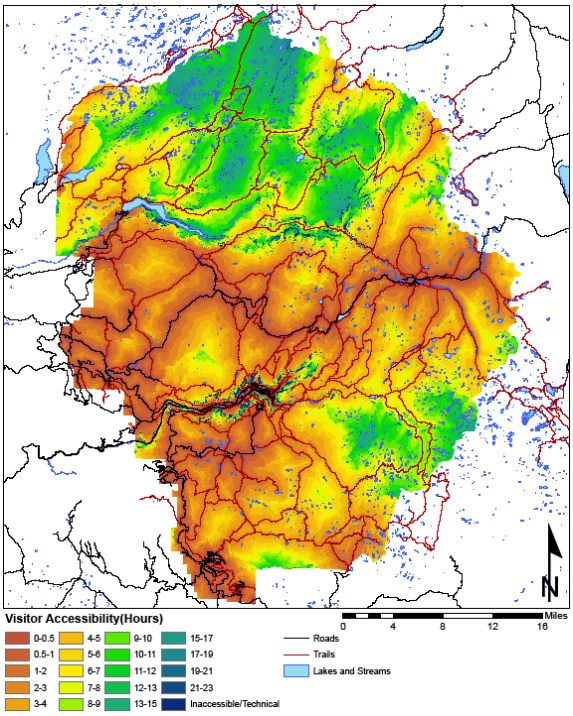
A park-wide, comprehensive study of visitor use in Yosemite was conducted in the summer of 2005 (Littlejohn, et al. 2005). This study provided a variety of visitor-related information including demographic and use characteristics. Data from this study were cut to draw a comparison between Tuolumne area visitors and overall park visitors. A summary of Tuolumne area visitor demographic and use characteristics is shown below (Table 1).

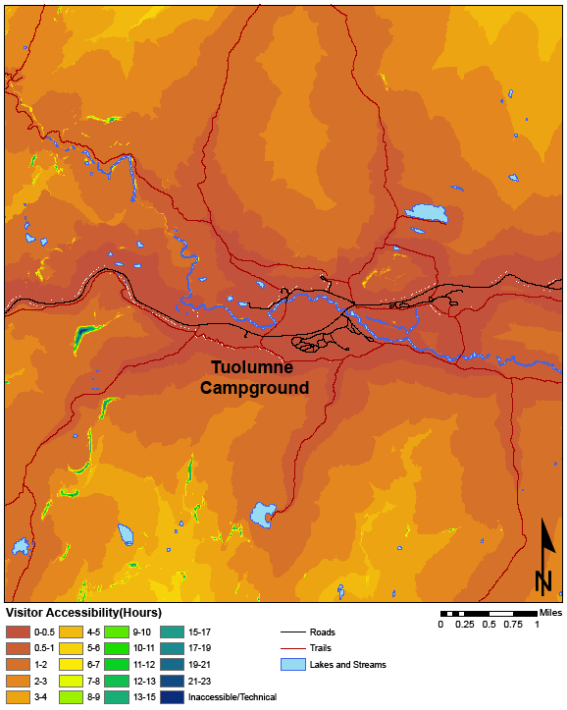
Table 1. Visitor Demographic and Use Characteristics
Gender = 51.5% Male and 48.4% Female
Average age = 32.8 years
Average group size = 3.4 (statistically significant from overall park users at 5.2)
First-time visitors = 51.7%
Average Length of Stay = 7.2 hours
Average Length of Stay in Days = 3.7 days

Visitor Access and Use Patterns

The Tioga Road provides direct visitor access by vehicle to the Tuolumne River corridor. Visitors can view the headwaters of the Tuolumne along the Dana and Lyell Forks easily from their vehicles as they pass along the road. For much of this route federally designated Wilderness lay a mere 200 feet from the centerline of the road. This ease of access to a remote, wilderness area is somewhat unique for the Sierra Nevada and shapes the character of visitor use to the area.

To further understand visitor access and resulting use patterns a model was developed using Geographic Information System (GIS) technology (Pettebone et. al 2007). In this model, visitor use intensity was depicted based on ease of visitor access (Figures 2a and 2b). Accordingly, those areas closest to roads, trails and other access points portray shorter travel times, and by extension suggest areas of potentially higher use intensity. While the model has not been validated with field data, professional experience and judgment indicate that use intensity follows a general pattern as indicated in Figure 2a, suggesting that Tuolumne Meadows is the location of the majority of visitor activities within the Tuolumne River corridor. Further, the model suggests that the majority of day use of Wilderness might extend approximately 4-hours travel time from trailhead areas, given time to return to the trailhead within the same day (Figure 2b). This information is useful in understanding the reaches of visitor day use in Wilderness. All other Wilderness use is overnight and is controlled by a permit system or special use authorization.





Figures 2a and 2b. Maps of Visitor Access and Use Intensity Based on-foot Travel Time

Visitor Activities

Visitors engage in a variety of activities throughout the Tuolumne River corridor. The 2005 study asked visitors which activities they participated in while visiting the park and which of these was their primary activity. Again, this data was split out for Tuolumne area visitors specifically and results are shown below. Visitors participated in a wide variety of activities with sightseeing, visiting the visitor center, leisure pursuits such as painting, drawing, and photography, and day hiking being the most common. Of these, sightseeing and day hiking were the most often reported primary activities participated in for Tuolumne area visitors.

Visitor activities specific to the Tuolumne Wild and Scenic River can be categorized as direct and indirect river recreation. The Secretarial Guidelines pertaining to Wild and Scenic Rivers further characterizes this distinction for designated rivers as primary and secondary contact recreation (DOI 1999). **Primary contact recreation** are those activities in which there is prolonged and intimate contact with the water, (e.g., swimming, water skiing, surfing, kayaking, "tubing," and wading or dabbling by children). **Secondary contact recreation** involves activities in which contact with the water is either incidental or accidental, (e.g., boating, fishing and limiting contact with water incident to shoreline activities). It is important to note that both primary and secondary contact recreational activities take place in the Tuolumne River corridor. Primary contact recreation activities include swimming and fishing. Secondary contact recreation activities are more common and numerous, including a variety of activities as shown below (Tables 2a and 2b).

Table 2a. Summer Activities	%
Sightsee/take a scenic drive	91.9
Visit visitor center	58.9
Paint/draw/take photographs	54.1
Day hike	51.6
View wildlife/bird watching	44.7
View roadside/trailside exhibits	44.3
Shop in park (other than park bookstore)	44.3
Eat in park restaurant	43.5
Picnic	37.8
Shop in park bookstore	33.3
Visit museum	26.4
Camp in developed campground	16.3
Other	14.6
Stay in park lodging	12.6
Attend ranger-led programs	8.9
Climbing	7.3
Overnight backpack	4.5

Table 2b. Primary Summer Activities	%
Sightsee/take a scenic drive	60.0
Day hike	18.7
Paint/draw/take photograph	4.4
Camp in developed campground	4.0
Other (not match with above answer)	4.0
Overnight backpacking	3.6
View wildlife/bird watching	1.8
Climbing	1.3
Other	0.9
View roadside/trailside exhibits	0.4
Attend ranger-led program	0.4
Picnic	0.4

Visitor Use Levels

The following section outlines the methods and assumptions used to estimate current visitor use levels for the Tuolumne River corridor in Yosemite National Park. Multiple estimates were generated each containing a specified set of assumptions, calculations, and corresponding results. Estimates range in scale from daily (per day) to people-at-one-time (PAOT).

Vehicle-based Use Estimates

Yosemite National Park is more than 700,000 acres in size and includes several dispersed sub-districts each containing notable attraction sites. These areas include Yosemite Valley, Wawona, Tuolumne Meadows, Mather, Glacier Point and Hetch Hetchy (Figure 3). More than 95% of the park is designated wilderness. Due to its size and remote landscape, estimating visitor use levels can be challenging.

Nevertheless, vehicle based estimates represent an efficient and effective method for documenting visitor use levels. Two facts are integral to conducting such estimates: 1) the primary means of access to the park is by automobile, and 2) the vast majority of visitors to the park arrive in personal vehicles (Gramman 1992; ORCA 1999; Littlejohn et al. 2005, Le et al. 2008).

Inductive traffic counters are in place at each of Yosemite's five entrance stations including Big Oak Flat, South Entrance, Arch Rock, Tioga Pass, and Hetch Hetchy (Figure 3). These counters have been in place for many years providing the park with estimates of park-wide visitor use levels. Data from these counters are managed by the National Park Service's public statistics office (www.nature.nps.gov/stats). A report is generated from this office each month detailing the park's visitation by entrance station, by month, and by year accumulations. Both recreational and non-recreational visits are estimated. **Estimates included in this document pertain to recreational visits only.**

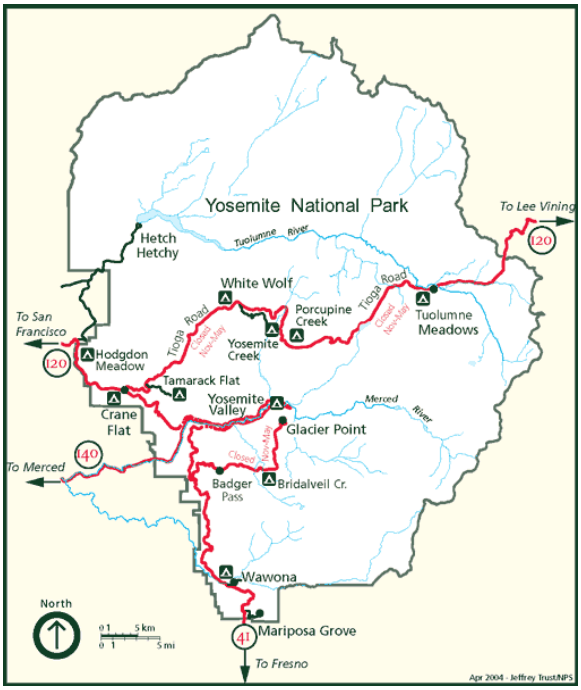


Figure 3. Map of Major Travel Routes in Yosemite National Park

As mentioned above, Tuolumne Meadows and the majority of the Tuolumne River are accessible via Tioga Road/Highway 120. This is a seasonal highway and is closed during winter months. Typically the road is open from approximately May to November representing an average summer season of 174 days per year. Very little backcountry use occurs in the Tuolumne area during the winter. **Estimates included in this document reflect summer season use only.**

Transit and Bus-Based Use Estimates

While the vast majority of visitors to Yosemite National Park arrive by private vehicle, estimates of the total number of people-at-one-time within the Tuolumne River Corridor must also account for those arriving by regional transit service, shuttle bus service within the park, and by privately operated tour buses. Yosemite Area Regional Transit (YARTS) operates a regularly-scheduled, fixed-route transit system providing service into Yosemite National Park and gateway communities located in Merced, Mariposa, Inyo and Mono Counties. During the summer months, YARTS operates a bus along the Highway 120 corridor from Mammoth Lakes to Yosemite Valley and back, stopping at Tuolumne Meadows, with a capacity of 45 passengers. Additionally, the Tuolumne Meadows Tour and Hiker's Bus, operated by the park's concessioner, provides a daily shuttle from Yosemite Valley to Tuolumne Meadows between July and September with a capacity of 45 passengers. The concessioner also operates a Tuolumne Meadows shuttle bus with frequent daily service to destinations and trailheads along Tioga Road between Olmsted Point and Tuolumne Meadows. This shuttle generally serves as an intra-park shuttle and few visitors will use the service to access the Meadows from other destinations along Tioga Road.

Private tour buses also bring visitors to Tuolumne Meadows and park at the Visitor Center, which can only accommodate two buses at a time with a maximum capacity of 45 passengers each. When the private tour bus maximum (90) is combined with the park shuttle (45) and regional transit maximums (90), a maximum of 225 people-at-one-time in Tuolumne Meadows can potentially arrive from outside the corridor by bus.

Trends in Visitor Use Levels

Based on entrance station counts Yosemite National Park has received an average of approximately 3.4 million visitors per year between 1979 (Tuolumne Wild and Scenic River designation) and 2011 (Figure 4 and Table 3). The highest recorded annual visitation occurred in 1996 with a steady decline following the 1997 Merced River flood. However, park-wide use is again on the rise with sharp increases experienced in recent years. Peak visitation generally occurs between May and October with August being the busiest month of the year (approximately 17% of annual visitation alone).

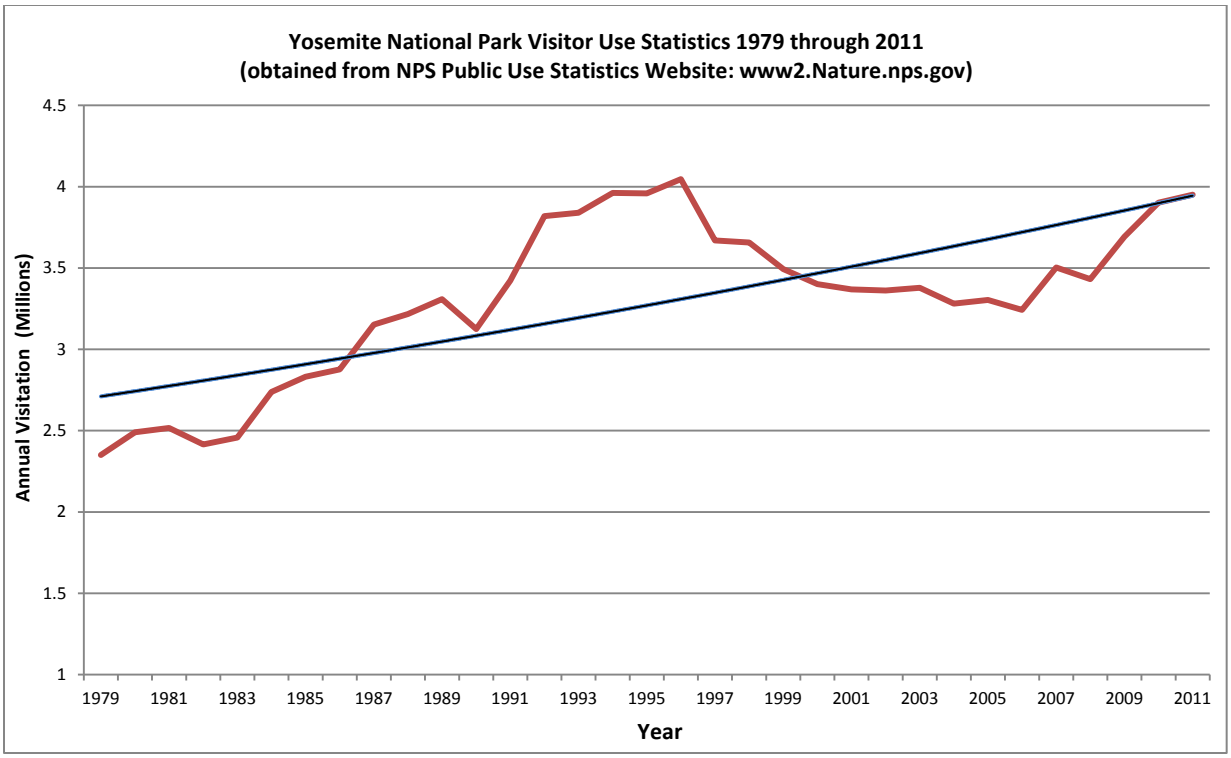


Figure 4. Overall Park Visitation by Year 1982-2011

Yosemite National Park Visitor Use Statistics 1982 through 2011 (obtained from NPS Public Use Statistics Website: www2.Nature.nps.gov)													
Year/Month	January	February	March	April	May	June	July	August	September	October	November	December	Total
1982	60,817	68,307	70,702	73,259	254,169	363,303	425,198	432,776	303,673	206,821	85,193	71,369	2415587
1983	64,748	64,554	85,104	90,376	214,870	266,832	441,436	473,638	350,841	242,778	87,561	74,726	2457464
1984	75,894	83,589	102,049	147,755	276,877	363,876	414,711	494,860	370,899	217,730	101,528	88,699	2738467
1985	84,266	86,738	101,035	158,974	314,386	375,841	447,936	498,319	344,277	230,095	105,532	84,553	2831952
1986	92,835	74,133	114,441	152,019	291,811	362,173	439,823	522,908	340,843	245,733	151,081	88,917	2876717
1987	94,639	98,799	109,617	192,048	373,894	419,479	487,915	526,850	328,866	281,719	146,909	91,540	3152275
1988	94,583	109,552	153,436	190,484	362,008	404,321	477,167	502,674	385,509	292,886	144,254	99,807	3216681
1989	102,646	96,527	143,858	204,102	377,940	413,068	511,957	524,395	390,364	264,670	163,939	114,693	3308159
1990	99,686	101,236	145,037	237,815	364,549	424,933	482,066	367,502	364,838	276,025	162,254	98,998	3124939
1991	104,673	111,073	117,735	187,607	354,908	396,841	521,822	587,904	441,553	320,769	164,072	114,144	3423101
1992	126,603	120,908	149,651	251,872	425,555	486,890	568,070	586,868	470,798	356,333	163,364	112,606	3819518
1993	101,503	105,315	151,472	246,136	378,548	446,235	604,248	634,588	503,629	368,978	171,108	127,885	3839645
1994	131,216	127,303	186,008	247,425	384,114	495,097	585,940	666,555	511,954	336,448	146,675	143,382	3962117
1995	123,844	151,102	124,710	250,592	279,575	449,511	663,052	656,064	551,886	409,319	210,295	88,456	3958406
1996	104,086	135,115	180,709	253,532	347,364	527,284	622,855	679,862	517,934	365,313	172,037	140,116	4046207
1997	12,520	64,201	136,476	200,212	319,108	460,459	595,059	697,060	516,567	372,171	168,533	127,604	3669970
1998	114,143	109,163	157,257	231,495	307,331	345,916	603,790	672,966	480,941	384,428	142,002	107,700	3657132
1999	100,857	102,345	136,795	169,517	335,374	448,560	558,114	625,405	433,178	330,334	150,843	102,285	3493607
2000	93,633	103,444	136,523	216,087	317,009	454,638	548,440	546,981	388,707	324,484	144,958	125,999	3400903
2001	102,455	101,897	142,141	192,936	315,897	434,014	528,849	591,196	448,519	264,465	137,876	108,486	3368731
2002	108,906	113,695	141,766	186,682	295,511	436,862	513,789	570,914	426,684	300,919	149,828	116,311	3361867
2003	116,984	111,506	137,550	174,337	280,335	445,887	536,683	604,093	405,605	316,366	136,390	112,928	3378664
2004	100,020	106,258	146,876	228,212	326,017	449,566	531,864	508,094	393,437	272,200	121,622	96,745	3280911
2005	91,238	103,756	143,335	195,385	304,552	413,124	554,567	485,643	430,134	318,508	152,671	111,231	3304144
2006	104,591	101,194	125,556	189,472	309,387	382,972	510,932	528,254	421,502	298,771	165,499	104,514	3242644
2007	99892	100941	135925	219854	374184	466054	543235	550172	417882	298122	178846	118321	3503428
2008	95124	107729	153735	199592	361193	473186	539874	543799	416918	295547	146837	97,979	3431513
2009	101484	78795	132711	230828	399683	438382	586591	643300	471530	346826	151297	110,545	3691972
2010	96089	100379	149651	224461	382414	521059	643566	659857	520210	356370	148459	98,893	3901408
2011	100718	93588	100433	231372	356588	503741	704553	699749	533502	360449	139079	127,621	3951393
Average	96,690	101,105	133,743	199,148	332,838	429,003	539,803	569,442	429,439	308,519	147,018	106,902	3,393,651
	January	February	March	April	May	June	July	August	September	October	November	December	Total
TOTAL	2,703,886	2,839,175	3,762,210	5,518,605	9,246,149	11,845,304	14,845,983	15,723,640	11,829,468	8,538,758	4,123,004	2,980,539	93,956,721
%	2.9	3.0	4.0	5.9	9.8	12.6	15.8	16.7	12.6	9.1	4.4	3.2	100
% of Annual Visitation - May to October							76.7						
% of Annual Visitation - June to September							57.7						
% of Annual Visitation - July and August							32.5						

Table 3. Yosemite National Park Recreational Visits by Month 1982-2011

In order to further understand trends in Tuolumne visitation over time a comparison of recreational visits as recorded by the Tioga Pass Entrance Station traffic counter from 2006 thru 2011 is shown in Table 4 below. This shows that use levels have recently increased when compared to previous years. In particular, use levels have significantly increased in 2009, 2010 and 2011. The highest use has occurred in 2011 at 466,188 recreational visits.

Recreational Visits Thru Tioga Pass Entrance Station 2006-2011 (from NPS public use statistics office at: www.nature.nps.gov/stats)								
Month	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**07-11 AVG**	**MAX**
July	132,938	117,999	122,065	131,191	132,325	137,058	128,128	137,058
Aug	119,478	125,722	133,268	189,062	189,394	190,931	165,675	190,931
Sept	98,298	94,095	102,095	136,810	136,022	138,199	121,444	138,199
Total	**350,714**	**337,816**	**357,428**	**457,063**	**457,741**	**466,188**	**415,247**	**466,188**

Table 4. Annual Recreational Visits thru Tioga Pass 2006- 2011

Table 5 shows the percent difference in recreational visits from 2006 thru 2011. The percent difference in visitation was calculated and averaged for each month of the core summer season of July to September. The percent difference was also calculated comparing 2006 visitation against 2011 levels directly ("Total %Diff 06-10) resulting in a 24.8% increase in visitation. In order to account for annual variations in use levels, the average % difference was calculated for use increases between the years 2007 thru 2011 and compared against the base year of 2006, resulting in an average increase in visitation over this time period of 15%.

July %Diff 06-11	August %Diff 06-11	September %Diff 06-11	Total %Diff 06-11	%Diff 06 to 07-11 AVG
3.0	37.4	28.9	**24.8**	**15.5**

Table 5. Comparison of Recreational Visits thru Tioga Pass 2006- 2011

Table 6 presents a comparison of the two-way traffic volumes at Tioga Pass for the peak use season in 2009, 2010 and 2011. Overall, the comparison of daily traffic volumes over this three year period shows slowed, but continued increase in visitation in the Tuolumne area. 2010 saw an increase of 8.2% over the previous year and 2011 showed only a 3.7% increase in traffic volumes. For all three years, there has been an average daily traffic volume of 2,939 and a maximum of 4,039 vehicles per day over this period.

YEAR:	2009			2010			2011		
DIRECTION:	Eastbound	Westbound	Combined	Eastbound	Westbound	Combined	Eastbound	Westbound	Combined
SUM:	122,619	129,283	251,902	135,405	138,913	274,318	139,895	144,969	284,864
MEAN:	1,333	1,405	2,738	1,472	1,510	2,982	1,521	1,576	3,096
STDEV:	365	364	697	318	348	618	312	352	609
MAX:	2,053	2,254	3,976	2,151	2,410	4,303	2,280	2,403	4,277
% CHANGE:	-	-	-	9.4	6.9	8.2	3.2	4.2	3.7

Table 6. Comparison of Daily Traffic Volumes at Tioga Pass 2009 - 2011

People-At-One-Time (PAOT)

The maximum number of day users that can be received in the river corridor is expressed as *people at one time* (PAOT). Because day users above Hetch Hetchy Reservoir access the river corridor between Tioga Pass and Tuolumne Meadows, the number of day users depends largely on the number of people entering the river corridor via Tioga Road (the number of visitors who access the river corridor below the reservoir is minimal).

As noted above, the vast majority of visitors to the Tuolumne River corridor arrive by private vehicle. Therefore, the NPS has selected a vehicle-based measure of the maximum PAOT, specifically the number of visitors who could be parked and out of their vehicles, to express the number of day users who are in the Tuolumne River corridor. In addition, the NPS has estimated how many visitors are arriving in the corridor by in-park shuttle, regional transit, and tour buses (see 'Transit and Bus-Based Use Estimates,' above). The current maximum number of day users is calculated by 1) determining the maximum number of vehicles parked in the river corridor, 2) multiplying by an average vehicle occupancy rate, and 3) determining the maximum number of visitors who may arrive by means other than private vehicle.

Parking Supply and Demand

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 in within the Tuolumne Meadows area. The two 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 were separate from one another in 2006 were merged into larger pullouts by 2011 due to increased use.

Based on data collected in 2006 and subsequent analysis by NPS staff, there are 533 designated parking spaces in the river corridor at Tuolumne Meadows (not including the Tuolumne Meadows campground): 340 for day use and 193 for overnight (see Table 7, below). However, the 2006 study did not include overnight parking at the Tuolumne Meadows campground, an overnight facility managed by a reservation system. There is a maximum of two vehicles allowed at each site in the campground. The theoretical maximum parking capacity would therefore be the number of campsites multiplied by 2 vehicles per site, or 651 vehicles.

Table 7. Designated Parking Areas at Tuolumne Meadows (based on DEA 2007)

Parking Location	Parking Type	Primary Use	Number of Designated Spaces
Visitor Center – Oversize Lot	**Lot**	**Day**	**19**
Visitor Center – Main Lot	**Lot**	**Day**	**31**
Gas Station**	**Lot**	**Day**	**15**
Tuolumne Store and Grill	**Lot**	**Day**	**51**
Campground Office	**Lot**	**Day**	**11**
Lembert Dome	**Lot**	**Day**	**29**
Concessionaire Stables	**Lot**	**Day**	**58**
Mono Pass Trailhead	**Lot**	**Day**	**16**
Gaylor Peak Trailhead / Tioga Pass	**Lot**	**Day**	**11**
Dog Lake Trailhead	**Lot**	**Day**	**25**
Elizabeth Lake Trailhead**	**Lot**	**Day**	**11**
Treed parking areas east of Pothole	**Lot**	**Day**	**-**
Pothole Dome Scenic Pull-out and Parking	**Roadside**	**Day**	**16**
Ranger Station**	**Roadside**	**Day**	**7**
Roadside pullouts (13) to Mono Pass	**Roadside**	**Day**	**22**
Dana Meadows Pull-out at Tioga Pass	**Roadside**	**Day**	**18**
Road to Parsons	**Roadside**	**Day**	**-**
Pull-out south of Pothole	**Roadside**	**Day**	**-**
Roadside in front of Visitor Center	**Roadside**	**Day**	**-**
Roadside trail across meadows to Parsons	**Roadside**	**Day**	**-**
Roadside in front of gas station	**Roadside**	**Day**	**-**
Roadside campground office to bridge	**Roadside**	**Day**	**-**
Roadside Lembert to Wilderness Office	**Roadside**	**Day**	**-**
Roadside Wilderness Office to Gaylor Pit	**Roadside**	**Day**	**-**
Roadside Dana Meadows	**Roadside**	**Day**	**-**
Gaylor Pit	**Roadside**	**Day**	**-**
Cathedral Lakes Trailhead	**Roadside**	**Day**	**-**
Tuolumne Meadows Lodge	**Lot**	**Overnight**	**102**
Wilderness Office	**Lot**	**Overnight**	**58**
Dog Lake Trailhead	**Lot**	**Overnight**	**33**
Road to Parsons	**Roadside**	**Overnight**	**-**
Cathedral Lakes Trailhead	**Roadside**	**Overnight**	**-**
Total Day			**340**
Total Overnight*			**193**
Total designated parking spaces at Tuolumne Meadows			**533**
* Tuolumne Campground has a maximum overnight parking capacity of 651 vehicles at 2 per site - this figure is not included in this analysis.			
** These locations were not included in the DEA 2007, and were subsequently estimated by the NPS.			

The parking study conducted August 11-13, 2006, found parking use was highest from mid-morning through late afternoon, with the exception of the use of the Tuolumne Meadows Lodge parking lots which had their peak occupancy of 115 vehicles at 8 a.m. Most areas had peak use from noon to 2 p.m. During the day, parking occupancy was greatest from the visitor center to the Tuolumne Meadows Lodge. The parking use in this area peaked at 687 vehicles at 1 p.m. (DEA 2007).

The most recent parking study conducted July 24 – August 20, 2011, also found parking use the highest from mid-morning through late afternoon. Again most areas had peak use from noon to 2 p.m. During this 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 more than 870 vehicles were parked during the peak hours on these two days.

A comparison of the designated parking supply in Table 7 and estimated parking demand (based on parking in counts in 2011) suggests that about 40% of the parking in the Tuolumne area is in undesignated or user-created locations. The supply of undesignated parking is generally found in roadside areas and can be primarily associated with visitor day use.

Vehicle Occupancy

The average vehicle occupancy for vehicles traveling along Tioga Road during the three-day collection period in August 2006 was 2.1 (DEA 2007). It is expected that the actual average vehicle occupancy is somewhat larger than this value, because it is assumed that some occupants of vehicles were not visible from the video used to collect the data and were not included. Other visitor studies conducted over the past 20 years have found the average vehicle occupancy to range from 2.6 to 3.4 (Van Wagtendonk and Coho 1980; FHWA 1982; ORCA 1999; Littlejohn et al. 2005; Le et al. 2008). The most recent surveys conducted in Tuolumne during 2010 found an average group size of 2.74 persons (White 2010). Based on this range, an average of 2.9 persons per vehicle is used for estimating visitor numbers for planning purposes in this document.

Visitor Day Use Capacity Calculations

The NPS estimated current peak day use by starting with an actual vehicle count on a peak day during summer 2011 (DEA 2012) and multiplying the number of parked cars attributed to day users by 2.9 persons per vehicle. The maximum number of visitors who currently arrive by tour bus, in-park shuttle, or regional transit was added to this number to reflect the current maximum number of day visitors in the river corridor.

As noted above, both the 2006 and 2011 parking studies (DEA 2007 and DEA 2012) indicate that more cars currently park in the Tuolumne Meadows area than can be accommodated in the available designated parking spaces. A maximum of 870 cars were parked at Tuolumne Meadows on Saturday, August 13, 2011 at the height of the summer season. This includes cars parking in the 340 designated day and 193 designated overnight parking spaces listed above in Table 7, and an additional 337 cars that were crowding into established parking areas and along roadsides. Not including the campground, it is estimated that 340 spaces are needed to accommodate existing overnight users at the lodge, Glen Aulin High Sierra Camp, and wilderness permit holders. Because only 193 spaces are currently designated for overnight users, it is estimated that 147 vehicles belonging to overnight users are currently parking in undesignated areas. The remainder of the cars parked in undesignated areas (190) were assumed to belong to day users.

Therefore, current maximum day use in the Tuolumne Meadows area and adjacent wilderness is estimated at 1,717 people at one time. This estimate is based upon the data described above as well as the factors described below:

(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 2.9 persons per car, for 1,537 maximum people at one time, plus the maximum number of day visitors who can arrive by in-park shuttles, tour bus, and regional public transportation (225 people per day)

(2) The current maximum day use corridor-wide is estimated to be 1,774: the sum of the Tuolumne Meadows area maximum day use (1,762 people at one time) and the estimated maximum number of vehicles parked below O'Shaughnessy Dam (4 vehicles * 2.9, or 12 people at one time).

Visitor Overnight Use Capacity Calculations

Overnight capacity is calculated by multiplying the number of units by the maximum occupancy of each unit. For camping this is the number of campsites times 6 people per site. For Tuolumne Meadows Lodge and the Glen Aulin High Sierra camp this is the number of tent cabins times 4 people. For overnight wilderness use this equates to the total of all backcountry zone capacities as managed by the trailhead quota and permit system. Collectively, these calculations provide an overall maximum overnight capacity of the river corridor.

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Appendix H:
Ecological Restoration Planning for the Tuolumne Wild and Scenic River Comprehensive Management Plan

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Ecological Restoration Planning for the Tuolumne Wild and Scenic River Comprehensive Management Plan

2010

Ecological Restoration Planning for the Tuolumne Wild and Scenic Comprehensive Management Plan

Division of Resources Management and Science

Yosemite National Park

WRITTEN BY

CHAPTER 1 - ECOLOGICAL RESTORATION PLANNING FOR THE GREATER TUOLUMNE MEADOWS AREA

MONICA BUHLER, SUE BEATTY AND APRIL JOHNSON

CHAPTER 2 - MITIGATION MEASURES TO PROTECT CULTURAL RESOURCES FOR THE GREAT SIERRA WAGON ROAD ECOLOGICAL RESTORATION PROJECT

DANIEL SCHAIBLE

REVIEWED BY

NIKI NICHOLAS AND JUDI WEASER

Cover Photos:

Upper - Photo taken from the west end of Tuolumne Meadows late 1800s

Lower – Photo taken from the west end of Tuolumne Meadows 2008

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INTRODUCTION

This report presents an ecological restoration plan to support the Tuolumne Wild and Scenic River Comprehensive Management Plan (Tuolumne River Plan). It provides a description of sites recommended for ecological restoration in the Tuolumne area, incorporating analyses of the status and integrity of plant communities in Tuolumne Meadows, and a cultural landscape review of the Great Sierra Wagon Road.

The first chapter in this report describes recommended ecological restoration actions throughout the Tuolumne Meadows area and the justification and need for these proposed actions. This chapter focuses on restoration actions associated with the Tuolumne River, Tuolumne Meadows, roads, trails, campgrounds, and lodging.

The second chapter in this report focuses on cultural resource protection of a portion of the Great Sierra Wagon Road. This chapter provides culturally sensitive recommendations for the ecological restoration efforts along the road. It establishes mitigation measures for ecological restoration of abandoned sections of the road, and maps the past alignment(s) of the Great Sierra Wagon Road relative to today's Tioga Road. Ongoing consultation with NPS cultural resources staff will accompany restoration efforts.

Two studies frequently cited in this document provide baseline data on hydrology and vegetation that directs ecological restoration efforts and priorities. Cooper et al. (2006) completed a study focusing on the effects of the Tioga Road on hydrologic processes and lodgepole pine invasion into Tuolumne Meadows. Researchers found incongruence between existing vegetation, hydrology and soils that requires further study. A second study (Ballenger and Acree 2008) focused on the biological integrity of Tuolumne Meadows north of the Tioga Road. Botanists compared vegetation and habitat attributes of Tuolumne Meadows with eight other subalpine meadows in the park with similar plant communities. This study focused on several measures of meadow integrity – community level plant diversity, forb:graminoid ratio, the percentage of areas without functioning vegetation (bare ground), and levels of small mammal activity.

CHAPTER 1. ECOLOGICAL RESTORATION PLANNING FOR THE GREATER TUOLUMNE MEADOWS AREA

By Monica Buhler, Sue Beatty and April Johnson

THE NEED FOR ECOLOGICAL RESTORATION

Meadow and riparian ecosystems are sites of exceptional ecological importance. While highly productive and diverse, riparian and aquatic systems (including meadows) are the most impacted areas in the Sierra Nevada (SNEP 1996). Declining spatial extent and degradation of riparian and wet meadow ecosystems is occurring throughout California at an alarming rate (SNEP 1996). While riparian and meadow ecosystems occupy relatively little land area in Yosemite National Park, they comprise the most biologically diverse areas and are priorities for ecological restoration (Hall 1997).

Tuolumne Meadows represents some of the most extensive subalpine meadow and riparian habitat in the Sierra Nevada (Weixelman, pers. comm.). This meadow/riparian/river complex provides habitat for a diversity of plant and animal species including several special-status species (e.g., slender lupine *(Lupinus gracilentis)*, Yosemite bulrush *[Trichophorum clementis (Scirpis clementis)]*, Yosemite toad *(Bufo canorus)*, several species of bats, and migratory bird populations). In addition, Soda Springs, a natural alkaline spring, supports localized populations of special status plant species (e.g., Buxbaum's sedge (*Carex buxbaumii)* and marsh arrow-grass (*Triglochin spp.*).

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed (SER 2004). Natural processes continue to shape the landscape and the meadow and riparian complex that extends through Tuolumne Meadows, Dana Meadows, and Lyell Canyon. While productivity of these riparian and meadow areas remains high, recent studies document changes in the ecological integrity particularly in parts of Tuolumne Meadows, exemplified by expanding areas of barren ground, atypical plant species, confer encroachment, and diminished willow vegetation along riverbanks (Cooper et al. 2006). In these portions of Tuolumne Meadows, the meadow and associated wetlands and riparian areas exhibit impacts, damage and some degree of degradation. Development such as buildings, roads, trails, and past land management practices (such as ditching) disrupt hydrology, discourage vegetation establishment, and degrade habitat. Many undeveloped portions of the Tuolumne Meadows area are also impacted from past and contemporary activities such as human trampling, old road beds, stock use, invasive plant introduction, vegetation loss, and impacts to river processes.

Through ecological restoration, processes that sustain natural ecosystems, such as hydrology, are restored to provide conditions ideal for the perpetuation of native flora and fauna. Ecological restoration is also appropriate to restore natural conditions if facilities are removed, updated, or relocated. This report describes potential ecological restoration actions for currently impacted areas in the Tuolumne Meadows area, including developed areas that require restoration if infrastructure are moved or

removed as well as undeveloped areas that have directly or indirectly been altered by human activities.

Important cultural resources are numerous in the Tuolumne Meadows area and in addition to specific mitigations outlined in Chapter 2, the following programmatic guidance and collaboration with cultural resource staff will ensure protection during ecological restoration. Archeological sites are fragile, non renewable resources and contain important information potential about past life ways and represent tangible heritage resources for park-associated American Indian peoples, as well as the visiting public. Where archeological sites are subject to ongoing impacts through social trails or visitor use, these areas will be carefully assessed for stabilization needs. Social trails will be removed and visitor use of these areas will be discouraged using techniques that retain the data potential of the resource while encouraging native vegetation. Where ecological restoration actions have the potential to affect archeological resources, the actions will be designed to avoid impacts wherever feasible. If avoidance is not possible, archeological site treatments such as controlled testing, and data recovery excavations where necessary, will be employed to reduce the level of impact and thereby avoid adverse effects. All treatments for pre-contact archeological sites will involve close consultation with park-associated American Indian tribes and groups to ensure these treatments incorporate native concerns, issues and perspectives.

Ecological Restoration Goals and Objectives

The goals and objectives of ecological restoration focus on restoring primary processes, particularly hydrology, to maintain the structure and function of a self-sustaining ecosystem. Overall goals of restoration actions are to promote sheet flow in meadows, maintain groundwater levels that reflect landforms without incised channels, and limit continued disruptions to natural hydrology, all of which are linked to maintaining native plant communities. In order to achieve these goals, a combination of restoration actions will provide the best avenue for achieving ecological restoration objectives:

- Protect, maintain and restore natural hydrologic function of the Tuolumne River and tributaries
    - Protect, maintain and restore the hydrologic connectivity between the main river channel and the floodplain (meadows, ponds, wetlands, cutoff channels, oxbows) during regular high water flows
    - Protect, maintain and restore naturally high ground water levels and sheet flow processes to support biotic communities in riparian and meadow plant communities
    - Protect, maintain and restore the ability for the Tuolumne River channel to migrate and change course
    - Improve and protect ecological integrity of Soda Springs
- Protect, maintain and restore the function, structure, diversity and productivity of native riparian and meadow plant communities and wildlife habitat
- Restore areas impacted by the removal or relocation of facilities to natural conditions

THE TUOLUMNE RIVER

Fig. 1-1. Riverbank erosion

Based on a preliminary Proper Functioning Condition Assessment (Pritchard et al. 1998) of the Tuolumne River as it flows through Tuolumne Meadows, a team of hydrologists and river managers determined that several reaches of the Tuolumne River appear to be 'functioning at risk' with an undetermined trend (NPS Roche, personal communication). For example, recent studies indicate that the banks of the Tuolumne River are eroding on outside meanders without concomitant riparian vegetation recruitment on the complementary point bar, likely resulting in channel widening (Cooper et al. 2006). Channel widening produces a shallower channel with a lower river stage for any given flow volume and a concurrent drop of the groundwater level associated with the river (Cooper et al. 2006). A wider, shallower channel also influences the magnitude and frequency of overbank flow. The low vegetation cover on riverbanks, perhaps exacerbated by human trampling, contributes to the rapid bank erosion.

RIVERBANK EROSION

Fig. 1-2. Heavily browsed willow

In general, the riverbanks on the Tuolumne River (particularly on the west end of the meadows) have little to no vegetation, particularly willows *(Salix ssp.)* and are characterized by extensive erosion and riverbank loss (Figure 1-1). Willows typically occur in much greater density along the river and are very effective at anchoring soils and stabilizing eroding riverbanks. Vegetation, particularly woody species, also slows the velocity of water and associated scour while promoting sediment accretion (Mitsch and Grosselink 2007).

Fig. 1-3. Trampled vegetation on riverbanks

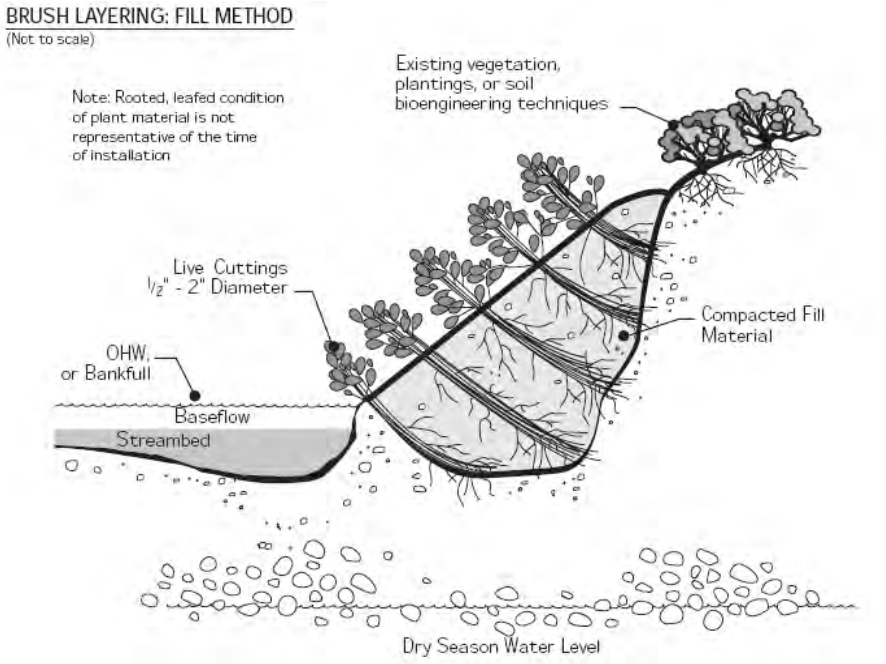
Existing willows in Tuolumne Meadows are heavily browsed (Figure 1-2), precocious (flowering on the previous season stems), or have no reproductive structures at all (Cooper et al. 2006). Deer browsing suppresses the plants to heights of less than 0.5 m in species that are typically 1-2 m tall. Heavy browsing can also limit the extent of willow stands, as well as willow regeneration as deer favor tender, young shoots. Willows provide important nesting habitat for many birds and cover for other wildlife. The lack of willow establishment on sandbars and riverbanks contributes to the net river channel widening. The absence of vegetation allows water to flow unimpeded, increasing velocity and altering scour and deposition relationships. The reason for the absence and heavy browse of willows along the Tuolumne River is not entirely understood but the condition of the riverbanks indicates that this has been occurring for some time.

Vegetation loss and the subsequent riverbank erosion can be exacerbated by visitor trampling (Madej et al. 1994; Milestone 1978), (Figure 1-3). Certain reaches of the Tuolumne River experience high levels of visitor use and are devoid of vegetation, facilitating more erosion. Protection of riverbanks in sensitive areas can help promote vegetation establishment and improve riverbank stability. If further studies indicate that riverbank conditions are exacerbated by current and past human actions, ecological restoration may be warranted.

Because of the dynamic nature of river processes and gaps in knowledge, it would be shortsighted to focus riverbank restoration in isolated areas. Therefore, a holistic approach for riverbank restoration and willow establishment will be considered for the entire stretch of the Tuolumne River including both the Dana and Lyell Forks, and as it flows through Tuolumne Meadows. Further research on willow establishment, recruitment and persistence, and sediment dynamics will refine restoration techniques. The following restoration actions are proposed to mitigate impacts and restore riverbanks and natural river processes:

- Protect, maintain and restore the function, structure, diversity and productivity of native riparian and meadow plant communities and wildlife habitat
- Apply bioengineering techniques (e.g. brush layering, anchor logs, intensive planting of vegetation) to stabilize riverbanks, promote sediment accretion, and minimize further riverbank loss
- Establish willows (using hydrodrilling techniques) along riverbanks
- Protect impacted riverbanks from further trampling using temporary fencing or natural obstructions, such as logs, so vegetation can establish
- Install temporary exclosures to protect willow regeneration from deer browsing
- De-compact, seed, mulch and plant to encourage vegetation establishment on denuded riverbanks
- Protect and document any cultural resources

Examples of bioengineering techniques commonly used for riverbank restoration include willow hydrodrilling, brush layering (Figure 1-4), willow wattles and anchoring logs to anchor soils and accrete sediment. To establish willow, cuttings are taken from established plants and placed deeply into the soil to promote establishment and to prevent them from washing away during high water events. Because riverbank areas are often rocky or compacted, a hydro-drill (a pump with a high-powered stream of water) can create deep holes into which cuttings are placed. Willows may also be bundled into wattles and partially buried and anchored along riverbanks.



Brush Layering

Brush layering is the technique of laying cuttings on horizontal benches that follow the contour of either an existing or filled bank (slope). Branches serve as tensile inclusions or earth-reinforcing units to provide shallow stability of slopes.

The cuttings are oriented more or less perpendicular to the slope face. The portion of the brush that protrudes from the slope face assists in retarding runoff and reducing surface erosion. When used on a fill slope, this technique is similar to vegetated geogrids without the geotextile fabric.

Applications and Effectiveness

- Breaks up the slope length into a series of shorter slopes separated by rows of brush layer.
- Dries excessively wet sites.
- Works where the toe is not disturbed.
- Works on a slump and as a patch.
- Reinforces the soil with the unrooted branch stems.
- Reinforces the soil as roots develop, adding significant resistance to sliding or shear displacement.
- Traps debris on the slope.
- Aids infiltration on dry sites.
- Adjusts the site's microclimate, aiding seed germination and natural regeneration.
- May cause flow to wash soil from between layers.
- Does not work on outside bends.

Construction Guidelines

Brush layering can be installed on an existing or filled slope. On an existing slope, a bench is cut 2- to 3-ft. deep and angled slightly down into the slope. On a fill slope, brush layers are laid into the bank as it is filled.

Live material

- Branch cuttings should be 0.5 to 2 in. in diameter and long enough to reach the back of the bench and still protrude from the bank.
- Side branches should remain intact.
- Mix easy-to-root species such as willow, dogwood, and poplar.

Fig. 1-4: From *A Soil Engineer's Guide* (Eubanks et al. 2006)

TUOLUMNE MEADOWS

Humans have used the Tuolumne Meadows area for thousands of years, but in the last century the level and intensity of use has increased and changed dramatically. Meadows link the main Tuolumne River channel with neighboring terrestrial systems and regulate the entry of water, nutrients, and organic material into the river channel (Gregory et al. 1991). Human alterations in Tuolumne Meadows range from historic actions such as digging ditches to drain ponded areas of the meadow, building roads

in the meadow, and extensive sheep grazing from 1860-1905, to contemporary impacts from trampling, development, and fragmentation. Other impacts result from parking area edge effect or parking creep leading to soil compaction, soil loss, and vegetation loss. Tuolumne Meadows is not only ecologically important but also is a treasured resource for visitors and highly valued by traditionally associated people as it contains sacred areas and provides traditionally used ecological resources. Efforts to sustain the integrity of the Tuolumne River ecosystem are likely to be more effective over the long term when considering the integrity of the meadow and associated riparian areas.

VEGETATION

Most of the greater Tuolumne Meadows comprises subalpine meadow vegetation with pockets of subalpine forest dominated by lodgepole pine *(Pinus contorta).* It must be recognized that existing vegetation communities are influenced by hydrologic and climatic conditions as well as past (intensive grazing, fire suppression, tree removal) and current (tree removal, infrastructure, fire suppression, trampling) human activities. Changes in hydrology from a variety of perturbations including ditching, road and trail building, water diversions, livestock grazing, visitor foot traffic, fire suppression, and imbalances in the mammal herbivore populations, have altered the plant and animal communities that once occupied the meadow (WRD 2010). These disturbances alter hydrologic conditions including water delivery (primarily through channelization rather than sheet flow), sediment dynamics, lowered groundwater levels, and changes in the amount and timing of ground and surface water availability for plants (Loheide et al. 2007).

A study completed in 2008 (Ballenger and Acree) compared several attributes of meadow integrity in Tuolumne Meadows with eight other subalpine meadows in Yosemite. All other meadows in the study have also experienced grazing or other perturbations and are not considered reference or pristine, but provide a range of meadow condition for comparison. Assessments focused on indicators of meadow function and structure including community level plant diversity, forb:graminoid ratio, the percentage of areas without functioning vegetation (bare ground), and levels of small mammal activity. Tuolumne Meadows had a much greater proportion of plots with bare ground as well as a much higher occurrence of plots with bare ground greater than 50%. Tuolumne Meadows study plots had four to eight times the proportion of plots dominated by forbs compared to the other meadows (Ballenger and Acree 2008). In terms of the forb:graminoid ratio, study plots in Tuolumne Meadows had two to eight times the proportion of plots dominated by forbs compared to six of the other meadows (Ballenger and Acree 2008). Areas in Tuolumne Meadows that have a high forb:graminoid ratio are of particular importance, especially in areas with high organic content in the soil. High organic content levels in meadow soils were likely generated by centuries of organic matter contributed from deep-rooted graminoids. If graminoids are missing from the floral composition, the plant composition may have changed. In addition, shallow- or tap-rooted forbs do not grow as densely as long-lived rhizomatous and clonal plants, and they do not grow into and reduce the areas of bare ground in the same manner as

the graminoid species (Ballenger and Acree 2008). Because tap- or shallow-rooted forbs lack the soil stabilizing characteristics of graminoids and do not contribute significantly to soil organic matter, areas with a high proportion of forbs are also at higher risk of soil erosion and loss of soil organic matter (Cooper et al. 2006). Areas with high forb:graminoid ratios and high levels of bare ground are not likely to re-vegetate on their own, and soils may be losing organic matter.

Tuolumne Meadows was the only meadow surveyed with areas dominated by big sagebrush (*Artemisia tridentata*) shrubs (Ballenger and Acree 2008). Related meadow studies found that expansion of sagebrush into meadows might be stemming from livestock grazing-related disturbances, which can compact soil, increase the aridity of soils, and cause changes in meadow hydrologic processes, such as stream incision (Magilligan and McDowell 1997; Vavra et al. 1994). Berlow et al. (2002) found that intact moist meadow vegetation effectively prevents sagebrush germination and subsequent seedling survival, while small disturbances (such as gopher activity) can decrease competition with other vegetation and promote sagebrush invasion (Burke and Grime 1996). The fact that Tuolumne Meadows has areas dominated by big sagebrush is another indication that the biological integrity of this meadow is in a compromised state (Ballenger and Acree 2008).

Mammal burrowing activity did not differ greatly between Tuolumne and the eight other meadows in the 2008 study (Ballenger and Acree). Although Tuolumne had proportionately more plots with high levels of mammal activity (except Lower Lyell, also a highly impacted meadow), the proportion of Tuolumne plots with any burrow activity falls within the normal range of variability of the other meadows.

Tree invasion into subalpine meadows has been observed and researched for nearly a century in the mountains of western North America. Several studies throughout the Sierra Nevada, including Tuolumne Meadows, indicate that conifer encroachment is likely a response to climate change (Cooper et al. 2006; Jakobus and Romme 1993), reduction in fire frequency (DeBenedetti and Parsons 1979) and high levels of bare ground and impacts from intensive grazing (Cooper et al. 2006; Millar et al. 2004; Miller and Halpern 1998; Ratliff 1985; Sharsmith 1959).

Conifer encroachment is widespread in Tuolumne Meadows. Lodgepole pines need bare mineral soil to establish so the high levels of bare ground found in Tuolumne Meadows provide ideal conditions for germination. Conifer encroachment takes place almost twice as often in drier meadow plant communities with higher cover of bare ground when compared with other communities in the meadow (Ballenger and Acree 2008). Cooper et al. (2006) found that lodgepole pine invasion in Tuolumne Meadows is linked to periods of low precipitation and low year-to-year variability in moisture conditions and follows recruitment patterns observed Sierra Nevada wide. Because tree removal activities have occurred in Tuolumne Meadows since around1933, it is unknown if earlier tree establishment episodes would have survived in the absence of managed tree removal.

Despite aggressive tree removal over the past 80 years, climate conditions as well as soil conditions likely contribute to the continued expansion of the conifer forest into

the meadow. Studies of subalpine meadows in the Cascade Mountains indicate that soils in meadows and adjacent forests have different biochemical properties and that meadow soils rapidly assume forest soil characteristics as trees establish in the meadow (Griffith et al. 2005). Changes in the soil pH, extent of fungal mats, denitrification potential, and litter depth, favor continued establishment of conifers even after cutting (Griffith et al. 2005). In particular, higher pH and the presence of extensive fungal mats that depend on conifers as their hosts, discourage establishment of meadow species, further favoring conditions for conifer establishment. It is probable that conifer establishment will continue with the current soil, vegetation, and climate conditions and ecological restoration may not be appropriate or feasible. However, where conifer encroachment can be directly tied to bare ground from human trampling or development and/or research indicates that conifer encroachment is resulting from anthropogenic impacts, ecological restoration that includes conifer removal to restore those plant communities may be appropriate. Clearing of conifers may also continue to maintain scenic vistas and the cultural landscape.

Both natural and anthropogenic factors likely influenced the fire regime in Tuolumne Meadows. Lightning-ignited fires are documented in Yosemite National Park (van Wagtendonk 1993), but the spatial and temporal patterns in Tuolumne Meadows during the last 500 years are largely unknown. Prior to the 1850s, American Indians may have set fires in Tuolumne Meadows to modify vegetation (Gassaway 2005; Reynolds 1959). During the early years of sheep grazing, sheepherders may have set fires in forested areas around Tuolumne Meadows in order to expand grasslands (Babalis et al. 2006). Fire suppression efforts in Tuolumne Meadows began after 1891 and natural fires have not occurred since at least 1921 (Cooper et al. 2006; Cunha 1992). However, it is unknown if natural or anthropogenic fires burned across Tuolumne Meadows or stopped at the forest/meadow margin.

Based on a limited study (Cooper et al. 2006) of fire scarred trees in the Tuolumne Meadows area, fire has not occurred in Tuolumne Meadows since at least the early 1900s, but may have been relatively frequent prior to the mid 1800s. More frequent fires may have modified the meadow environment or led to the mortality of lodgepole seedlings, thus greatly changing the prevalence of conifer establishment. A fire history study of lodgepole pine forests in the Sierra Nevada is in progress and may shed some light on the spatial and temporal patterns of previous fires.

These findings support the importance of further investigation into the causes of differing vegetation and habitat features in Tuolumne Meadows. High levels of bare ground in areas that likely have rich organic soil suggest that the dense deep-rooted sedges and grasses that formed these soils over centuries of time may not be self-sustaining, and these areas may even be losing organic matter. When coupled with high forb:graminoid ratios, revegetation may not occur on its own. Research into the root causes of vegetation differences, the make-up of historic vegetation, and whether carbon is being lost in the soil, could confirm these hypotheses (Ballenger and Acree 2008). Meadow integrity is reflected in biotic elements and the processes that generate and maintain those elements such as groundwater levels (Angermeier

and Karr 2005). Investigations into the presence of high groundwater levels during the growing season indicate the hydrologic regime of the meadow ecosystem is still in place, suggesting that other causal factors are occurring (Ballenger and Acree 2008).

Soils

Based on initial assessments of soils in Tuolumne Meadows completed by the National Resources Conservation Service (NRCS), meadow soils are comprised of sandy loams, loamy sands and silt loams, with some component of volcanic ash or glacial till (Jones and Stokes 2001). A hydric soils list has not been completed for the Tuolumne Meadows area, but redoximorphic features (those indicating prolonged inundation or saturation during the growing season) have been observed in many areas.

A 2006 study (Cooper et al.) of the organic matter in soils found that content ranged from 12-18% in wet meadow plant communities and approximately 7% in upland and border areas dominated by lodgepole pine and upland herbaceous plant species. Initial investigations indicate that the high organic content of these soils and the low below-ground plant production may suggest that the existing vegetation did not form the existing soils (Cooper et al. 2006). Further investigations are needed to determine if ecological restoration actions are feasible and warranted.

Hydrologic Processes

Sheet flow is very important in maintaining meadow ecosystems by providing water via surface flow at low velocities and dropping out sediment that provides nutrients to meadow biota. Channel incision resulting from downcutting, vegetation loss and headcuts has altered sheet flow processes in the meadow, leading to concentrated flows and a lower groundwater level. Ponding associated with culverts further concentrates water and limits sheet flow.

Fig. 1-5. Trails and channels can interrupt or channelize sheet water flows

The conditions of the riverbanks along the Tuolumne River, as well as the shallower and wider channel, also influence sheet flow processes and groundwater levels. According to recent assessments of the hydrologic regime in Tuolumne Meadows, most sediment transport occurs during spring or summer rainstorms (Roche, personal comm). During heavy downpours associated with thunderstorms, water flows off adjacent granite domes at high velocity in sheets that typically flow into lower lying areas such as meadows. Small streams quickly become bank full and redeposit sediment transported by the high velocity water sheeting off of landforms. However, when water reaches trail ruts, incised channels, bare or sparsely vegetated areas, flows are concentrated in these channels rather than sheeting across the meadow (Figure 1-5). Sediment accumulated during these storms is deposited in concentrated areas rather than dispersing throughout the meadow, limiting the distribution of nutrients. Flow concentration and channelization limit infiltration of storm water and snow melt, affecting soil moisture and groundwater.

Fig. 1-6. Headcut near Delaney Creek

Fig. 1-7. Headcut on Budd Creek

Fig. 1-8. Diffuse headcut

Fig. 1-9. Healthy transition between vegetation types

HEADCUTS

Numerous headcuts associated with trails, culvert ditches and natural water channels (such as incised sections of Budd Creek) occur throughout Tuolumne Meadows (Figure 1-6, 1-7). Headcuts occur when water flow is concentrated and channeled at high velocity, increasing scour and altering sedimentation dynamics. Headcuts lower the adjacent groundwater level, expose soils, and limit sheet flow across the meadow. With a lower groundwater level, the upper soil levels dry sooner in the year, potentially changing wetland plant communities to upland plant dominated communities with less anchoring roots. Headcuts are most commonly due to some perturbation such as vegetation loss, concentration of water flow, increase in flow or increase in slope. While these perturbations can occur naturally, most headcuts observed in Tuolumne Meadows result from artificial (human-caused) changes to hydrology.

There are also incipient headcuts that are more diffuse and characterized by an abrupt transition between different vegetation types (Figure 1-8, 1-9). These types of headcuts have been observed below Pothole Dome where surface water flows off the dome at high velocity and is channeled onto informal trails. The abrupt slope transition from sheet flow to the trail surface erodes the trail margin, progressively incising the meadow surface upslope from the trail. Once flow is concentrated by the trail, sediment is routed to discrete deposition points rather than diffuse deposition across broad areas of the meadow.

To mitigate downcutting, headcutting, and other disruptions to hydrologic flow, the source of the problem must be understood and addressed. Headcutting is a result of channeling (often in trail ruts or incised streambeds) and simply filling in the deep gouges does not address the cause of the headcut. The source or cause of the high velocity, concentrated flow, must be mitigated to limit the development and enlargement of headcuts. To restore the hydrologic conditions to limit further headcutting, the following actions are proposed:

- Determine source of problem (channeling of water from culvert ditches, trails, bare ground etc.) and mitigate to decrease velocity, slope and concentration of flow
- Fill in deep headcuts with local native soil to discourage continued channeling
- Apply bioengineering techniques (such as hydrodrilling of willows, brush layering, installing of woody debris, plant material, and erosion control structures such as wattles or blankets) to divert and disperse runoff, promote deposition and limit scour
- Re-contour surrounding area to natural landform
- Mulch, seed and plant to re-vegetate with native species and minimize bare ground, sediment loss and continued erosion
- Protect and document any cultural resources in the area

Fig. 1-10. Incised channel near Pothole Dome

Fig. 1-11. Ditch draining kettle pond

Fig. 1-12. Bare area adjacent to shuttle bus stop

Fig. 1-13. Bare area with lodgepole seedlings

Ditches and Incised Channels

There are several ditches and incised channels throughout Tuolumne Meadows associated with perennial and intermittent streams, trails, culverts and historic draining efforts (Figure 1-10). The most prevalent ditches are those adjacent to a section of the Great Sierra Wagon Road that serves as a trail between the Visitor Center and Soda Springs. Other, more subtle ditches are likely remnants of draining efforts of potholes (kettle tarns) and ponding associated with culverts for mosquito abatement (Figure 1-11). There is also extensive channel incision associated with perennial and intermittent streams throughout the meadows that may be attributed to poor or inadequate culverts and bare ground.

Ditches and incised channels alter the hydrologic regime by channeling and concentrating water flow, intercepting surface and groundwater, cutting off supplies to downstream areas and altering the timing, velocity, depth and direction of groundwater flow. The resulting concentrated flow and velocity leads to further downcutting. Upstream areas and the conditions that have led to channel incision also need to be addressed and mitigated. To restore the landform from past ditching and channel incision, the following actions are proposed:

- Determine source of problem and mitigate to decrease velocity, slope and concentration of flow
- Fill in ditches and incised channels with local native soil to discourage continued channeling
- Apply woody debris, native mulch, and plant material (willows using hydrodrilling techniques) to divert and disperse runoff, promote deposition and limit scour
- Re-contour surrounding area to natural landform
- Mulch, seed and plant to re- vegetate with native species and minimize bare ground, sediment loss and continued erosion
- Protect and document any cultural resources

Trampling

Several areas experience high levels of human trampling resulting in vegetation loss and degraded meadow habitat. Several of these areas are adjacent to trailhead parking, shuttle bus stops and visitor facilities such as the Visitor Center, Tuolumne Meadows Store and Grill and Gas Station. The meadow adjacent to these high use areas is characterized by a high proportion of bare ground, different vegetation communities than observed in undisturbed portions of the meadow (e.g. dominated by big sagebrush), dead or damaged vegetation, compacted soils, and disrupted hydrologic function such as headcutting (Figure 1-12). Because of the high level of visitor use in the Tuolumne Meadows area, allowing dispersed use only increases the area of vegetation damage. Human trampling may also, via soil compaction and bare soil exposure, contribute to the lodgepole pine encroachment apparent in Tuolumne Meadows (Vale and Vale 1994), (Figure 1-13). Based on a recent study of the effects of tramping on subalpine meadow habitat, Tuolumne Meadows is very sensitive to trampling impacts and is very slow to recover from damage and degradation

(Holmquist 2008). Several methods can be utilized to minimize these impacts and the following actions are proposed:

- Protect sensitive areas using closure signs, fencing, and/or other natural barriers such as rocks and logs as deterrents
- Focus use by delineating trails, signs and other means of concentrating visitor use to more sustainable areas
- Assess visitor flow associated with trailheads, shuttle bus stops and facilities and focus use to more appropriate areas
- Delineate parking areas adjacent to meadow
- Delineate trailhead areas and the beginnings of trails to reduce informal trail density and minimize area of impact
- Consider shuttle bus stop locations in respect to impacts on vegetation
- Protect and document any cultural resources

PARKING AND TRAILHEADS

Limited parking for visitors to the Tuolumne Meadows area puts enormous pressure on the existing parking areas. These areas exhibit parking lot "creep" (Figure 1-14) and continue to expand as more and more visitors try to find parking. Areas around the parking areas exhibit damaged vegetation, bare ground and many informal trails. This also impacts cultural resources and archeological sites. The most impacted areas include the Cathedral Meadow Trailhead, the Soda Springs trailhead and the Lembert Dome/Glen Aulin Trailhead (Figure 1-15). Issues and design for the trailheads along the entire Tioga Road are being addressed in a separate environmental assessment. Depending on the preferred alternative for parking determined in the Tuolumne Meadows Plan, the following actions are proposed to maximize natural and cultural resource protection:

Fig. 1-14. Parking lot creep

- Delineate parking areas with rocks, logs, or other obstructions to discourage creep (expansion)
- Ensure that parking areas are flat to minimize erosion and runoff
- Organize parking areas and trail access to minimize the tendency for informal trails
- Focus parking areas away from meadow habitat or sensitive cultural areas
- Re-vegetate damaged areas by de-compacting soils, seeding, mulching and planting
- Protect newly restored areas from further impact with closure signs, fencing, and/or other natural barriers such as rocks and logs
- Protect and document any cultural resources in the area

Figure 1-15. Denuded area adjacent to trailhead parking

CATHEDRAL LAKES TRAILHEAD

The Cathedral Lakes and Cathedral Peak trailhead is one of the most popular in the Tuolumne Meadows area. Over decades, the roadside parking area has expanded further west and east along the road and further out into vegetated areas, particularly on the north side where parking is immediately adjacent to the meadow. The impacts extend beyond the parking as visitors walk further out into the meadow, trampling vegetation and promoting more bare ground. Because parking is limited, visitors annually increase the parking area by squeezing their cars between trees, boulders or directly onto meadow vegetation. Roadside parking in this fragile meadow ecosystem is neither sustainable nor appropriate. To restore this heavily impacted area after parking is removed, the following actions are recommended:

- Close area to parking with fencing, boulders or other obstructions
- In forested areas, de-compact, mulch and seed the area
- In meadow areas, de-compact, plant, seed and re-contour to restore natural meadow topography and vegetation
- Protect and document any cultural resources
- Collect seed and grow native vegetation in a nursery to plant the area
- Address any hydrologic diversions or channeling to limit erosion and facilitate sheet flow

ROADS

TIOGA ROAD

Highway 120 (Tioga Road), runs east to west along the southern edge of Tuolumne Meadows and surface water flowing from the southern slopes is channeled through 35 culverts. In 2006, culverts clogged with vegetation and sediment were observed in 12 locations and signs of ponding water south of the road were observed in 23

Fig. 1-16. Partially blocked culvert

Fig. 1-17. Culvert set too low in meadow

Fig. 1-18. Ponding below culvert at Budd Creek

Fig. 1-19. Budd Creek culvert

locations (Cooper et al. 2006), (Figure 1-16). In most places, water is diverted to run parallel to the road at a distance less than 10 meters before a culvert allows water conveyance under the road and into the meadow (Cooper et al. 2006). Ponding is much more frequent near the east end of the meadow, where culverts are spaced further apart. This is also where the campground, gas station, store, and other infrastructure, coupled with lower gradient surface slopes, further interrupt water flow. The Tuolumne River is spanned by a bridge on the east end of the meadows that impacts the free-flow of the river.

CULVERTS

Because culverts force previously dispersed runoff into localized channels, downcutting has occurred downstream of many of the culverts, particularly in the west end of the meadow. This downcutting results in levee formation and accumulations of soils with greater permeability than surrounding meadow soils. These areas experience isolated prolonged inundation (in the channel) surrounded by higher elevation areas with little to no inundation. Surface water inflows, in particularly Unicorn and Budd Creek, provide groundwater recharge to the meadows, resulting in locally higher water levels near the streams. Downcutting may decrease recharge from surface water to meadow groundwater since it lowers the water table in the downcut streams and limits overbank flow (Cooper et al. 2006).

In addition, many of the culverts along Tioga Road were installed lower or higher than the surface level of the meadow (Figure 1-17). This increases downcutting, headcutting, and ponding, producing lower water availability and concomitant changes in species composition.

Currently, Budd Creek is conveyed through a single culvert that does not effectively accommodate high spring flows. As a result, on the south side of the road upstream incision has deepened the channel and reduced overbank flow. A secondary channel and associated culvert for Budd Creek only receives water at very high flows due to this channel incision and decreased overbank flow from the main stem (Figures 1-18, 1-19).

In order to improve the hydrologic connectivity between the surface flow from the south side of the road and Tuolumne Meadows, an assessment of the placement, number and size of existing culverts is recommended. In general, additional, larger and better-placed culverts could mitigate many of the observed impacts. Placement of culverts should depend on surface levels of the meadow to minimize downcutting, headcutting and ponding effects. In particular, culverts conveying water from Budd Creek and Unicorn Creek need to be much larger and numerous to accommodate peak spring runoff, some channel migration and flashy floods from summer thunderstorms. Several of the culverts are historic and reconstruction of these culverts would be guided by the recommendations in Chapter 2.

Once culverts are enhanced and replaced, work to restore the contours adjacent to existing culverts would help reduce the impacts and likelihood of further downcutting, channeling and ponding on the meadow vegetation and groundwater level. To

mitigate impacts of the culverts on meadow hydrology, the following restoration actions are proposed:

- Fill in ditches associated with culverts with native soil
- Apply woody debris, native mulch, and plant material (willows using hydrodrilling techniques) to divert and disperse runoff, promote deposition and limit scour
- Place rocks to disperse outflow energy and prevent downcutting
- Re-contour slope and landform to natural conditions to encourage sheet flow
- Re-vegetate areas adjacent to and downslope of culverts with native species to slow velocity of water flowing into the meadow, encouraging sheet flow and sediment deposition

TIOGA ROAD BRIDGE

The Tioga Road Bridge, west of the Lembert Dome parking area, has a 400-foot length of fill on the northeast approach to the bridge that acts as a levee, bisecting the wetland floodplain into two separate areas. Transfer of water downstream across the right bank floodplain is impeded, forcing overbank flows back through the constricted bridge opening which increases hydraulic pressure on the bridge. This condition also erodes the riverbank, alters the composition of wetland soils in the area, and compromises the structural integrity of the bridge. To reestablish a hydrologic connection between the floodplain on either side of the fill and allow water to transfer under the approach road, one of the following actions is recommended: 1) Install a series of large culverts placed on grade under the road or 2) Increase span of bridge to a greater width, including more of the river and floodplain.

LITTLE BLUE SLIDE

Little Blue Slide is an unstable road cut east of Tuolumne Meadows along Tioga Road. With runoff and emerging groundwater, silt and boulder-sized material from the Slide erode and deposit in the Dana Fork of the Tuolumne River. This increases turbidity and poses risks to Tuolumne's public water supply. Re-vegetation of the roadcut is necessary to stabilize soils and the following actions are recommended:

- Engineer benches backfilled with soil with adequate rooting depth for plants to stabilize the surface layer, facilitating infiltration and providing cover
- Construct a small retaining wall at the base of the slope
- Re-vegetate the slope by planting, seeding and mulching

HISTORIC ROADS

There are remnants of old roadbeds along the northern and southern edges of Tuolumne Meadows (Figure 1-20, 1-21). Many sections of the roads are difficult to detect, while other sections are obvious and characterized by sparse vegetation, multiple ruts, and conifer encroachment. Old roadbeds impact meadow integrity in a number of ways including channeling water, altering vegetation composition, compacting soils, and disrupting hydrologic connectivity (ponding upslope and drying downslope areas). Portions of old roadbed that impact meadow integrity and are not

Fig. 1-20. Old roadbed north of the Visitor Center

Fig. 1-21. Old roadbed adjacent to Delaney Creek

Fig. 1-22. Headcut and downcutting

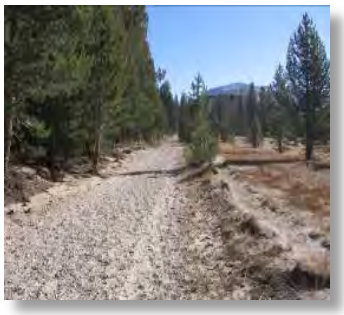


Fig. 1-23. Wide, deep rut with trail on the side

a contributing element to the cultural landscape may be candidates for ecological restoration. To mitigate these impacts, the following restoration actions are proposed:

- Ensure documentation of historic resources
- Re-contour, de-compact, seed and mulch to restore to natural conditions
- Remove any nonnative fill or infrastructure associated with these roads

In 1883, the Great Sierra Consolidated Silver Mining Company built the Great Sierra Wagon Road (GSWR) to access the company's mines east of Tuolumne Meadows. In 1915, the road became a public highway and was officially renamed the Tioga Road. Today, sections of the original Great Sierra Wagon Road are well defined and serve as a trail or access road while some portions lie under the footprint of Tioga Road, or are barely discernable. The Great Sierra Wagon Road is listed in the National Register of Historic Places and within Tuolumne Meadows, is a contributing feature to the Tuolumne Meadow Historic District. The objective for ecological restoration is to retain the road for foot and stock traffic, yet minimize impacts to the meadow. Chapter 2 in this report provides a cultural resource analysis with design recommendations and mitigations required to prevent impacts should restoration take place. Two sections of this original roadbed require special attention due to the impacts they have to ecological processes in the adjacent meadow and proposed restoration actions are listed below.

Section 1: Tuolumne Campground Entrance to the Tuolumne Lodge

This section of the Great Sierra Wagon Road now serves as a trail but is up to 3 feet deep, up to 12 feet wide, and significantly impacts hydrology of the meadow. Its proximity to the Tioga Road and the Tuolumne River, combined with the sandy substrate, has lead to deep channeling, heavy erosion, headcuts and sediment transport into the river. Sheet flow coming off Lembert Dome is channeled through culverts, along the deeply rutted trail and toward the river. This diverts water from the meadow areas, lowers groundwater levels, and alters plant communities (Figure 1-22). Because this section of trail is so deep and sandy, it is difficult to walk on and visitors and pack stock walk on the edge of the trail, promoting more vegetation loss and further widening (Figure 1-23). This section of trail is heavily used by stock coming from the NPS stables towards the Glen Aulin trail. There are also several informal trails leading to the main trail that exacerbate channeling effects. In order to mitigate impacts to the meadow, prevent sediment from going into the Tuolumne River, retain the trail for foot and pack stock traffic, and retain the historic character of the Great Sierra Wagon Road, the following actions are proposed:

- Follow design considerations prescribed in Chapter 2
- Bring trail ruts up to the same elevation as the adjacent meadow (fill with native soil, rocks and/or gravel) – heavy equipment such as bobcat and excavator may be used
- Apply woody debris, plant material, and erosion control structures such as wattles or blankets to divert and disperse runoff, promote deposition and limit scour

- Establish vegetation (seeding, planting, mulching) to slow water velocity
- Narrow roadbed to recommended width to retain historic character (determined by cultural resource specialists), while minimizing impacts to natural resources
- Improve culverts conveying water flowing off of Lembert Dome (north of the road) to reduce channeling, downcutting, headcutting, and velocity, and encourage sheet flow
- Stabilize existing headcut – completely fill and plant or install a series of properly designed checkdam structures to encourage sediment accumulation
- Where the trail diverges from the historic GSWR (through the meadow in front of the Ranger Station), relocate the trail to the edge of the road and restore the meadow to natural conditions
- Improve signage to encourage visitors to stay on the trail

SECTION 2: VISITOR CENTER TO SODA SPRINGS

There are two sections of the Great Sierra Wagon Road leading to Soda Springs and Parsons Lodge, one from the east and the other from the south. The east section of road, currently used by maintenance vehicles to access wastewater treatment facilities, originates in the Lembert Dome parking area and follows the northeast edge of the meadow. While the wastewater treatment facilities remain in the current location, this section of road is not a candidate for ecological restoration.

The section from the south begins at the Visitor Center and serves as a foot trail to access Parson's Lodge, the old Sierra Club Campground and the Soda Springs area. The Great Sierra Wagon Road was improved in the early 1900s so that vehicles could access the Sierra Club Campground and averages 12 feet in width. During road construction, soil dug from the sides of the road was used to raise the roadbed above the level of the meadow (Figure 1-24). Water is channeled laterally in these ditches alongside the roadbed into one of three culverts, one of which conveys Unicorn Creek. The damming action of the roadbed, headcuts, vegetation loss and incised channels associated with the ditches and culverts impact the surface flow of water throughout the meadow. The surface of the roadbed is characterized by multiple trail ruts, vegetation loss and soil compaction (Figure 1-25). It is also detracts from scenic views. A bridge spans the Tuolumne River just south of Parson's Lodge. Abutments constructed in the middle of the river support this bridge but alter natural river processes and sediment deposition and scour. This bridge also does not accommodate the overflow channel to the south and a large headcut is forming.

Fig. 1-24. Headcut and ditch adjacent to trail

Figure 1-25. Trail to Soda Springs

In order to mitigate impacts on hydrology and meadow vegetation, retain the trail for foot and pack stock traffic, and retain the historic character of the Great Sierra Wagon Road, the following actions are proposed:

- Remove or lower causeways that act as dams
- Apply woody debris, plant material, and erosion control structures such as wattles or blankets to divert and disperse runoff, promote deposition and limit scour
- Narrow roadbed to recommended width to retain historic character (determined by cultural resource specialists), while minimizing impacts to natural resources
- Remove non-native fill and/or use to fill in ditches (specifically those parallel to the Soda Springs trail) or incised channels - heavy equipment such as a bobcat and/or excavator may be used
- Salvage native fill and plants
- Restore multiple ruts to natural conditions by re-contouring, de-compacting, seeding and re-vegetating
- Improve signage to encourage visitors to stay on the designated trail
- Install additional and larger culverts to accommodate flow from Unicorn Creek and improve hydrologic connectivity across the trail
- Re-design Soda Springs Trail bridge (considering historic values) over the Tuolumne River to accommodate overflow channel to the south of the bridge (currently only a small culvert) and to limit impact on the free flow of the river
- Install sections of boardwalk or other surface types through wet and saturated areas to maintain sheet flow and protect vegetation from trampling
- Obstruct restored areas with natural materials and improve signage to encourage visitors to stay on the designated trail

Fig. 1-26. Wilderness sign at informal trail

TRAILS

There are miles of both formal and informal trails throughout the Tuolumne Meadows area. Trails through meadows can affect hydrology, compact soils, reduce vegetation cover and degrade scenic views. In general, multiple rutted trails are common in meadows because as the ruts deepen they are subject to more saturation and inundation, causing visitors to move to drier areas adjacent to the trail, thus creating a new trail that also will become rutted (Figure 1-25). In some areas of frequent saturation, the trail may be built up to keep the tread dry but this impacts hydrology by obstructing sheet flow by acting as a dam. Most of the formal trails in the Tuolumne Meadows area lie within the footprint of the Great Sierra Wagon Road and are described in that section. There are also heavily used trails along the Dana and Lyell Forks of the Tuolumne River. Sections of these trails also exhibit braiding, rutting and widening. To mitigate impacts of both formal and informal trails, particularly multiple, rutted trails, the following restoration actions are proposed:

- Reroute trails out of meadows to drier, more resilient areas in collaboration with Trails, Wilderness, and RMS staff
- Remove any non-native fill, salvage native fill and vegetation
- Restore multiple ruts to natural conditions by re-contouring, de-compacting, seeding and re-vegetating
- Improve sheet flow disrupted by existing trails by improving or adding causeways
- Lower trail sections that act as dams
- Fill ditches that channel water with native soil
- Apply woody debris, plant material, and erosion control structures such as wattles or blankets to divert and disperse runoff, promote deposition and limit scour
- Install boardwalks or other trail types in very wet sections to promote sheet flow, protect vegetation and discourage multiple trail ruts
- Assess site appropriateness for formal trails considering wetland status, duration and depth of flooding/saturation, impacts of installing boardwalks or elevated trails and recovery of subalpine vegetation
- Delineate trails with natural materials and improve signage to encourage visitors to stay on the designated trail
- Narrow trails where appropriate (considering historic character)
- Protect and document any cultural resources

INFORMAL TRAILS

Informal hiking trails are common throughout Tuolumne Meadows. Some of these trails exhibit heavier use just in the past decade, as they become more defined from constant traffic. Informal trail conditions vary depending on the level of use. Some are deeply rutted and are characterized by multiple ruts while others only exhibit trampled vegetation. A restoration project at Pothole Dome in the 1990's addressed multiple informal trails and proved effective in protecting the central part of the meadow. Fencing was installed, guiding visitors to walk along the edge of the meadow. In recent years, an informal trail originating from parking just east of Pothole Dome and

extending to the Tuolumne River has become much more prominent, particularly after an "Entering Yosemite Wilderness" sign was placed at the edge of the road (Figure 1-26). The sign is an indication to visitors that it is a formal trail and subsequently, use has increased. High concentrations of informal trails exist adjacent to the Tuolumne Store and Grill, at the Soda Springs trailhead, around the Soda Springs area, along the Cathedral Peak parking area and along the banks of the Tuolumne River. Many of these informal trails also affect cultural resources and merit removal. To minimize the extent and impact of informal trails, the following actions are proposed:

- Restore informal trails to natural conditions through de-compacting, re-contouring, seeding and re-vegetating
- Close the meadow to off-trail hiking
- Direct visitors to established trails
- Formalize sections of the existing informal trails based on visitor use patterns
- Install temporary deterrents to protect sensitive areas from further impact
- Allow dispersed use in more resilient and less popular areas
- Protect and document any cultural resources

TUOLUMNE MEADOWS CAMPGROUND

The Tuolumne Meadows Campground has seven loops and 304 campsites. While most of the campground is within lodgepole pine forest, the A loop is very close to the riparian corridor of the Lyell Fork of the Tuolumne River. This loop road experiences ponding and flooding in the early part of the season. At the end of the A loop, flooding in 1997 washed out some of the road, prompting park mangers to lay riprap to harden the riverbank (Figure 1-27). Riprap can be effective in protecting infrastructure from further flood exposure, but it decreases the free flow of the river, compromising channel morphology and altering scour and deposition dynamics. There are many informal trails along this section of riverbank as well. The access road, campsites and other hardened areas concentrate water flow and sediment movement. To restore the free flowing character of the Tuolumne River and to protect and restore riverbanks and the riparian corridor, the following actions are proposed:

Fig. 1-27. Riprap along river in Tuolumne Campground

- Remove the A loop access road, informal trails and infrastructure to better protect the riverbanks from further impact and to allow free flow of the Tuolumne River
- Remove riprap and any other erosion control structures
- Remove asphalt, re-contour, de-compact, re-vegetate and mulch impacted areas
- Reroute the road entering the campground further away from the river out of the floodplain
- Re-vegetate and re-contour disturbed areas adjacent to the reroute
- Salvage any soil or vegetation that is removed for any new road development
- Apply bioengineering techniques (e.g. brush layering, anchor logs, intensive planting of vegetation) to stabilize riverbanks, promote sediment accretion, and minimize further riverbank loss
- Minimize the extent and concentration of informal trails by focusing access to more resilient areas and restore impacted areas to natural conditions
- Protect and document any cultural resources

TUOLUMNE MEADOWS LODGE

Fig. 1-28. Employee housing next to river

The Tuolumne Meadows Lodge is a historic resource and provides overnight accommodation for visitors and housing for employees. Several structures, particularly the lodge and employee housing, are located within 10 meters of the Dana Fork of the Tuolumne River (Figure 1-28). These areas exhibit compacted soils, vegetation loss, exposed roots and riverbank erosion. Having structures so close to the river can also affect water quality. If any structures are removed, the following are proposed:

- Remove all above and below ground infrastructure (including pipes or any utilities)
- Re-contour the area to natural landform
- De-compact, mulch, seed and plant to promote vegetation establishment
- Protect newly restored areas from further impact with closure signs, fencing, and/or other natural barriers such as rocks and logs
- Protect and document cultural resources

GLEN AULIN HIGH SIERRA CAMP

The Glen Aulin High Sierra Camp is a historic resource and provides overnight lodging six miles into the wilderness. A wetland delineation of the area completed in 2006 documents areas of fragmented wetlands, a heavily used trail through a wetland and areas in need of ecological restoration. Denuded riverbanks also occur in the area. Whether the camp remains, is reduced in size, or is completely removed, ecological restoration is needed to mitigate current impacts to wetlands and riverbanks. Because Glen Aulin is located in a Potential Wilderness Addition, extra sensitivity to natural and cultural resources and wilderness character is necessary. For any structures or utilities that are removed or altered, the actions outlined in this plan under "Removal or Relocation of Facilities" apply. In addition, the following restoration actions are recommended:

- Remove any impacts to wetlands and restore currently impacted areas to natural conditions
- Reroute the heavily used trail out of the fragmented wetland to a less sensitive upland area
- Salvage plants in reroute area and transplant to obstruct old trail
- Remove trail in wetland by de-compacting soils, filling in ruts, re-contouring natural meadow topography, seeding and mulching to promote plant establishment
- Obstruct old trail with natural materials to encourage visitors to use the new route
- Restore the natural drainage that was filled in and flattened to natural conditions, thereby improving access to toilets
- Re-vegetate (de-compact, mulch and seed) the historic corral on the granite bench that once was an extension of a delineated wetland
- Re-vegetate, stabilize and protect denuded riverbanks on the Tuolumne River
- Protect and document cultural resources in the area

SODA SPRINGS AND PARSON'S LODGE

Soda Springs is a natural alkaline spring, unusual in the high Sierra Nevada, which provides habitat for many special status plant species. Soda Springs is not only ecologically valuable but is also an important American Indian historic resource. Parsons Lodge is listed on the National Register of Historic Places and is designated a National Historic Landmark. It is currently used for workshops and as a starting point for interpretive walks and talks. This area experiences high levels of use, with most people accessing the site via the trail from the Visitor Center. Additionally, the road to the sewage treatment ponds, the Glen Aulin trail, and many informal trails provide access to this very popular area. The Glen Aulin trail, heavily used by stock, passes very closely to the springs and the associated manure and dust has potential to contaminate the springs. To improve the ecological integrity of the site, the following actions are proposed:

- Consult with park-associated American Indian tribes and groups to develop restoration strategies, ensuring that treatments incorporate native concerns, issues, and perspectives
- Improve delineation of trails
- Improve signage
- Remove informal trails and restore to natural conditions
- Direct visitors to use established trails
- Reroute the Glen Aulin trail further away from the springs
- Protect and document and cultural resources
- Establish monitoring of vegetation and hydrology

STABLES

To provide supplies to the High Sierra Camps, day rides for visitors, and park management operations in wilderness, stock is housed in one of two corrals in the Tuolumne area. Issues associated with the corrals include soil loss from erosion and dust, potential water quality issues, water diversions for water supply, and vegetation loss. For alternatives of the Tuolumne Meadows Plan that propose to relocate, remove or consolidate stock staging areas, the following ecological restoration actions are recommended to minimize continued impacts:

- Re-contour impacted area to natural landform (i.e. if stables are consolidated or removed)
- De-compact, mulch, seed and plant to re-vegetate with native species
- Restore hydrologic processes to minimize erosion, eliminate water diversions and address water quality issues
- Remove and restore associated trails that would no longer be needed to natural conditions
- Where stables are retained, ensure that water quality issues are addressed
- Where stables are retained, minimize footprint

- Protect newly restored areas from further impact with closure signs, fencing, and/or other natural barriers such as rocks and logs
- Protect and document any cultural resources

Removal or Relocation of Facilities

There are several facilities providing visitor and park management services in the Tuolumne Meadows area including roads, trails, employee housing, maintenance facilities (including stock operations, water collection and wastewater treatment facilities, and storage and staging areas), the Tuolumne Meadows Visitor Center, Tuolumne Meadows Campground, Tuolumne Meadows Lodge, Store, Grill, Mountaineering Shop and Gas Station, and Glen Aulin High Sierra Camp. Day use, overnight parking areas, and utilities are also associated with these facilities. Depending on the preferred alternative, any plans to remove or relocate facilities would require consideration for natural and cultural resources to ensure that impacts are minimized. If facilities, utilities, and/or associated infrastructure are removed, the following actions are proposed to restore areas to natural conditions:

- Survey for rare or sensitive plant and animal species
- Restore historic wetlands that were previously impacted
- Remove all above and below ground infrastructure impacting hydrologic conditions (pipes, asphalt, water diversion etc.)
- Crush, fill (slurry), or remove all abandoned underground utilities
- Re-contour area to natural landform
- Restore primary ecosystem processes, primarily hydrology and wetland function
- Salvage any soil or vegetation impacted by removal
- De-compact, mulch, seed and re-vegetate impacted area
- Minimize impacts to surrounding vegetation by limiting size and development of staging and construction areas
- Minimize impacts to hydrology
- Minimize impacts to wildlife
- Ensure that all equipment and materials are weed seed free
- Ensure that impact does not degrade the surrounding area, specifically wetland, riparian or riverine ecosystems or any primary ecological processes
- Protect rare or sensitive plant and animal species from impact
- Protect and document cultural resources
- Protect restoration areas from further impacts with fencing or appropriate deterrents

Wastewater Treatment

Wastewater from Tuolumne Meadows facilities is currently conveyed through pipes to two sewage ponds and spray fields north of Parsons Lodge (Figure 1-29). If the preferred alternative is to move wastewater treatment facilities to another location, significant restoration of the existing site is needed. Any site chosen for new

Fig. 1-29. Sewage Treatment Pond

Fig. 1-30. Pump station associated with treatment pond

wastewater treatment facilities or associated infrastructure would require an impact analysis for natural and cultural resources. The following actions are proposed to ecologically restore the existing site as well as associated access routes (including roads) to the site:

- Restore natural contours which match the surrounding landscape using heavy equipment (excavator, bulldozer, loader, dump trucks)
- Fill in pond sites (potentially using fill material left from the construction of the ponds)
- Remove asphalt, de-compact, re-contour, re-vegetate and restore to natural conditions
- Remove pump station and restore area to natural conditions (Figure 1-30)
- Remove and properly dispose of any toxic substances associated with the wastewater treatment
- Remove or crush all pipes and underground infrastructure associated with wastewater treatment
- Remove riprap and re-contour mounds associated with construction of the ponds
- Re-contour ditched areas associated with the spray field and restore area to natural conditions
- Remove sections of non-historic road and restore to natural conditions; narrow sections of historic roads to retain historic character

RESEARCH

Additional research is needed to quantify the degree of degradation of meadow plant communities and the Tuolumne River, and the relationships to past and current land management practices. In particular, more research is necessary to examine evidence of the historic vegetation communities in these areas of concern, the most efficient and effective techniques for restoration, and the feasibility or appropriateness of ecological restoration. Research into the composition of historic vegetation is likely to entail analysis of soil seed banks, plant macrofossils and phytoliths (microscopic pieces of plants that are resistant to decay and can identify historic plant species). Analyses of organic matter content, soil carbon, carbon cycling, and plant productivity may also be included. Ecological restoration techniques to actively restore meadow plant communities, if feasible or appropriate, are likely to involve planting, seeding and mulching with temporary closure to foot traffic as vegetation re-establishes. These data may also provide information on the conditions that increase the rate and extent of conifer seedling establishment as related to past land use (i.e. intensive grazing). All of these studies would address the potential influence of climatic conditions and consider those interactions.

Cooper et al. (2006) recommended a detailed study of willows in order to understand the factors that limit willow establishment and persistence in the area and the relationship between willow growth and bank stability. Research may also focus on mammalian herbivory (pocket gophers, voles and deer) and the effects on establishment and growth of perennial plants typical of wet meadows. This research

may require installation of temporary experimental plots that eliminate entry of small mammals. The effects of deer browsing would be assessed by protecting individual willows from grazing by small exclosures and assessing any changes in willow height, productivity, and catkin/seed production. These research plots would be located outside of designated Wilderness. If research indicates that vegetation communities are in an altered state due to anthropogenic influence, restoration actions to restore these plant communities may be desired and appropriate.

Fire also played a role in shaping the vegetation communities and landscape of Tuolumne Meadows but knowledge of the frequency and ignition source of fire is largely unknown. Ongoing studies of fire history in subalpine forests may shed some light on the role that fire may have played in shaping Tuolumne Meadows and point to using fire as an additional restoration tool.

Monitoring and Long-Term Maintenance

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. However, successful ecological restoration should include continued protection and management of the project site into the indefinite future (Clewell et al. 2005). Frequently, ecological restoration projects are not funded for subsequent management that may be required to prevent recurrent degradation of restored ecosystems. To ensure success and to facilitate learning (sometimes from mistakes), it is critical to include monitoring and utilize adaptive management in ecological restoration planning.

Monitoring can help to determine the efficacy of the restoration efforts and provide guidance for future restoration projects in similar environments. Monitoring methods may include vegetation transects, quadrats or ocular estimations, temporary exclosures, groundwater monitoring wells, and photo point establishment.

Tuolumne Meadows and the Tuolumne River corridor comprise diverse and dynamic ecosystems. Any alterations can effect cascading changes to the complex physical, chemical and biological interactions and conditions. Monitoring the efficacy of restoration efforts and the conditions stemming from those actions can feed into adaptive management and help avoid unwanted results. Ecological restoration is a long-term process of initiating autogenic repair but when the degree of degradation is high, further intervention may be necessary. Future ecological restoration actions and monitoring will also be guided by ongoing and future research as understanding of the causal factors for ecosystem damage increases.

Future monitoring of restoration actions will be dependent on Park staff to secure funding through proposal processes.

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CHAPTER 2. MITIGATION MEASURES TO PROTECT THE GREAT SIERRA WAGON ROAD

By Daniel Schaible, Historical Landscape Architect

HISTORIC OVERVIEW OF THE GREAT SIERRA WAGON ROAD

The Great Sierra Wagon Road was built in 1883 by the Great Sierra Consolidated Silver Mining Company to access the company's mines on Tioga Hill east of Tuolumne Meadows. This road was unpaved, built to a maximum grade of 10% and was 10-20 feet wide. In 1915 it was acquired by Stephen Mather and donated to the Department of the Interior as a public highway serving motor tourism in the area. At that time the road was officially renamed the Tioga Road, although it had been referred to by that name for some time earlier.

In the early 1930s, the National Park Service decided to reconstruct the Tioga Road in three phases. The first involved rebuilding the road from the east, from Tioga Pass to Cathedral Creek, the second from the west, from Crane Flat to White Wolf, and the third involved connecting these two road segments. Although the first two segments were constructed on schedule, the third section of roadway, having been stalled following the U.S. entering into World War II, was not completed until 1958. The "new" Tioga Road was built to contemporary Forest Highway Standards, as defined by the Bureau of Public Roads, and was 26-28 feet wide with a maximum grade of 6%. Although following a similar route in some locations, the new Tioga Road deviated from the alignment of the original road in many stretches. Today, many remnants of the original alignment of the Great Sierra Wagon Road are still present, some of which are currently used as foot and stock trails.

The western portion of the Great Sierra Wagon Road, from the area near Aspen Valley to White Wolf, (which is far outside of the proposed ecological restoration project area) was listed in the National Register of Historic Places in 1978 with local significance within the fields of transportation, industry and engineering. Furthermore, the remnant section of the Great Sierra Wagon Road that passes through the project study area is a contributing feature within the Tuolumne Meadow Historic District, as defined in the Tuolumne Meadows Cultural Landscape Inventory of 2007.

PROJECT OVERVIEW

The goal of this project is to restore natural hydrological functions and reduce erosion and trampling of native vegetation within Tuolumne Meadow.

A component of this project will involve regrading and narrowing remnants of the Great Sierra Wagon Road (1883) that are now used as foot and equestrian trails in the Tuolumne Meadows area. These modifications are necessary because (in many

locations) the remnant road corridor has resulted in deep incisions and erosion within the meadow. The section of the road that crosses the meadow to Soda Springs was built on fill primarily acquired from the side of the roadway (creating a roadside swale that has, in many locations, become deeply incised). The roadbed disrupts natural hydrologic flow. There are currently an inadequate number of culverts resulting in disrupted surface water flow and increased erosion. Furthermore, the trail itself is deeply rutted and braided in some locations, resulting in unsecure walking surfaces and leading people to walk off the intended surface, further widening the trail and negatively impacting meadow vegetation.

The following actions can assist in the restoration of natural processes within Tuolumne Meadows:

- Narrow stretches and eliminate braiding of the Great Sierra Wagon Road roadbed.
- Remove fill and reduce the profile from the Great Sierra Wagon Road roadbed.
- Add fill and raise the profile of eroded sections of the Great Sierra Wagon Road.
- Add culverts underneath portions of the Great Sierra Wagon Road roadbed.
- Fill in and/or re-contour the swales that run parallel to the Great Sierra Wagon Road.
- Remove vegetation that has grown on the elevated Great Sierra Wagon Road roadbed, particularly lodgepole pine.
- Obliterate social trails that now run parallel to the Great Sierra Wagon Road.
- Fill in ditches of unknown origin that were constructed at an unknown time within Tuolumne Meadows to drain kettle ponds. These ponds were likely drained as part of a mosquito abatement project.

MITIGATION MEASURES TO PROTECT EURO-AMERICAN HISTORIC LANDSCAPE RESOURCES WITHIN TUOLUMNE MEADOWS

In order to minimize impacts to cultural resources, the following guidelines should be followed during the ecological restoration project at Tuolumne Meadows:

- When narrowing the roadbed (which is wider than historically and excessively braided in some locations) maintain a minimum width of 10 feet in order to convey the corridors historic use as a wagon road.
- Maintain the current alignment of historic remnants of the Great Sierra Wagon Road.
- If modifications are necessary to historic culverts and their associated headwalls, efforts should be undertaken to ensure that the modifications match their historic character. These efforts may include photo-documentation, contracting with a qualified stone mason, numbering headwall stones for reconstruction and locating granite that matches the color and texture of the existing stone masonry granite.
- New culverts (if added) should be built in a manner of similar culverts along the roadway, with simple, understated stone masonry headwalls with discrete, low profiles. The stone used in the headwalls should match, as closely as possible, the color, texture and dimensions of the stone found in other historic culvert headwalls found at Tuolumne Meadows.
- Reducing or adding to the vertical profile of the roadway is acceptable. However, it should be maintained at least slightly above the grade of the meadow.
- It is acceptable to remove woody vegetation from the roadside shoulders, as these features were not present during the historical period.
- Filling and re-contouring the swales on either side of the Great Sierra Wagon Road is acceptable as these features have been scoured out and are now deeper than they were during the historic period. We would recommend against eliminating the ditches entirely, as this would likely lead to the road/trail washing out.
- The ditches that lead from and drain many of the area's kettle ponds are not documented as historic features. As such, filling and regrading them is acceptable within the Historic District.
- Major reroutes of historic trails in the area, particularly iconic trails such as the John Muir Trail and the Pacific Crest Trail, might constitute an adverse effect on the resource, and should go through additional impact analysis and environmental compliance.
- Do not pave any sections of the Great Sierra Wagon Road. Appropriate surface materials are dirt or dirt with a thin application of locally sourced decomposed granite.

- Removal and naturalization of the A-Loop Access Road in the Tuolumne Meadows Campground could result in an adverse effect to the Historic District. If pursued, this work should be preceded by requisite environmental compliance processes and the establishment of additional mitigation measures for the loss of the historic features.

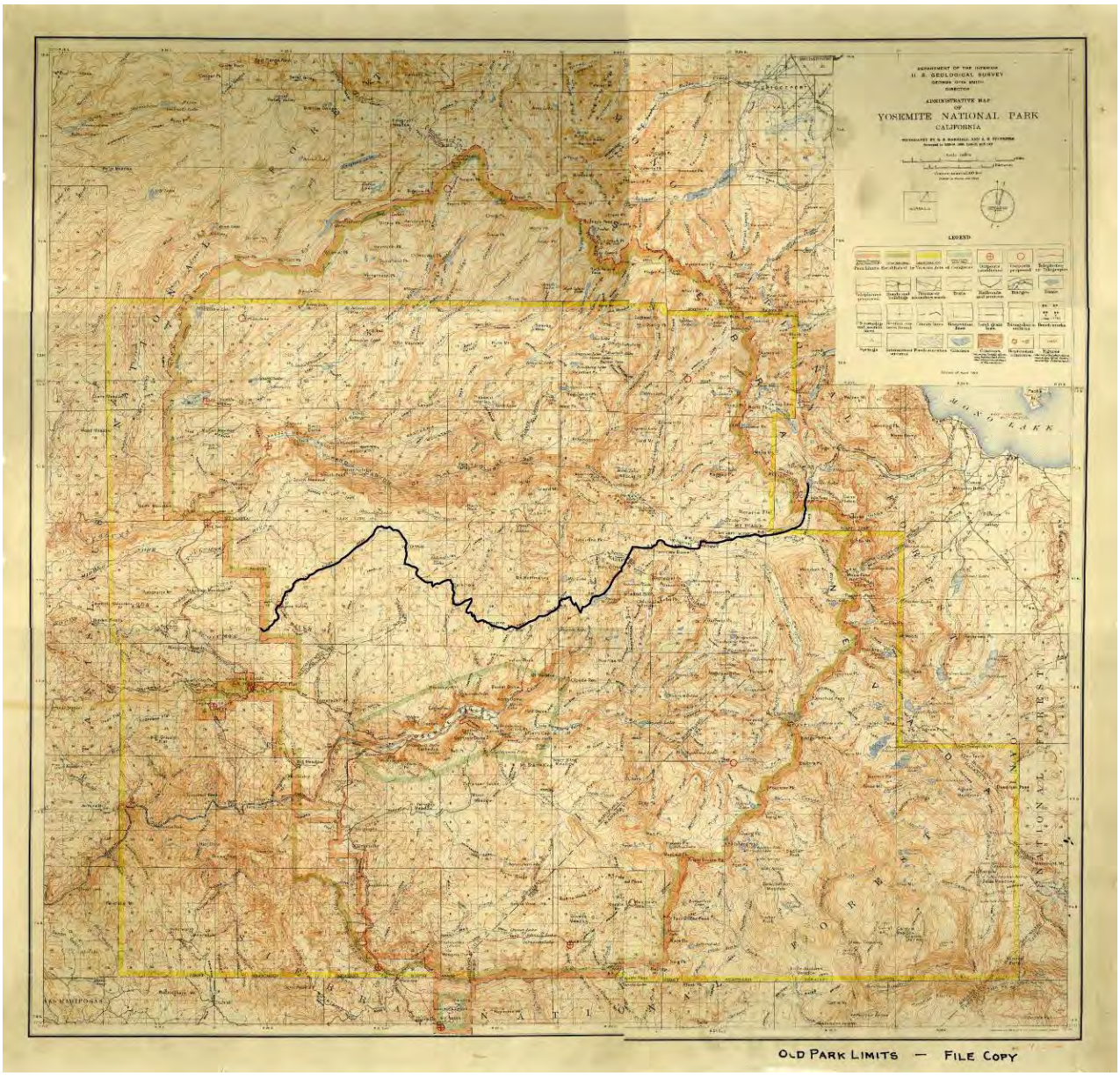

Figure 2-1. U.S. Geological Survey map of Yosemite National Park from 1910, 1:125,000. The alignment of the Tioga Road is traced in black.

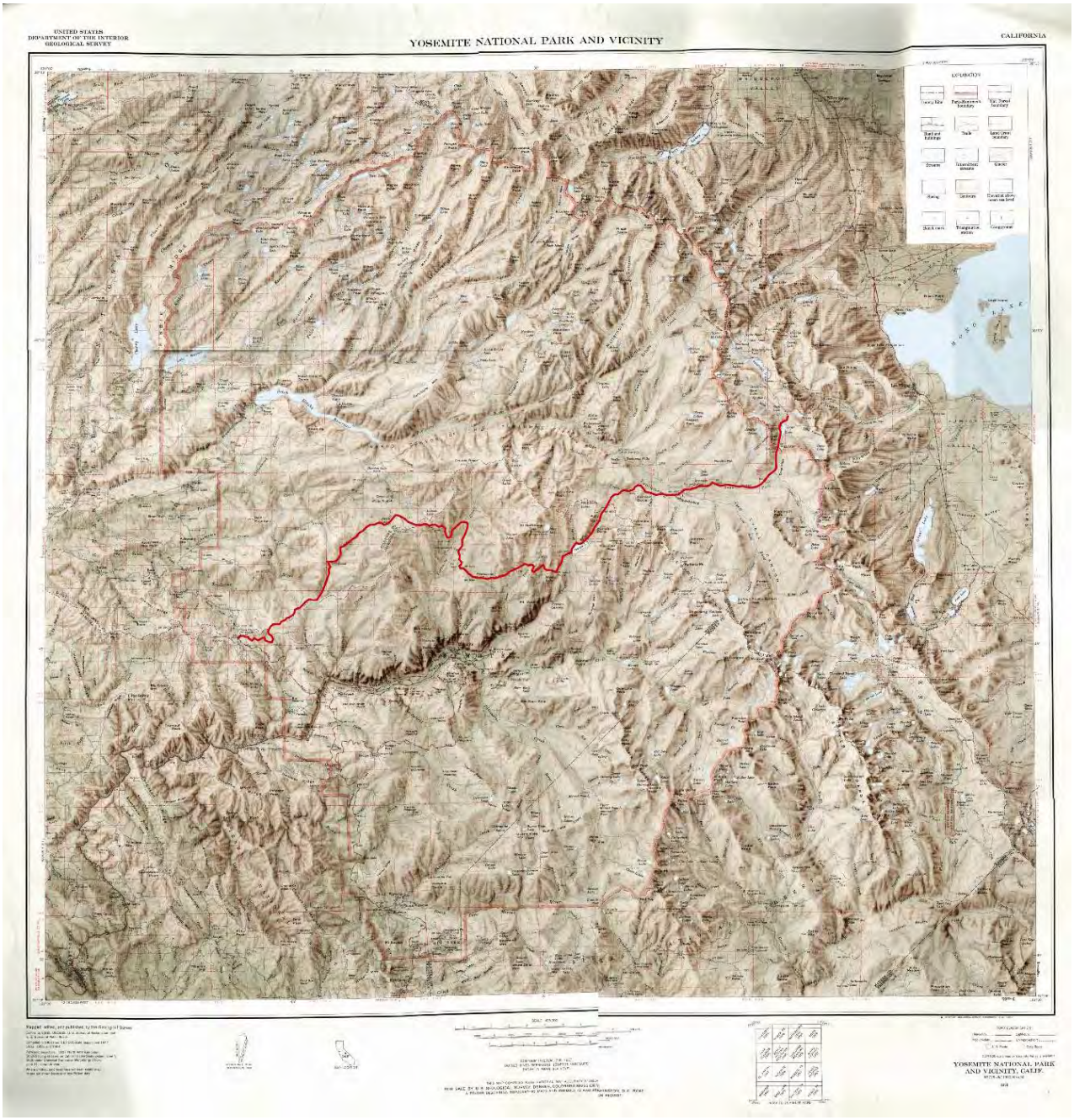

Figure 2-2. U. S. Geological Survey map of Yosemite National Park from 1958, 1:125,000. The alignment of the Tioga Road is traced in red.

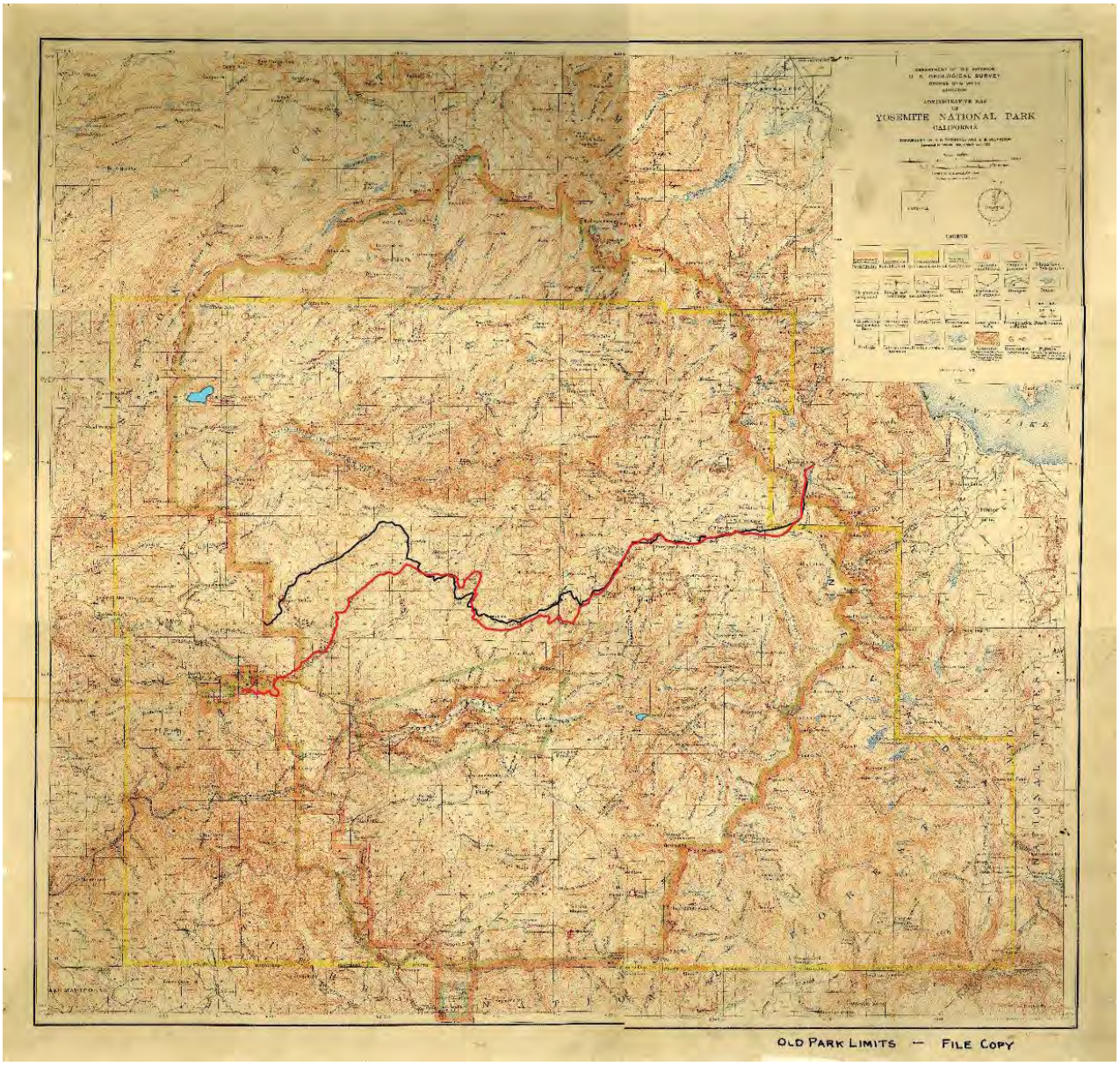

Figure 2-3. Map showing the 1910 alignment of the Tioga Road (black) overlaid with the 1958 alignment of the Tioga Road (red). Notice that the alignment is profoundly different, particularly along the western stretches of the road.

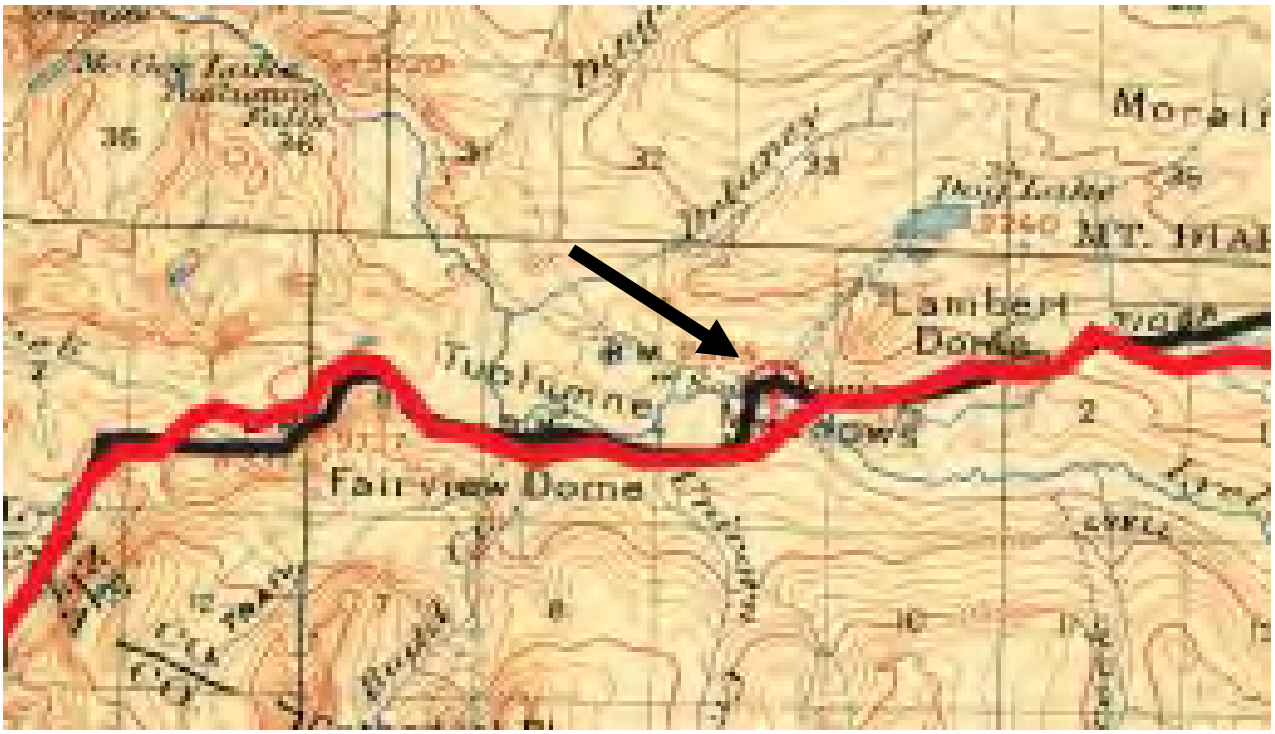

Figure 2-4. Map showing a detail of the 1910 (black) and 1958 (red) alignments of the Tioga Road as it passes through Tuolumne Meadows. Although the alignments are quite close for this stretch of the road, the arrow points to the section of the 1910 road that used to cross Tuolumne Meadows out towards Soda Springs, but, since the 1930s, now runs along the meadows perimeter. Most of the ecological restoration work will take place on this stretch of the historic roadway.

Appendix I:
Tuolumne Wild and Scenic River Section 7 Determination

Introduction

Purpose of this Determination

In 1984 Congress designated the Tuolumne as a Wild and Scenic River to protect the river's free-flowing condition and to protect and enhance its unique values for the benefit and enjoyment of present and future generations (16 USC 1271). This designation gives the Tuolumne River special protection under the Wild and Scenic Rivers Act.

The *Tuolumne Wild and Scenic River Comprehensive Management Plan* (*Tuolumne River Plan*) proposes actions that would be located on stream tributaries to the Tuolumne Wild and Scenic River and therefore require additional consideration under section 7(a) of the Wild and Scenic Rivers Act. The purpose of this determination is to evaluate the potential of these actions to either invade or diminish the scenic, recreational, fish, or wildlife values of the wild and scenic river.

Authority

The authority for this determination is found in section 7(a) of the Wild and Scenic Rivers Act (Public Law 90-542, as amended, 16 United States Code [USC] 271-1278). Section 7 states that

> *No department or agency of the United States shall assist by loan, grant, license or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration. Nothing contained in the foregoing sentence, however, shall preclude licensing of , or assistance to , developments below or above a wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or unreasonably diminish the scenic, recreation, and fish and wildlife values present in the area on the date of designation of a river as a component of the national wild and scenic rivers system.*

While the Wild and Scenic Rivers Act does not prohibit development along a river corridor, it does prohibit activities that would interfere with the free-flowing condition of the river or degrade the values for which it was designated wild and scenic. The Wild and Scenic Rivers Act specifies guidelines for the determination of appropriate actions in the bed and banks of the river and either below, above, or on a tributary to a wild and scenic river.

As the designated river manager for the Tuolumne River segments located within the boundaries of Yosemite National Park, the National Park Service must carry out a determination of effects on all proposed water resources projects[1] in accordance with section 7(a) of the act.

1 A water resources project is any dam, water conduit, powerhouse, transmission line, or other works project under the Federal Power Act, or other developments, that would affect the free-flowing character of a wild and scenic or congressionally authorized study river. In addition to projects licensed by the Federal Energy Regulatory Commission, water resources project may include dams, water diversions,

Methodology

The *Tuolumne River Plan* proposes to improve the river's free flow by

- removing the impediments to the river's free flow cause by the abutments for the Tioga Road Bridge and Soda Springs Bridge, both of which span the Tuolumne River at Tuolumne Meadows;
- improving, replacing, and adding new culverts on upstream tributaries at Tuolumne Meadows; and,
- removing riprap from approximately 150-feet of riverbank near the Tuolumne Meadows campground A-loop.

The actions to improve bridges over the river called for in the *Tuolumne River Plan* will require a separate, subsequent environmental compliance process. A Section 7 determination for those actions will be performed as part of that separate planning process.

For the culverts proposed on upstream tributaries in the *Tuolumne River Plan*, Section 7(a) of the act provides a specific standard for review of developments below or above or on a stream tributary to a designated river. Such developments may occur as long as the project "will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area as of the date of designation." The section 7 evaluation for actions associated with the Tuolumne Wild and Scenic River Management Plan is based on guidance provided in appendix D ("Evaluation Procedure under 'Invade the Area or Unreasonably Diminish'") of the *Wild and Scenic Rivers Act: Section 7* technical report published by the Interagency Wild and Scenic Rivers Coordinating Council in 2004.

The initial question to be addressed is whether or not the proposed project invades the designated river. The term 'invade' is defined as "encroachment or intrusion upon." If the proposed project does not invade the designated river, the next question to be answered, relative to the standard in section 7(a), is whether or not the proposed project will "unreasonably diminish" any of the specified values. Given that the standard implies that some diminution of values may be determined reasonable, there are two questions to consider:

1. Does the proposed project cause diminution of the scenic, recreation, and fish and wildlife values of the designated river as present at the date of designation?

2. If there is diminution, is it unreasonable? This would suggest an evaluation of the magnitude of the loss. Factors to be considered include:

    - whether the value contributed to the designation of the river (i.e., an outstandingly remarkable value)
    - the current condition and trends of the resource (If diminution is determined unreasonable, measures might be recommended to reduce adverse effects to within acceptable levels.)

Tuolumne Wild and Scenic River Outstandingly Remarkable Values

Outstandingly remarkable values are the river-related values that make the river unique and worthy of special protection. They form the basis for the river's designation. The complete list of outstandingly remarkable

fisheries habitat and watershed restoration, bridges and other roadway construction/reconstruction projects, bank stabilization projects, channelization projects, levee construction, boat ramps, fishing piers, and activities that require a section 404 permit from the U.S. Army Corps of Engineers (Interagency Wild and Scenic Rivers Coordinating Council 2004).

values for the Tuolumne River are listed in chapter 5. Detailed descriptions specific to the Tuolumne Meadows segment are included in the analysis.

Rationale for Determination

The *Tuolumne River Plan* provides the basis for the section 7 evaluation. The plan is in compliance with established policies and plans providing direction for Yosemite National Park. The "Affected Environment and Environmental Consequences" section of the *Tuolumne River Plan*/*Draft EIS* (chapter 8) describes the existing condition of resources in the project vicinity and analyzes the potential environmental impacts associated with implementation of each of the proposed alternatives.

Project Description

The Tioga Road is a trans-Sierra highway that runs east to west along the southern edge of Tuolumne Meadows in Yosemite National Park. Surface water flowing from the southern side of the road is channeled through 35 culverts under the road to Tuolumne Meadows and the Tuolumne River. In 2006, researchers observed that Tioga Road culverts were clogged with vegetation and sediment in 12 locations, and signs of ponding water south of the road were observed in 23 locations.

Culverts force previously dispersed runoff into local channels, and downcutting (also known as vertical erosion) in these channels is occurring on the meadow side of the culverts. These culverts may also be causing headcuts, which occur when sheet flow is concentrated and channeled at higher than natural velocity, thus increasing scour and altering sedimentation dynamics. Like downcut channels, headcuts lower the adjacent water table and limit sheet flow across meadows. In addition, many Tioga Road culverts were installed lower or higher than the meadow surface, exacerbating downcutting, headcutting, and ponding.

To enhance meadows and hydrologic function, culverts along Tioga Road would be improved to facilitate water flow to the river and adjacent meadows. Some culverts would be repaired, and additional larger, better placed culverts would be installed to mitigate many of the observed impacts in Tuolumne Meadows. Culverts conveying water from Budd Creek and Unicorn Creek, two named tributaries to the Tuolumne River, would be made larger and more numerous to accommodate runoff.

Historic culverts would require special treatment to mitigate impacts on the cultural landscape. An adverse effect on the Tioga Road Historic District could be minimized or avoided by salvaging materials from existing culverts and using culvert types and materials that are historically compatible with the period of significance for this section of the Tioga Road Historic District (1932-1961). Placement of all culverts would depend on surface levels of the meadow to minimize downcutting, headcutting, and ponding effects. Work to restore the contours adjacent to existing culverts would help reduce impacts and likelihood of further downcutting, headcutting, and ponding and could include

- filling in ditches associated with culverts with native soil
- applying woody debris, native mulch, and plant material (willows using hydrodrilling techniques) to divert and disperse runoff, promote deposition and limit scour
- placing rocks to disperse outflow energy and prevent downcutting
- Recontouring slope and landform to natural conditions to encourage sheet flow
- Revegetating areas adjacent to and downslope of culverts with native species to slow velocity of water flowing into the meadow, encouraging sheet flow and sediment deposition

To enhance free flow of the Lyell Fork of the Tuolumne River, approximately 150-feet of boulder riprap would be removed from the riverbank near the campground A-loop. The boulders would be removed during low flow and the riverbank would be restored to a natural contour similar to that of adjacent unaffected riverbank. Willows and other local, native vegetation would be planted to stabilize the riverbank protect, protect water quality, and restore natural conditions and blend in with adjacent native vegetation.

Analysis

Considerations

Does the proposed project invade the designated Tuolumne Wild and Scenic River?

The proposed culvert improvement and riprap removal work would be located within the Tuolumne Wild and Scenic River corridor, along the Tioga Road, throughout Tuolumne Meadows. The proposed action includes two named tributaries to the Tuolumne River, Unicorn Creek and Budd Creek. Budd Creek is located within the 100-year floodplain of the Tuolumne River. Culvert work would occur within the bed and banks of the tributaries, and construction work could occur within the ordinary high-water mark.

Potential construction impacts from these actions would be minimized by scheduling construction activities during seasonal periods of low or no water. Additional mitigation measures would include minimizing the disturbance area at the banks of the tributaries, salvaging excavated materials for replacement after construction, returning the banks to their preexisting contours, and implementing best management practices (see appendix N of the *Tuolumne River Plan/Draft EIS*) during construction to ensure that construction activities would not affect water turbidity, temperature, or nutrient availability.

Final culvert dimensions and design would be determined by hydrologists and engineers during the design phase of the project. The culverts would be designed to minimize impacts to hydrologic function. In combination with the mitigation proposed above for construction activities, the culverts would be designed so that they would not impede the free-flowing condition of the Tuolumne River, and hydrologic processes would be protected during low- and high-water periods. Boulder riprap removal would be designed and reviewed by restoration ecologists, hydrologists and engineers and would improve the free flowing condition and scenic quality of the river. Following removal, the riverbank would be restored to natural contours and stabilized with willow plantings and other area native plants. Restoration techniques are described in greater detail in Appendix H. Therefore, the proposed actions would not encroach or intrude upon the hydrologic function of the Tuolumne River and would not invade the wild and scenic river.

Does the proposed project unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area as of the date of designation?

The effects of the proposed water resources management action on scenic, recreational, and fish and wildlife values are outlined in table I-1.

Table I-1.
Effects of the Proposed Water Resources Management Action on Scenic, Recreational, and Fish and Wildlife Values

Value	Conditions at the Time of 1984 Designation	2012 Condition of Outstandingly Remarkable Values	Effect of Proposed Culvert Improvement and Riprap Removal
Scenic	Expansive views were afforded by the natural vegetation patterns at Tuolumne Meadows. The natural features created numerous scenic viewing opportunities, ranging from high panoramic views to views into and away from Tuolumne Meadows. Views into and away from the meadows were maintained and occasionally expanded by the mechanical removal of encroaching lodgepole pines. Additionally, the siting of all post-1920s development was guided by the principle of not obstructing or competing with the naturally occurring views and vistas. Reducing human visual impacts was a key reason for realigning the Tioga Road and eliminating all camping inside the meadow. Building locations and circulation patterns were designed to take advantage of the scenic opportunities of this landscape, while remaining as unobtrusive as possible.	Views from trails and vista points through Dana and Tuolumne Meadows continue to have high aesthetic value. The predominantly open meadows provide for a remarkable variety of visual experiences, including unobstructed views of the craggy Sierran horizon line and the ability to watch dramatic weather formations roll in. Even from the periphery of the meadows, where denser vegetation obstructs the panoramic views, a sense of openness is provided by glimpses of the meadows and distant peaks between the trees.	Scenic and visual landscape elements would not be affected by the culvert improvement or riprap removal. The culverts would be low profile, compatible with the surrounding cultural landscape and would not be visible from the Tuolumne River upon project completion. Short-term visual impacts during installation of the culverts and removal of riprap would be visible from the banks of the Tuolumne River.
Recreational	Abundant recreational and educational opportunities were available at the time of designation. They included day hiking, overnight backpacking, swimming, wading, fishing, camping, climbing, horseback riding, picnicking, artistic pursuits, sightseeing, nature study and skiing and snowshoeing in winter. Tioga Road offered excellent opportunities for scenic driving. The Tuolumne Wild and Scenic River Study noted that Tuolumne Meadows contained one of the largest campgrounds in the national park system and served as a major trailhead into the spectacular Yosemite backcountry. It noted that the number of visitors in the Tuolumne Meadows area reached 3,000 per day during the peak summer season.	The Tioga Road continues to provide access to a great diversity of recreational and educational opportunities in the Tuolumne River corridor that are easily accessible to people of various ages and abilities. These opportunities have not changed since the time of designation, with the exception that the number of campsites in the Tuolumne Meadows campground has been reduced from about 600 (USFWS and NPS 1979a) to 304 to accommodate larger modern recreational vehicles, provide better site separation, and better protect natural features. Recreational opportunities include day hiking sightseeing, viewing exhibits along the road, and many other related activities. In winter, the road is the primary route taken by trans-Sierra skiers.	Abundant recreational and educational opportunities would remain available in the river corridor and would not be diminished in the project area. The proposed action would not change access to the Tioga Road and would improve the visitor's ability to find parking at Tuolumne Meadows.

Value	Conditions at the Time of 1984 Designation	2012 Condition of Outstandingly Remarkable Values	Effect of Proposed Culvert Improvement and Riprap Removal
Fish and Wildlife	At the time of designation, the subalpine meadow and riparian complex was largely undeveloped, with high biodiversity and productivity. The vast meadows—the annual floodplains for the Tuolumne River—were largely free of structures. Most facilities, with the exception of roads and trails, were concentrated in upland areas around Tuolumne Meadows. Tioga Road skirted the southern edge of the meadow. Culverts along the Tioga Road allowed for flows from upland areas to connect to Tuolumne Meadows (although these flows did not replicate natural sheet flows).	The unusual extent and influence of glaciations in the Tuolumne River corridor created extensive areas of low relief that alternate with steep river reaches flowing over bedrock. The long, low-gradient reaches along the Lyell Fork, the lower Dana Fork, and below their confluence through Tuolumne Meadows were conducive to the accumulation of sand, silts, and organic debris. The resulting meadow/riparian complex is the largest in Yosemite National Park and one of the most extensive in the Sierra Nevada.	Additional and/or enlarged culverts would improve hydrologic processes compared with existing conditions by accommodating peak spring runoff, some channel migration, and flash floods from summer thunderstorms. To the extent possible, natural sheet flow at those locations would be restored. Improved hydrologic flow and connectivity between the river and the meadows would be expected to enhance adjacent meadow and wetland areas and associated habitat. Removing the boulder riprap, and restoring natural contours and vegetation would restore habitat for plants and wildlife and would allow for natural migration of the river channel. The project is expected to result in a long term beneficial impact on vegetation, wildlife communities, habitat, diversity, and the river processes that species depend on. Project specific mitigation measures (see appendix N of the *Tuolumne River Plan/Draft EIS*) would be implemented to minimize any impacts to wildlife or associated habitat during construction. There would be no impacts on fish.

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Section 7 Determination

The Tuolumne Wild and Scenic River Plan includes actions to improve or replace existing culverts on stream tributaries of the Tuolumne River. The proposed actions would replace culverts at Tioga Road on Budd Creek and Unicorn Creek with additional, larger, and better placed culverts to better accommodate peak runoff, channel migration, and flash flooding during summer storms. The new culverts will use construction types and materials that are historically compatible with the Tioga Road Historic District.

Using the *Tuolumne River Plan/Draft EIS* as the basis for the Section 7 determination and implementing specific mitigation measures (e.g. performing construction at periods of low or no water, application of best management practices, and seasonal species-specific restrictions for construction activities) outlined in appendix N of the *Tuolumne River Plan/Draft EIS*, the National Park Service has determined that the proposed projects will not invade the Wild and Scenic Tuolumne River or unreasonably diminish the scenic, recreational, or fish and wildlife values present in the area as of the date of designation.

Recommended by Don L. Neubacher, Superintendent Date

Approved by Chris Lehnertz, Regional Director Date

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Appendix J: Scenic Vista Management in the Tuolumne River Corridor

The *Scenic Vista Management Plan for Yosemite National Park Environmental Assessment*, completed in 2010, inventoried 181 potential vista points throughout the park, outside of wilderness and chiefly along the major roads. The plan outlined a programmatic framework for prioritizing and prescribing the work to be completed at each of the viewpoints necessary to obtain a desirable vista. The 2011 *Finding of No Significant Impact* (FONSI) stipulates that the final determination of vista points for the Tuolumne Wild and Scenic River corridor would be deferred to the comprehensive river management plan.

This appendix captures the programmatic direction and outlines methods in the *Scenic Vista Management Plan*, but also analyzes the viewpoints from the perspective of the Wild and Scenic Rivers Act mandate to protect and enhance the values of the Tuolumne Wild and Scenic River.

The scenery through the Tuolumne River—considered an outstandingly remarkable value—offers outstanding views of the river valley, meadows, glacially carved domes, rugged mountain peaks, steep canyons, and expansive skies. Where these tremendous views intersect with frequent visitation is along the roads, in highly visited sites such as Tuolumne Meadows. The *Scenic Vista Management Plan* FONSI identified ten vistas located in, or adjacent to, the wild and scenic river corridor at Tuolumne Meadows. Upon analyzing these ten vista locations within the context of the *Tuolumne River Plan*, eight vistas were selected for their outstanding scenic qualities.

The eight vista points originally identified in the *Scenic Vista Management Plan* in the Tuolumne Meadows area (which includes the Tuolumne Meadows and Lower Dana Fork segments of the river corridor) can be summarized as views encompassing the meandering river, adjacent meadows, domes, and mountain peaks as seen from the bed and banks of the river, and from view corridors along Tioga Road and the Great Sierra Wagon Road. Two of these viewpoints are physically located outside the wild and scenic river corridor, but are included because of their proximity to the river corridor, and because their views are dominated by features within the river corridor.

- Tioga Road: Mount Dana and Mount Gibbs view facing east, overlooking a pond and meandering Tuolumne River (note that this viewpoint is outside the Tuolumne River corridor)
- Tioga Road: Mount Dana viewpoint, looking east at the river meandering through Dana Meadows, with the Sierra crest in the background
- Tioga Road: "Islands in the Ice" interpretive viewpoint, looking west down through the glaciated river valley along the Dana Fork, with distant views of the granite peaks
- Tioga Road: (near the "little blue slide" roadcut), overlooking Lyell Canyon and the Kuna Crest
- Lembert Dome (near the parking area), looking west to Unicorn Peak (note that this viewpoint is outside of the Tuolumne River corridor)
- Tioga Road and Parsons Memorial Lodge trailhead: looking northwest toward and river, with Fairview Dome in the background
- Tioga Road: Pothole Dome (near the parking area), looking east over Tuolumne Meadows, Mount Dana, and Mount Gibbs (note that this viewpoint is outside the Tuolumne River corridor)
- Parsons Memorial Lodge doorway, looking east across the meadow and river to Mount Gibbs

The *Tuolumne River Plan* acknowledges that the outstandingly remarkable scenery through Tuolumne and Dana Meadows will continue to evolve in response to natural ecological processes. The mechanical removal of conifers from meadows will be discontinued, pending further study as part of the ecological restoration program with the possible exception of limited removals at the eight scenic vista points identified above. If conifer removal proved to have ecological benefits as part of the program to restore meadow and riparian habitats, it could be included in that program. Management of scenic vista points would vary among the alternatives. Once an alternative has been selected in a formal record of decision, the management actions included in that alternative will be incorporated into chapter 5 of the *Tuolumne River Plan* to guide the future management of scenic values in the Tuolumne River corridor. This guidance could also amend the park's *Scenic Vista Management Plan*.

The objectives for managing and maintaining these sites are to protect the visitor's access to the scenic value of the Tuolumne River while protecting any sensitive resources. Maintenance of these viewpoints will further enhance the visitor's recreation enjoyment and enhance their connection to the natural world along the Tuolumne River. At the same time, management of scenic vistas at these select locations must protect biological values (meadow/riparian complex), cultural values (archeological sites), water quality, and the free-flowing condition of the river. Management will involve removal of trees, and when done after careful review and attention to protection of river values, will ensure that all other biological and cultural values are minimally affected.

Providing and maintaining viewing areas at existing infrastructure (such as roadside turnouts) lessens the frequency of visitors creating or using social trails to see a view that they may have once experienced, or that is referred to in existing signs and publications. Many park visitors' (87%) primary purpose when visiting the park is to take a scenic drive (Littlejohn et al 2006). By removing a limited number of trees at locations that can support visitor use, the National Park Service gives many visitors an incentive to avoid walking in more sensitive areas, and thus better protect and enhance biological resources. The intention of the *Scenic Vista Management Plan* in the Tuolumne Wild and Scenic River corridor is to reestablish vistas that once existed in these locations without degrading other outstandingly remarkable values.

The Tioga Road east of Cathedral Creek was completed in 1934 and aligned to take advantage of views through the adjacent trees and other natural features. To maintain the experience of this historic roadway design, trees that were present along the road in 1934 will be preserved. Similarly, existing trees from 1915 or older, when Parsons Memorial Lodge was built, will not be removed.

What follows is a description of the proposed workplan for each of the viewpoints established for the Tuolumne River corridor if vista management is adopted under the chosen alternative. These work plans are consistent with enhancing and protecting the ORVs of the Tuolumne River. Each workplan provides:

- A description of the viewpoint (its specific location);
- Ecological considerations, particularly as they pertain to the outstandingly remarkable values of the Tuolumne River;
- A summary of the work to be performed;
- A schematic depicting the work area, which was compared to site analysis maps prepared for the *Tuolumne River Plan* (i.e., archeological sites, wetlands and meadows, rare plants, etc.).

In the initial management of a vista, some downed trees may be left –generally no more than one tree in twenty – and some debris would be chipped, with chips either remaining on site, outside of meadows, as mulch (no more than 1 inch deep), or hauled away. The small diameter vegetation is to be loped and scattered such that

any saw marks are not visible from the vista. What woody debris may be left depends on conditions at the time and must adhere to the guidelines of tons per acre of downed fuel levels as defined by the *Fire Management Plan*. Excess logs and greater diameter brush can be either used for traditional cultural purposes if there is a need, hauled to the nearest burn pile, chipped using a masticator, or removed from the park.

Once vista clearing has been completed, the work area will be restored. Any tracks left by machinery or workers will be decompacted, recontoured, and duffed. Stumps must remain in place to provide soil stability, so they will be flush cut and buried to preserve a natural aesthetic. Any plants that could be impacted by compaction must be removed before work begins and replanted afterward. Damage to trees and shrubs should be noted for replacement. Revegetation could occur on a later date with either seed or container plants at the appropriate season. Native seeds (of grasses and herbaceous plants) would be collected prior to work and dispersed within the work area during restoration.

Proposed Vista Points that Will Not Be Managed

A total of ten potential vista points were listed in the *Scenic Vista Management Plan* in or adjacent to the river corridor. Upon analyzing these vista locations within the context of the *Tuolumne River Plan* and considerations for river values (including free flow, water quality, and outstandingly remarkable values), two of these sites were removed, for the following reasons:

- The analysis of one site (number 175) revealed resources of a sensitive nature at this location. Vista management in the ecologically sensitive area would conflict with restoration goals.
- The second site (number 104) was eliminated due to its low assessment score. This turnout is in a densely forested area and with little potential for distant or unique vistas. Low priority sites in a subalpine zone are not maintained or managed under the *Scenic Vista Management Plan*.

It should be noted that the elimination of these two sites is consistent with the program in the *Scenic Vista Management Plan*. The intent of the plan is to identify potential vista points and conduct a more detailed review for sensitive resources as they are proposed to be managed. The remaining eight sites are summarized below and the proposed work actions analyzed regarding how management of scenic vistas will take place as described under the *Scenic Vista Management Plan*, and compatible with *Tuolumne River Plan* to protect and enhance river values.

Dana-Gibbs View

Dana-Gibbs view is located at a turnout on Tioga Road, 2.6 miles west of Tioga Pass. The turnout has an interpretive sign, and is part of the *Yosemite Road Guide* (marker T36) which describes it as having the best view of Mount Gibbs and Mount Dana. It is the vista of these peaks that is the primary scenic view. The Dana- Gibbs view is adjacent to and overlooks a pond, Dana Meadows, and the meandering Tuolumne River.

Figure J-1. Dana Gibbs Viewpoint.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 101. When evaluated with the Visual Resource Assessment (VRA, the process used in the *Scenic Vista Management Plan,* which is similar to that proposed for monitoring of the scenic ORVs—the Visual Resource Management system, or VRM) and compared to other points in the park, this site rated as a high priority. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Dana-Gibbs views averaged 10.5 out of 18.

Description of River Values at this Location

- Biological: Dana Meadows, part of the extensive subalpine riparian and meadow complex for the Tuolumne River;
- Cultural: Part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not proximate to the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

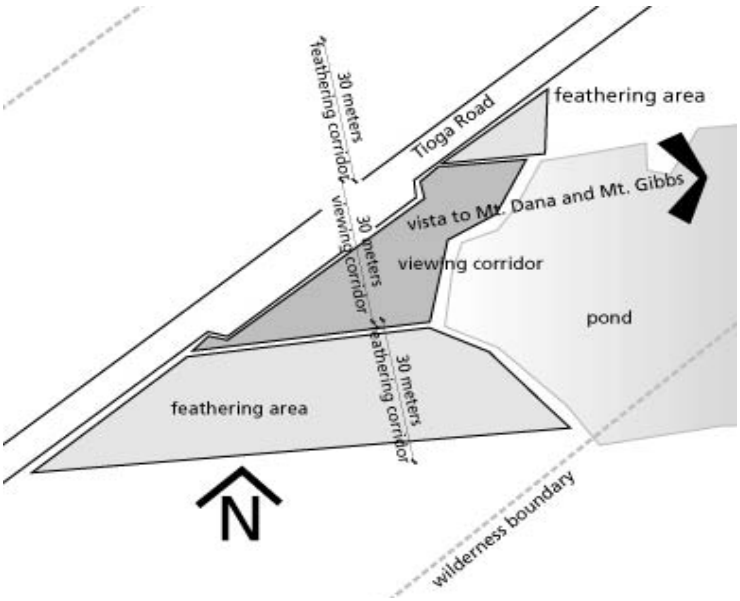

Figure J-2. Dana Gibbs view work area.

Initial Management

This vista is located in a mixed conifer forest situated in the subalpine vegetation zone. Management recommendations include removal of trees that are obstructing the vista in the middle ground (60 – 1000 meters from turnout) as well as foreground (0 – 60 meters from turnout). Snags are of particular importance in these communities and no existing snags are recommended to be removed at this location. The vista is located proximal to a pond and riparian zone and additional protection measures as defined in the *Scenic Vista Management Plan* apply in determining which trees to remove, such as leaving in place trees that are adjacent to and overhang the water's edge. The Wilderness area is 60 m from the centerline of Tioga Road and no actions will take place in Wilderness for vista management. Because this is a high priority site, the viewing area can be up to 30 m wide, with 30 m of feathering to each side. In no way does this mean that all trees within this boundary are removed. Feathering edges and leaving mature trees within the viewing area are intended to leave a site with a more natural appearance.

Tree Species	< 20" dbh	>20" and <30" dbh	Total
Lodgepole Pine	30	8	38
TOTAL TREES			**38**

Vista management activities will generally take place in September and October to avoid effects to nesting birds and hibernating bats. Compaction of soils will be avoided as well. The ideal time would be in September or October when the ground is frozen. However, the weather is more variable at that time of year, so the exact

time will need to be weather dependent. Steps will be taken to avoid compaction if the ground is not frozen, such as using mats for equipment. If action is delayed later than October when the ground is frozen, a wildlife biologist will inspect the site for habitat prior to action taking place. If the wildlife biologist locates habitat that would be negatively affected by actions at that time, action would be either modified to avoid any affect, or delayed until the following year and undertaken at a more preferable time. The trees to be removed for initial management are summarized in the table.

In addition, due to the steepness of the bank immediately beneath the viewing area, the area will be seeded and covered with local duff. Other erosion mitigation measures may be employed as needed. Check dams or wattles built out of logs, slash, should be positioned to catch eroding sediment and protect water quality in the pond.

Continued Maintenance

The site shall be evaluated and maintained on an annual basis. Such maintenance includes felling of trees less than 6" that encroach on the vista and revegetation of eroded slopes or any areas denuded by the initial clearing process. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

Dana Fork of the Tuolumne

The Dana Fork of the Tuolumne vista is located at a turnout on Tioga Road, about 3.2 miles west of Tioga Pass. The primary view is of Mount Dana and Mount Gibbs, but Mammoth Peak and the Dana Fork and Tuolumne River can also be seen.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 102, and is a medium priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Dana Fork of the Tuolumne vista averaged 9.5 out of 18.

Figure J-3. Viewpoint for Dana Fork of the Tuolumne.

This vista is located in the subalpine vegetation zone with mixed conifers and meadow next to the riparian area. At this time the vista is not obscured so no initial management actions are necessary.

Description of River Values at this Location

- Biological: Dana Meadows, part of the extensive subalpine riparian and meadow complex for the Tuolumne River;
- Cultural: Archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;

- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

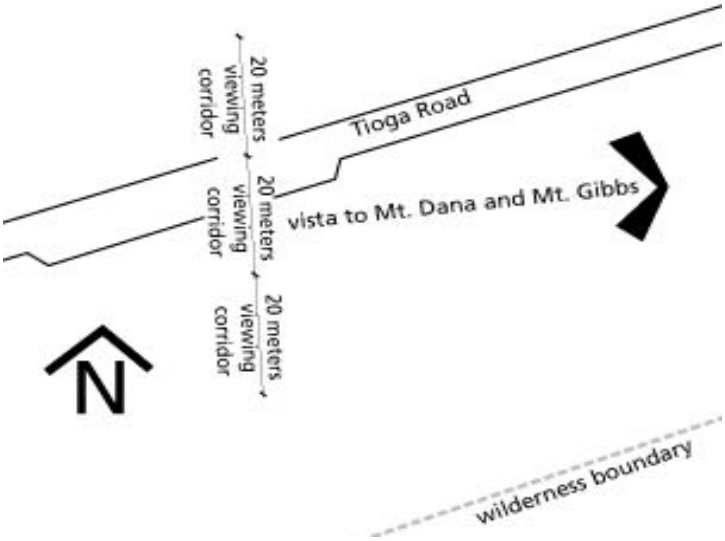

Figure J-4. Dana Fork of the Tuolumne work area.

Continued Maintenance

Although no tree removals are recommended at this time, this site shall be evaluated and maintained as a medium priority vista. This means that the site will be reevaluated and maintained at least every three years. The viewing area is up to 20m wide and feathering 20m to each side, as shown in figure J-4. Such maintenance includes felling of trees less than 6" that encroach on the vista and revegetation of eroded soils. There are a very limited number of small lodgepole pines or new lodgepole pines that could obscure the view in the future. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

Islands Above the Ice

Figure J-5. Viewpoint at Islands Above the Ice interpretive sign.

Islands Above the Ice is a vista located at a turnout on Tioga Road 3.6 miles west of Tioga Pass. The primary vista is of Unicorn Peak, Johnson Peak, and Cathedral Peak. The turnout has an interpretive sign title "Islands Above the Ice" that describes the mountain peaks that were above the glaciers as "islands." Currently, these peaks are difficult to see from the sign due to encroachment of trees. The site is also referenced in the *Yosemite Road Guide* (marker T35).

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 103, and is a high priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and this vista averaged 11.0 out of 18.

This vista is located in the subalpine vegetation zone among mixed conifer forest near the Tuolumne River and near a subalpine meadow. The tree species present include lodgepole pine and whitebark pine. Snags are of

particular importance in these communities and none are currently obscuring the vista and do not need to be removed.

Description of River Values at this Location

- Biological: Dana Meadows, part of the extensive subalpine riparian and meadow complex for the Tuolumne River;
- Cultural: Part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

Initial Management

Tree Species	< 6" dbh	<20" dbh	Total
Lodgepole Pine	119 (+/- 10% are saplings)	116	235
TOTAL TREES			**235**

Management recommendations are that trees obstructing a vista should be cleared in the middle ground (60 – 1000 meters from turnout) and foreground (0 – 60 meters from turnout). The vista is located proximal to a riparian zone, so additional protection measures apply, such as not removing trees that are adjacent to and overhang the water's edge. The Wilderness area is 60m from the centerline of Tioga Road and no actions will take place in Wilderness for vista management. Because this is a high priority site, the viewing area can be up to 30 m wide, with 30m of feathering to each side. In no way does this mean that all trees within this boundary are removed. Feathering edges and leaving mature trees within the viewing area are intended to leave a site with a more natural appearance.

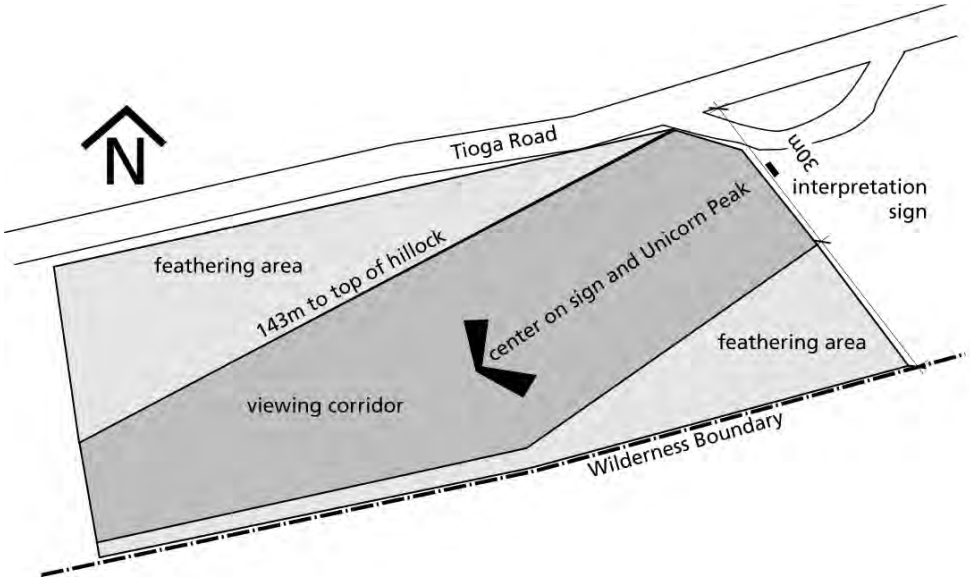

Figure J-6. Islands Above the Ice site work diagram. Not to Scale.

Vista clearing will generally take place in September and October to avoid effects to nesting birds and hibernating bats. Compaction of soils will be avoided as well. The ideal time would be in September or October when the ground is frozen, but the exact time will need to be weather dependent. Steps will be taken to avoid compaction if the ground is not frozen when action is taken. If action is taken after October when the ground is frozen, a wildlife biologist will inspect the site for habitat. If the wildlife biologist locates habitat that would be negatively affected by actions at that time, action would be either modified to avoid any affect, or delayed until the following year and undertaken at a more preferable time. The summary of trees to be removed for initial management is summarized in the table on the previous page.

Continued Maintenance

The site shall be evaluated and maintained on an annual basis. Such maintenance includes felling of trees less than 6" that encroach on the vista and revegetation of denuded areas. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

Little Blue Slide

Figure J-8. Viewpoint from Little Blue Slide.

The Little Blue Slide vista is located at a turnout on Tioga Road, about 5.2 miles west of Tioga Pass. It is also a part of the *Yosemite Road Guide* as T33, which refers to the glacial moraine on the north side of the road. The primary view is to the Cathedral Range to the southwest. In addition there are great vistas to the south of Lyell Canyon, Mount Lyell and Amelia Earhart Peak.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 105, and is a medium priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Dana Fork of the Tuolumne vista averaged 9.25 out of 18.

Description of River Values at this Location

- Cultural: Archeological landscape;
- Scenic: Exemplary views up Lyell Canyon, encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

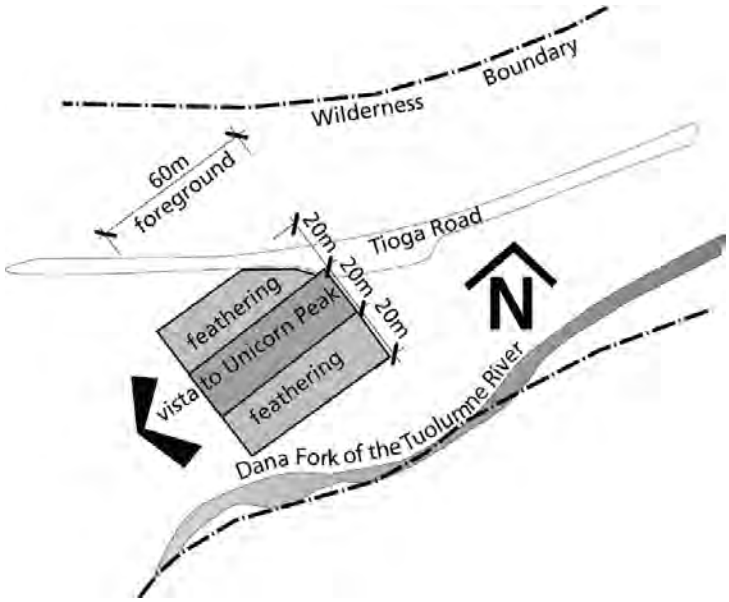

Figure J-9. Little Blue Slide work area.

Initial Management

Management of this medium priority site is recommended under the *Scenic Vista Management Plan*. At the present time, however, there have been rock slides from the moraine on the north side of the road and there is

concern that managing the vista at this site would likely encourage visitors to stop in the potentially hazardous area. The types of solutions to this rock slide hazard involve bank stabilization and site restoration as called for in chapter 5 and appendix H of the *Tuolumne River Plan*. The recommendation to manage the vista should be undertaken only after the issues of potential hazards are addressed.

This vista is located in the subalpine vegetation zone among mixed conifer forest. The tree species present include lodgepole pine and western white pine. Snags are of particular importance in these communities, but none are obscuring the vista, so none need to be removed. This is a medium priority site in a subalpine region so only trees in the foreground (60 meters from the turnout) shall be removed for vista management and the viewing area can be up to 20 m wide, with 20 m of feathering to each side. Due to the slope away from the turnout there are few trees beyond the foreground that could ever potentially obscure the vista. The Wilderness area is 60m from the centerline of Tioga Road and no actions will take place in Wilderness for vista management.

Tree Species	<20" dbh	Total
Lodgepole Pine	34	34
TOTAL TREES		**34**

In addition, due to the steepness of the bank immediately beneath the viewing area, seeding and duffing will be done and erosion mitigation measures taken as needed. Check dams or wattles built out of logs, slash, should be positioned to catch eroding sediment.

Continued Maintenance

The site shall be evaluated and maintained at least once every three years. Such maintenance includes felling of trees less than 6" that encroach on the vista and revegetation of eroded slopes or any areas denuded by the initial clearing process. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

Lembert Dome Parking

Figure J-10. Viewpoint from Lembert Dome Parking.

The Lembert Dome parking area on the eastern edge of Tuolumne Meadow, just north of Tioga Road at the base of Lembert Dome, has a great view of Unicorn Peak to the southwest. This site was inventoried as part of the *Scenic Vista Management Plan* as site number 106, and is a medium priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Lembert Dome vista averaged 8.75 out of 18.

This vista is located in the subalpine vegetation zone with mixed conifers, next to a wetland and riparian area. At this time, the vista is not obscured so no management actions are necessary.

Description of River Values at this Location

- Biological: Tuolumne Meadows, part of the extensive subalpine riparian and meadow complex for the Tuolumne River. This location contains wetland and riparian habitat;
- Cultural: Part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

Continued Maintenance

The *Scenic Vista Management Plan* recommends a tree should be considered for removal if it will likely obscure the vista within the next five years. There are a number of lodgepole pines, seen in figure J-10, or new lodgepole pines, that will likely obscure the vista within the next ten years, but are not obscuring the vista at this time. These are immediately north and south of Tioga Road on the road embankment. Trees larger than 6" that encroach on a vista would require a work plan identifying the specific number of trees being considered for removal; the plan must undergo resource review to minimize or eliminate any adverse effects to ensure it preserves and enhances the ORVs of

Figure J-11. Lembert Dome Parking work area.

the Tuolumne River. As with other work plans for the *Scenic Vista Management Plan*, it will be posted for public review at that time.

Although no removals are recommended at this time, this site shall be evaluated and maintained at least every three years as a medium priority vista in a subalpine region. Only trees in the foreground (up to 60 meters away) may be removed, and the viewing area is up to 20 meters wide and feathering 20 meters to each side. Such maintenance includes felling of trees less than 6" that encroach on the vista up to 60 meters away and revegetation of eroded areas.

Tuolumne Meadow Trail to Parsons Memorial Lodge

The Tuolumne Meadow Trail to Parsons Memorial Lodge view area is located on the trail to Parsons Memorial Lodge just north of Tioga Road from the trailhead approximately one mile west of the Lembert Dome parking area. Lembert Dome to the east is the primary focal point of this vista, but the Cathedral Range can also be seen.

Figure J-12. Viewpoint from Tuolumne Meadow Trail to Parsons Memorial Lodge.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 107, and is a high priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Tuolumne Trail to Parsons Memorial Lodge vista averaged 10.5 out of 18.

Description of River Values at this Location

- Biological: Tuolumne Meadows, extensive subalpine riparian and meadow complexes;
- Cultural: Parsons Memorial Lodge, a national historic landmark sited near the Tuolumne River, uniquely commemorates the significance of this free-flowing segment of the river in inspiring conservation activism and protection of the natural world on a national scale;
- Cultural: part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

This vista is located in a subalpine meadow vegetation zone near the riparian area. Additional protection measures apply in a riparian area, with no trees that are adjacent to and overhang the water's edge being removed. The views into meadows, and the broad and distant view allowed by meadows, are all important visual experiences for visitors. The *Scenic Vista Management Plan* recommends maintaining the meadow structure within the area for this vista for these reasons. Biological conditions are dynamic and conditions will be assessed on an annual basis. As with all sites in the *Scenic Vista Management Plan*, management intensity is determined by the ecological conditions. Natural resources are dynamic and maintenance can change and adapt to the changing ecological conditions to best enhance and protect all the values of the Tuolumne River.

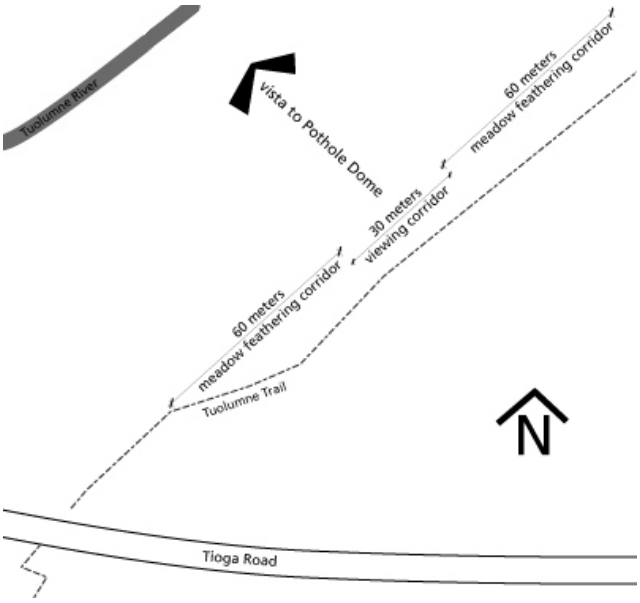

Figure J-13. Tuolumne Meadow Trail to Parsons Memorial Lodge site diagram. Not to Scale.

The trail that the vista point is on could be moved slightly under some alternatives of the *Tuolumne River Plan*. If this were to happen, this current vista point would not be maintained at its present location, but a comparable vista on the new trail would be found--one that would need little if any initial maintenance. That view point would be evaluated for initial treatment and maintenance. The likely outcome is that the trail could move to the east, and the boundary to maintain would shift east with the new point. As stated earlier, by maintaining vistas at areas with sufficient infrastructure to minimize visitor impacts, both the cultural and natural resources can be protected and impacts minimized.

Initial Maintenance

Management recommendations for a high priority site in a subalpine meadow allow for a viewing area up to 30 meters wide, with feathering of 60 meters, and removing trees up to 1 kilometer away. The relevant wilderness boundary to this vista is over 1 kilometer away, beyond the middle ground limits set by the *Scenic Vista Management Plan*. Lodgepole pines have matured along the meadow edges, although seedlings are scattered throughout. The initial management recommendations are to remove a limited number of trees larger than 6" dbh.

Tree Species	< 20" dbh	Total
Lodgepole Pine	10	10
TOTAL		**10**

Continued Maintenance

The site shall be evaluated and maintained on an annual basis. Such maintenance includes removal of conifers in the meadow within the defined viewing corridor less than 6" dbh, and revegetation of eroded slopes or denuded areas. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

Pothole Dome Turnout

The Pothole Dome turnout is on Tioga Road at the west end of Tuolumne Meadows, immediately south of Pothole Dome. Although dominated by the nearby Pothole Dome, the primary vista is across the meadow to Lembert Dome and Mount Gibbs, Mammoth Peak, and ridges beyond. This vista point is not within the wild and scenic boundary for the Tuolumne River. However, the parking area is discussed within the *Tuolumne River Plan*. The Wilderness boundary is 60m from the centerline of the road and no actions to manage vistas will take place inside Wilderness.

Figure J-14. Viewpoint from Pothole Dome Turnout.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 108, and is a high priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the vista at the Pothole Dome turnout averaged 13 out of 18.

Description of River Values at this Location

- Biological: Tuolumne Meadows, extensive subalpine riparian and meadow complexes;
- Cultural: Part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

This vista is located in a subalpine meadow vegetation zone. Management recommendations for a high priority site in a subalpine meadow allow for a viewing area up to 30 meters wide, with feathering of 60 meters, up to the wilderness boundary. The vista is not obscured, so no removals are necessary for initial management.

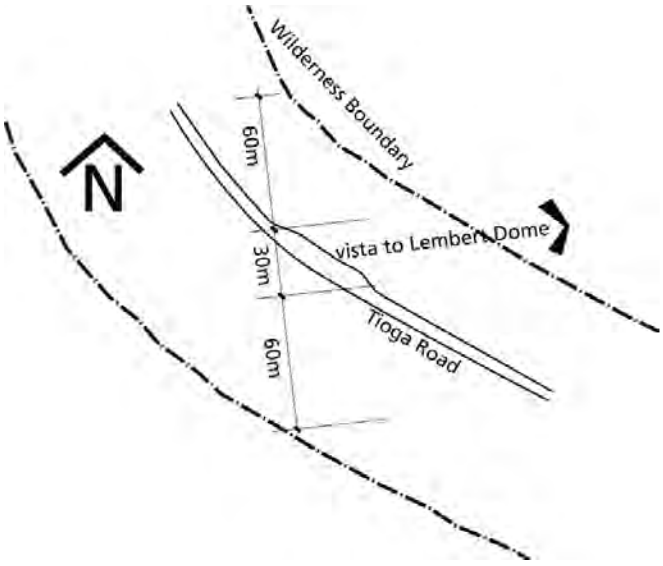

Figure J-15. Pothole Dome Parking work area.

Continued Maintenance

Although no removals are recommended at this time, this site shall be evaluated and maintained as a high priority vista. This means that the site will be reevaluated and maintained at least every three years. Such maintenance includes removing trees less than 6" dbh that encroach on the vista and revegetation of eroded soils. Future maintenance will likely involve removal of lodgepole seedlings on the road embankment, within the boundary for this site.

Parsons Memorial Lodge

Figure J-16. Viewpoint from Parsons Memorial Lodge.

Parsons Memorial Lodge is a National Historic Landmark built by the Sierra Club in 1915 in the rustic style. The front door opens onto a great vista of Unicorn Peak.

This site was inventoried as part of the *Scenic Vista Management Plan* as site number 176, and is a medium priority when evaluated with the Visual Resource Assessment (VRA) and compared to other points in the park. All sites that score a 10.0 or higher on an 18 point scale are considered a high priority and the Parsons Memorial Lodge vista averaged 7.5 out of 18. This site scores high enough to be considered as a medium priority for management under the *Scenic Vista Management Plan*, and its importance to the Parsons Memorial Lodge and its association to the historic value of the Tuolumne River as noted in the *Tuolumne River Plan* make this a desirable vista to manage and maintain to enhance the ORVs of the river.

Description of River Values at this Location

- Biological: Proximity to Tuolumne Meadows, extensive subalpine riparian and meadow complexes;
- Cultural: Parsons Memorial Lodge, a national historic landmark sited near the Tuolumne River, uniquely commemorates the significance of this free-flowing segment of the river in inspiring conservation activism and protection of the natural world on a national scale;
- Cultural: Part of the archeological landscape;
- Scenic: Exemplary views encompassing the meandering river, adjacent meadows backed by glacially carved domes, and rugged mountain peaks of the Sierra Crest;
- Recreational: The Tioga Road across the Sierra provides rare and easy access to high-elevation sections of the Tuolumne River through Tuolumne and Dana Meadows.
- This location is not within the bed and banks of the river; therefore, the free-flowing condition would not be affected.
- Actions to protect water quality should be initiated through all phases of activity at this site.

Initial Treatment

This vista is located in the subalpine vegetation zone among mixed conifer forest on the edge of a subalpine meadow. Because this is a medium priority site, the viewing area can be up to 20 m wide, with 20 m of feathering to each side and only trees in the foreground (up to 60 m) may be removed. Snags are of particular importance in these communities, so none are recommended to be removed. The Wilderness boundary to the south is about 1 km away across Tioga Road, and there is a boundary to the west. No actions are to take place in wilderness.

Tree Species	<20" dbh	Total
Lodgepole Pine	40*	40*
TOTAL TREES		**40***

*Estimate based on photographs

NPS personnel working on the *Scenic Vista Management Plan* were not able to record potential tree counts for initial management at this location. The best estimate based on 2009 photographs is that 40 lodgepole pines under 20" dbh are necessary to remove and reestablish the view and feather the clearing. Revegetating the area is also recommended.

Continued Maintenance

The site shall be evaluated and maintained at least once every three years. Such maintenance includes felling of trees less than 6" that encroach on the vista and revegetation of eroded slopes or any denuded areas. Trees larger than 6" that encroach on a vista would require an additional work plan and undergo resource review to minimize or eliminate any adverse effects.

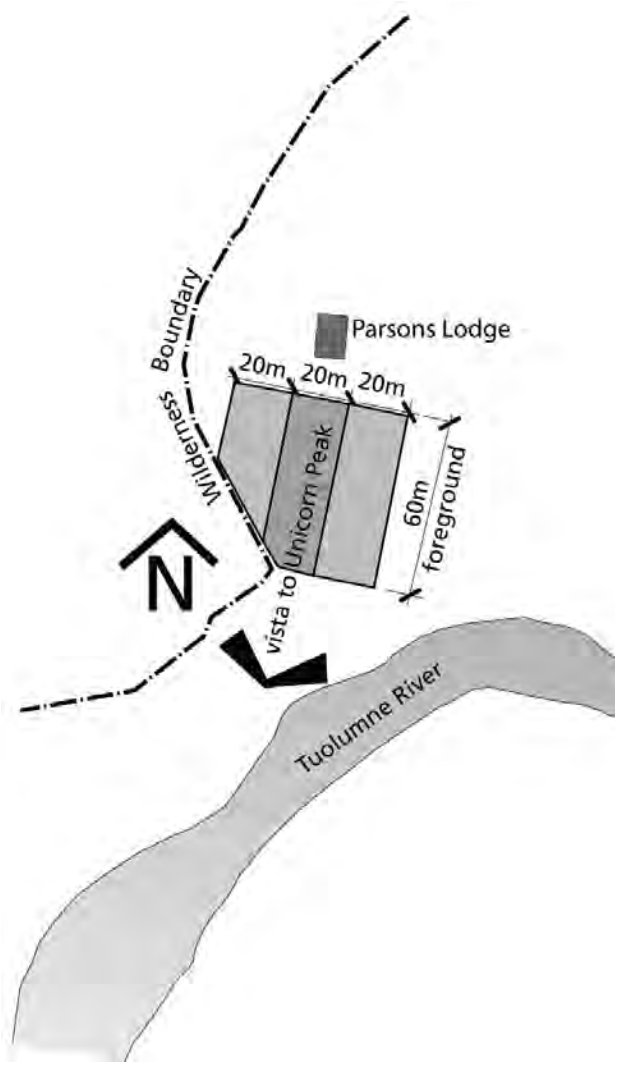

Figure J-17. Parsons Memorial Lodge work area.

Scenic Vista Points in the Tuolumne River Wild and Scenic River Corridor

Appendix K: Design Guidelines Specific to the Tuolumne River Corridor

Employee Housing Design Guidelines

Campground Design Guidelines

Developed Areas at Tuolumne Meadows

Despite the presence of a built environment, the stunning, expansive, and dramatic natural landscape at Tuolumne Meadows rightfully dominates the scene. Over the last several decades, permanent and semi-permanent structures arose in relatively small clusters tucked into the lodgepole forest at the edge of the meadows. Building character in Tuolumne Meadows ranges from large, boulder-faced, historic park Rustic architecture to seasonal, light, canvas-roofed structures. Relatively simple and understated wood-frame structures make up most of the buildings throughout the district. Most structures are rustic and their scale, materials, and massing are meant to blend unobtrusively into their natural settings (NPS 2007b).

A number of buildings in Tuolumne Meadows are significant examples of the park Rustic style. Designed by NPS staff to minimize the visual impact of constructed development, these include the old visitor contact station, the three original campground comfort stations, and the original Road Crew Camp complex. Another example is Parsons Memorial Lodge — a National Historic Landmark — designed by the Maybeck and White office for the Sierra Club in 1915 (NPS 2007a). All of these sites or structures are individually listed on the National Register of Historic Places and are contributing features of the Tuolumne Meadows Historic District.

The Civilian Conservation Corps (CCC) built some of the most distinctive and architecturally significant structures in Tuolumne Meadows, often using materials from the site. This Rustic style was perfectly suited for the patient handiwork of the corps and benefited from such labor being readily available during the Depression. Many of the finest examples of the park Rustic style in Tuolumne Meadows would be difficult to replicate under modern conditions. These buildings thus reflect a unique moment in time as much as they embody this distinctive architectural style. (NPS 2007b).

Much of the early history of the meadows is related to pioneering conservation activism in the late 19th and early 20th centuries. The predominance of the Rustic style of architecture, the concentration of development in limited areas, and the absence of modern improvements attest to the intense concern for and love of the meadows maintained by the conservation community over the decades. (NPS 2007a).

In 2007 Tuolumne Meadows was determined eligible for listing on the National Register of Historic Places as a historic district. The district encompasses the visitor facilities of the developed areas, the Soda Springs Historic District, and the adjacent natural resources of the broad meadow flanking the river to the west of its junction with the Dana and Lyell forks. To the east it includes the drier, more broken terrain between the Dana Fork and the Tuolumne Meadows Lodge. The northern and southern limits of the historic district are defined by Yosemite Wilderness boundaries (NPS 2007b).

Four areas within the Tuolumne Meadows Historic District are slated to continue providing employee housing: Ranger Camp, Bug Camp, Tuolumne Meadows Lodge, and Road Camp. Each of these areas –described in detail below– contains structures, architectural patterns, or other features that contribute to the significance of the Tuolumne Meadows Historic District. Therefore, projects in these areas should first and foremost follow the Secretary of the Interior's *Standards for the Treatment of Historic Properties* (NPS 1995 and NPS 1996a).

Ranger Camp (Administrative Area) and Bug Camp

Ranger Camp is between the Old Tioga Road and the modern Tioga Road at the eastern end of Tuolumne Meadows. Ranger Camp was constructed to provide maintenance and administrative services for the Tuolumne Meadows area. Historically known as the Government Administrative Area, or simply the Administrative Area, it has since become known more commonly as Ranger Camp (NPS 2007b).

Cabins and hard-sided tent cabins sit in a randomly scattered pattern among sparse pine and occasional boulder and granite outcroppings. This results in a random "ad hoc" character reminiscent of the small-scale encampments found in the foothills and other parts of the High Sierra. Each unit contributes to the historic patterns of massing and scale at Ranger Camp. Contributing structures to the Tuolumne Meadows Historic District include the five original buildings built in 1924: ranger station, naturalist cabin, patrol cabin, barn, and shower house. Over the years, other buildings and structures have been added, including additional tent cabins for park employee housing. The ranger station, NPS stable, and other historic structures are at the western end of the cluster.

The ranger station was erected in 1924 and served as the original park entrance and ranger station on the Tioga Road. The 525-square-foot, single-story building has an exposed peeled log frame structure with vertical plank infilling and a gable roof with log framing and brackets. The roofing material is corrugated metal. The building is painted Wosky brown, a color named for landscape architect John Wosky in the 1930s and used widely throughout the park.

During the winter, three buildings are in use in Ranger Camp: the ranger's cabin, the snow survey cabin, and the ranger office (the ranger station). The canvas for the tent cabins is removed at the end of the summer season, contributing to the camp's seasonal character.

Bug Camp was constructed in response to a needle miner infestation that occurred during the 1950s. It is located adjacent to and east of Ranger Camp. Aside from a slightly steeper south-facing slope, the terrain and subalpine forest of the Bug Camp area is similar to that of Ranger Camp. Tent cabins and other 1950s structures are tightly clustered among pines and boulders and are accessed through narrow unpaved driveways and a paved parking lot off the Old Tioga Road. Of the original camp, the mess hall, comfort station, and research shed are considered historic and date back to the period of significance (NPS 2007b).

During the winter, none of the buildings at Bug Camp are used. Similar to Ranger Camp, the canvas for the tent cabins is removed at the end of the summer season, contributing to the camp's seasonal character.

GUIDELINES FOR RANGER CAMP AND BUG CAMP

- New, or replacement, structures should maintain the general spacing, scale, massing, and color of the existing structures.
- New structures should be laid out in a way consistent with historic patterns, which were based on proximity to natural features such as boulders or tree groupings.

- New parking areas should minimize visual impacts on the housing. Refer to Unifying Elements in *A Sense of Place: Design Guidelines for Yosemite National Park* for guidelines on parking and vegetative screening.
- New design should incorporate measures to ensure protection of existing vegetation. Use appropriate barriers to prevent trampling of such areas. Refer to Unifying Elements in *A Sense of Place: Design Guidelines for Yosemite National Park* for guidelines on pathways, circulation and barriers.

Road Crew Camp

Road Crew Camp is an enclave 400 feet south of Tioga Road at the western end of the Tuolumne Meadows Historic District. Built in 1934 by the Civilian Conservation Corps to provide maintenance and administrative facilities for the higher elevations of Yosemite, the development cluster still retains its original six structures. These include the CCC mess hall, the shower house, and four bunkhouses.

The CCC mess hall is on a lightly forested ridge, surrounded by lodgepole pines. The CCC mess hall is an excellent example of 1930s park Rustic architecture. This wood-frame structure measures roughly 33 feet x 60 feet. The foundation, main fireplace chimney, and front porch floor and steps were constructed of rubble stone masonry. The roof is sheathed in wood shingles. The lower portion of the walls has horizontal bevel siding, and the upper portion has vertical redwood board siding, originally finished with a coat of clear linseed oil (NPS 2007b).

The mess hall historically served as the kitchen, dining room, and social hub for the Road Crew Camp. It was listed in the National Register in 1978. In 1980 it was converted to a visitor center.

Four identical bunkhouses and a shower house are clustered in the trees to the east of the visitor center. These were the first structures to be built in the Road Crew Camp area and are fine examples of park rustic architecture. Built during the CCC era, all are wood-frame structures with rubble masonry foundations and redwood board and batten siding. A large rubble masonry chimney distinguishes the shower house. The bunkhouses are still in use as housing for seasonal NPS employees and retain most of their original materials and details of workmanship. These structures were all listed in the National Register in 1978.

GUIDELINES FOR ROAD CREW CAMP

- The character of new structures should be compatible with the architectural vocabulary of the historic Rustic structures at Road Camp. They should, in addition, be of a scale, form, massing, materials, and color that blend with the immediate natural and historical surroundings.
- Cluster employee parking in small groups, screened with native vegetation.
- New design should include measures to ensure protection of existing vegetation. Use appropriate barriers to prevent trampling of such areas.
- The openness of the approach to the CCC mess hall is a character-defining aspect of the site and new construction should not occur within this area.
- Maintain the pattern and spacing of the CCC mess hall with the other buildings and structures on the moderate forested slope, regardless of future use. Do not allow temporary or permanent structures to encroach into the spaces surrounding the buildings, in particular the foreground when viewed from the parking lot and the pedestrian approach routes to the immediate north. Any new development, including alterations to the wastewater treatment buildings and surroundings should be done in a manner that is obscured from trails, roads, and public view; and acoustically buffered. Lighting should be limited (refer to Yosemite Lighting Guidelines) to avoid polluting the dark night sky.

Tuolumne Meadows Lodge

Tuolumne Meadows Lodge is sited on the north bank of the Dana Fork of the Tuolumne River. It consists of a tent reception/dining room, kitchen, bathhouse, storage buildings, and tent cabins.

Tuolumne Meadows Lodge is one of two High Sierra Camps accessible by automobile, the other being White Wolf. The large paved parking area west of the dining hall and downslope of the tent cabin area is expansive and highly visible from the tent cabins. Its size dominates the setting and the arrival experience. To the east, tent cabins are disbursed on an uneven upslope among boulders, granite outcrops, and lodgepole pines. A group of exposed, highly visible propane tanks, along with other supplies, is clustered adjacent to the bathhouse. Intensive foot traffic has obliterated most pathways, leaving extensive areas of unvegetated and in some areas eroding, barren soils.

At the time of publication, employee tent cabins, permanent service buildings, and the canvas-roofed reception and dining hall were aligned in a row facing the river. Beyond these buildings to the south is a popular view of Miller Rapids, where intensive foot traffic has all but eliminated riparian bank vegetation.

Buildings and structures are simple in the tradition of the High Sierra Camps. Except for kitchen, storage, and bathhouse, most of the structures are roofed with canvas stretched over permanent wood or metal frames.

The reception/dining room structure has a timber frame with canvas walls and roof set upon a slightly elevated concrete slab. The framing members are painted white to blend with the canvas. Double-hung windows provide ventilation. On the east side, a canvas awning extends from the structure to provide a protected seating area adjacent to a fire pit. At the end of each summer season, canvas roofs, walls, and windows are removed, leaving the concrete floor and framing exposed to the elements in winter when the camp is closed.

Adjacent to the tent dining area, permanent kitchen and storage structures are built of conventional wood-frame construction. The exterior of the kitchen is sheathed in board and batten siding painted brown.

The typical tent cabin measures 12 feet x 14 feet. It is constructed by stretching heavy duck canvas over an open framework of wood or metal to create a simple shelter with an entrance on the gable end. All of the cabins have small iron stoves that vent through the sidewall thimble to the metal flue. Tent cabins at all high camps are for seasonal occupancy and are disassembled at the end of summer.

The *Tuolumne River Plan* calls for the removal of employee tent cabins along the bank of the river, and replacing them in the area just north of the Lodge parking area—east of the entrance road. In addition to Tuolumne Meadows Lodge employees, this area is also slated to accommodate housing for all other Tuolumne Meadows concessioner employees such as those who work at the store and grill.

GUIDELINES FOR TUOLUMNE MEADOWS LODGE

- Because the new employee housing will be visible on the arrival road to the Lodge, it is important that it help set the architectural tone—enhancing, and not diminishing the sense of arrival to this historic lodge.
- New structures along the arrival road should maintain the general spacing, scale, and color of the existing tent cabins at Tuolumne Meadows Lodge.
- New structures should be sited and spaced in a way consistent with historic patterns, which were based on proximity to natural features such as boulders or tree groupings.

- In the new employee housing area, pedestrian pathway network should be well-delineated to protect vegetation. Use appropriate naturalistic barriers such as partially buried boulders or lodgepole logs to prevent trampling of such areas.
- New parking for the employee housing area, should be clustered in small groups and, screened with native vegetation or natural features, and should be sited so it is obscured from the main road.
- New exterior storage, service areas, utilities, and equipment should be out of public view. If this is not feasible, then these areas should be screened with vegetation and/or fencing to ensure that the historic and natural scenes are minimally impacted. This guideline applies to the arrival experience along the road leading up to the lodge as well as within the lodge area itself. Refer to the Unifying Elements chapter for guidelines on vegetative screening and fencing.
- Any redesign of the existing parking area should incorporate natural features such as boulders, trees, and meadow grasses to soften the visual expanse of large areas of asphalt.

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National Park Service
U.S. Department of the Interior

Yosemite National Park
Tuolumne River Plan

Tuolumne Meadows Campground Design Guidelines - Draft July 2009

1 Tuolumne Meadows Campground Design Guidelines

Contents

Photo 1 (cover). Tuolumne Meadows Campground campsite, 2008.

Photo 2 (left). Camping in Tuolumne Meadows, 1928.

3 Tuolumne Meadows Campground Design Guidelines

History

Tuolumne Meadows campground, with 304 sites, is one of the largest campgrounds in the National Park System. The campground was built in the early 1930s by the Civilian Conservation Corps (CCC). Prior to campground construction, camping in Tuolumne Meadows was unrestricted over an area of approximately four square miles.

In 1961, the original 250 campsites were supplied with new picnic tables, grills, and trash receptacles. In the same year, an amphitheater ("campground circle") and new comfort stations were added, and a 100-site camping area for groups was developed along a spur road leading from the main campground road. Later, a portion of the original group camping area was converted to campsites for visitors with horses.

Over time, the overall number of individual campsites in the campground has fluctuated. There were reportedly between 600 and 700 sites in the 1960s. In the 1980s, a few hundred campsites were removed and restored to natural conditions because they were so densely spaced that visitor experiences were compromised and vegetation and soils were being impacted. The campground originally had two entry/exit points. However, the westernmost entry/exit, which connected Loop D to Tioga Road east of Unicorn Creek, was reportedly closed in the 1970s, when the NPS started charging fees for camping. The main campground roads were probably last repaved in the early 1960s.

Campground Setting, Condition, and Current Management

General Description: Campsites are organized into seven areas or "loops", labeled A – G. There are 304 sites, including 300 standard sites that accommodate up to six people and four horse campsites that accommodate up to six people and six horses. Additionally, there are seven group sites that accommodate between 13 and 30 people. There is also a designated area for backpacker camping (26 sites). Campsites are allocated 50% by reservation, and 50% first-come, first-served. Eight comfort stations are distributed throughout the campground.

There is no designated area within the campground for recreational vehicles (RVs). The official campground map (see next page) illustrates which sites can accommodate RVs of various sizes. However, none of the campsites have electrical hook-ups, which means that some RV campers run on-board generators to produce electricity.

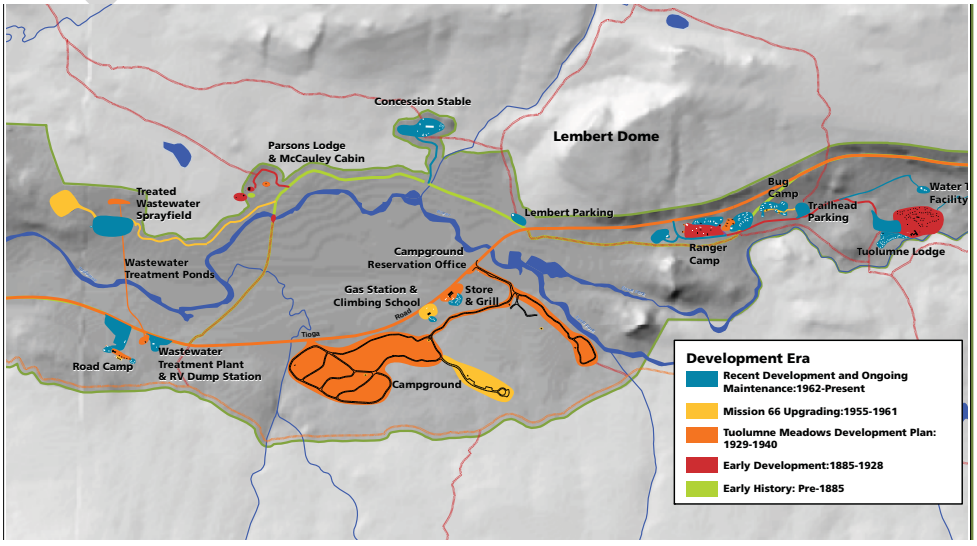


Photo 3 (left). Main campground road in the vicinity of Loop B.

Map 1. Development stages in Tuolumne Meadows.

National Park Service 4

Vehicular Circulation: Asphalt pavement on the campground's narrow primary roads has degraded over time (photo 3) so that these roads look similar to the unpaved secondary routes that access individual clusters of campsites. For this and other reasons, visitors easily become disoriented within the large campground; many end up driving in circles before eventually finding their destination.

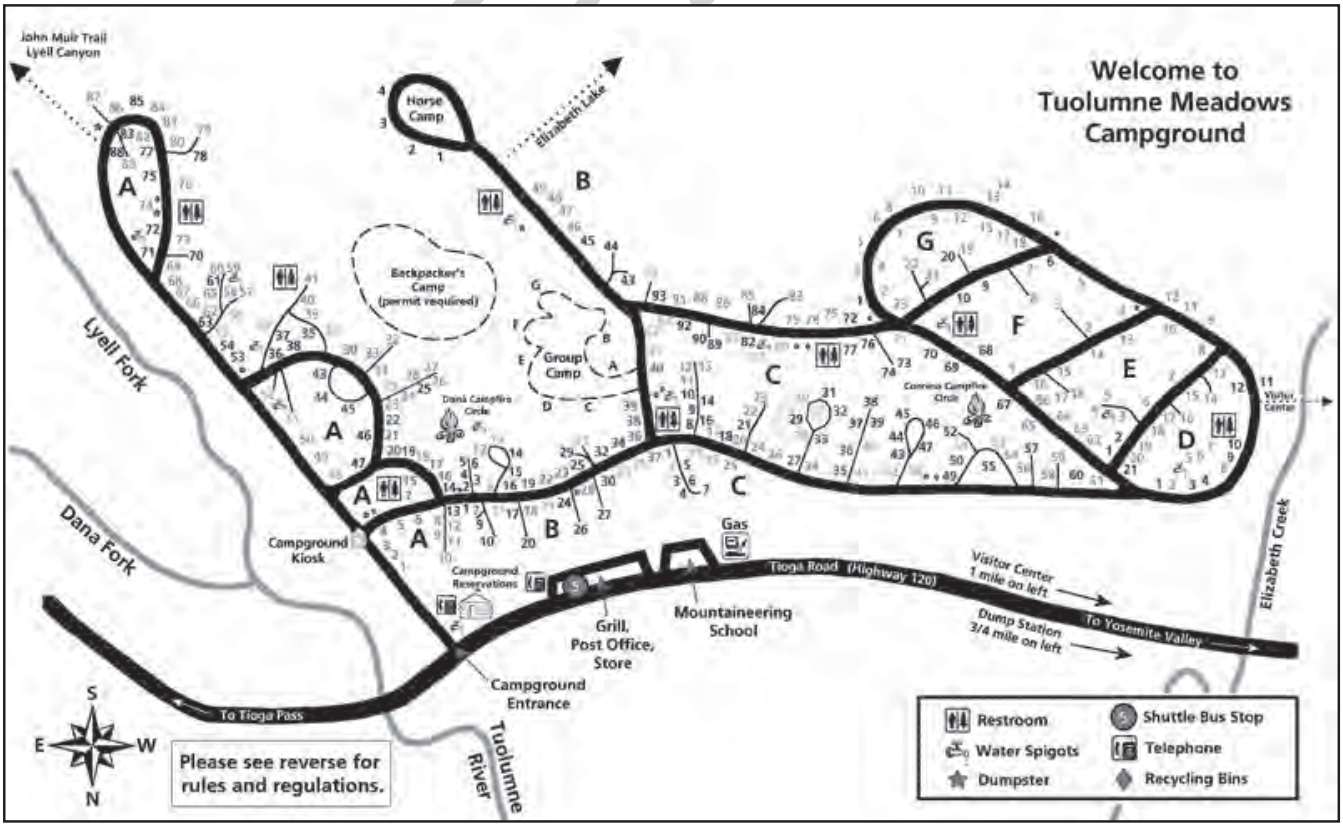
Loop A campsites that are closest to the campground entrance/exit experience considerable vehicular traffic and congestion when the campground is busy. This is because (a) all vehicles entering or exiting the campground must pass by those sites, and (b) vehicles entering the campground tend to stack up at the campground entrance kiosk.

Condition: Because parking areas and vehicular access areas within the campground are not well defined, visitors in vehicles can drive virtually anywhere within a campsite. Many areas in the campground, including the terrain around comfort stations, are bare of vegetation because they are repeatedly run over by vehicles (photos 4,5,6). Some visitors drive deep into the heart of campsites to minimize the distance they have to haul food or equipment from their vehicle, often driving directly up to picnic tables. Cumulatively over time, vehicles compact soil and damage tree roots; crush and kill understory plants, seedlings, and saplings; and make campground soils prone to wind and water erosion. This has diminished the scenic quality of the campground and the privacy of campsites because screening vegetation has been lost.

The practice of placing tents in various locations within individual campsites has had a similar effect; understory plants within campsites have been damaged and few young trees are present to replace those that die from natural causes or human impacts.

Loop D - The westernmost portion of Loop D is currently reserved for use by Yosemite Association volunteers and participants in Yosemite Association's Outdoor Adventure programs. This loop has better vegetative cover and fewer compacted and denuded areas than other parts of the campground.

Group camping area - Group campsites are located in the trees, around a large central expanse that consists of decomposed granite and is devoid of vegetation and natural cover (photo 7). This barren area is confusing to visitors and detracts from the area's natural scenery.



5 Tuolumne Meadows Campground Design Guidelines

Map 2 (left). Official campground map given to campground visitors.

Photo 4 (above). Heavily impacted area near Conness Campfire Circle, loop C.

Photo 5 (above). Heavily impacted area between the main campground roads and Loop C comfort station.

Photo 6 (above). Campground area heavily impacted by vehicles.

Photo 7 (above). Large barren area in the center of the group camping area.

Backpacker camping area. The backpacker camping area is used by wilderness permit holders for one-night stays while either departing for or returning from trips into the backcountry. This area is visually separated from main portions of the campground and parking is not permitted. Campers must park their vehicles, if any, outside the campground.

Pedestrian Circulation: Pedestrian circulation is largely un-delineated throughout the campground. As a result, a network of social trails has formed leading to several issues of concern: 1) many social trails through wetland areas creating vegetation damage and soil loss; 2) several social trails pass in close proximity to, or directly through individual campsites, disrupting those campers' experiences; 3) other social trails connect the campground with the store and grill; these trails take pedestrians past the rear service and employee tent cabin areas, which is an undesirable approach from both the visitors' and employees' perspectives.

Comfort Stations: Comments from visitors and campground hosts suggest that the number and condition of comfort stations is a concern. Eight campground comfort stations buildings are often shared by more than one thousand people. According to campground hosts, campers commonly complain that there are too few comfort stations and that their condition is poor because the toilets do not always function properly. As a result, some campers choose to use the woods instead. Campground rules require campers to dump used dishwater into toilets because there is no designated sink area for washing dishes. Each comfort station is divided in half by gender, and each half has three to four toilet stalls and one or two sinks (cold water only). The comfort stations offer only basic facilities with no showers, lighting, or heat. Lighting is not used in the comfort stations to minimize effects on natural night skies.

Accessibility for Persons with Disabilities: All campsites have wheelchair accessible picnic table, but no campsites are designed to be fully accessible to persons who use wheelchairs. At least one of the comfort station is wheelchair accessible.

Desired Conditions for Tuolumne Meadows Campground

- The campground's original rustic setting is restored and maintained.
- The campground is predominated by natural sounds and scenery.
- The campground is safe and easy to navigate.
- Users understand where it is allowed and not allowed to drive and park, and can easily discern the hierarchy of circulation routes.
- A representative portion of campsites and comfort stations are accessible to persons with mobility disabilities, including those who use wheelchairs.
- Campers rarely must wait to use a comfort station.
- Campers travel less than 300' to use a comfort station.
- Campground water fixtures function well and are water-efficient.
- Views of the campground from Tioga Road and surrounding peaks and domes are largely obscured by vegetation.
- Reasonable visual separation between campsites.
- Trash, bear box, and recycling collection areas are properly sized and sited.
- Campers travel within the campground and to neighboring destinations by foot using camp roads and/or designated paths.
- Use is focused within well delineated campsites and pedestrian paths.

7 Tuolumne Meadows Campground Design Guidelines

Design Guidelines and Concepts

The intent of the following section is to provide managers and future designers with tools for achieving the desired conditions at Tuolumne Meadows Campground.

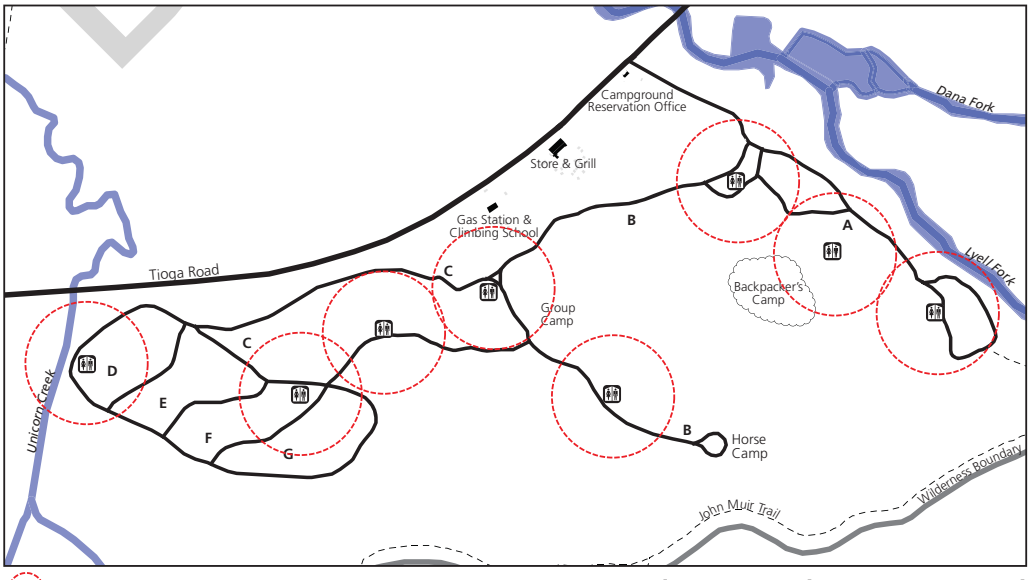
New Development to be Sustainable, Safe, and Consistent with the Campground's Historic, Rustic Character

- When replacing or adding comfort stations, use the same architectural scale, style, construction techniques, and building materials used in the original CCC-era Tuolumne Meadows campground comfort stations (e.g., shake gable roof, large cobble masonry, and natural colors (photo 8: original CCC-era comfort station).
- When replacing the entry kiosk, use the same architectural style, construction techniques, and building materials used in the original CCC-era comfort stations and other buildings found within Tuolumne Meadows.
- Vernacular construction techniques and locally available building materials should be used as long as they do not adversely affect the natural and cultural resources of the area. The methods and techniques should ensure that there are no residual signs of construction or environmental damage.
- Building products and materials should be non-toxic renewable or recyclable, and environmentally responsible.
- New facilities should be subordinate to the ecosystem and cultural context. They should conform to the constraints of existing landforms and tree locations to the greatest extent possible.
- Site trash/recycling stations and new comfort stations around natural features such as trees and boulders in order to minimize their visual impact in the landscape.
- When replacing campsite furnishings such as fire grates and picnic tables, use rustic furnishings that fit with the historic character and meet ADA requirements.

Improve Comfort Station Distribution and Amenities

- Comfort stations should be located to achieve a 300' maximum travel distance from campsites (map 3).
- Locate dishwashing basins at new comfort stations.

Photo 7 (left). CCC-era comfort station.



Map 3. 300' travel distance from existing comfort stations.

Photo 9. Example of defined small parking area.

Photo 10. Example of defined edge of parking and path to walk-in campsite.

Improve Access for Persons with Disabilities

- Provide some campsites that are fully accessible to people who have mobility disabilities and/or use wheelchairs. Sites should be located in a variety of loops to provide a range of experiences. Moderately accessible paths (natural-material or well-maintained natural soil) to primary elements such as comfort stations and spigots should be provided, where appropriate.
- Provide a minimum of two ADA parking spaces at comfort stations at a representative proportion of comfort stations.
- Bear-proof trash and recycling receptacles should be offset a minimum of three feet from the road. An asphalt or other slip-resistant natural material platform should provided for the receptacle area.
- All new picnic tables, fire rings, and grills should meet accessibility requirements.
- All new storage lockers should be accessible.

Road Design and Existing Road Upkeep – New Roads

- Design new roads (primary and secondary) to have similar widths, crowns, and paving as existing historic campground roads while allowing for large vehicles (RV) and two-way circulation (designed for low travel speed) where appropriate.
- A curvilinear alignment should be designed to lay lightly upon the existing topography to the greatest degree possible.
- Crossing unstable or steep slopes should be avoided.
- Roads should have low design speeds (with frequent and tight curves and a narrower width to minimize/avoid cut-and-fill disturbance).

Road Design and Existing Road Upkeep – Existing Roads

- Repave the primary circulation roads with asphalt, retaining their narrow width and center crown. This will help distinguish these roads from secondary connector roads and spurs so that visitors can more easily find their way in the campground.
- Discourage travel on user-created road spurs (unofficial) by restoring natural conditions and using natural materials such as vegetation, downed trees, granite boulders, berms, and logs.

Delineate Vehicular Access and Parking Areas (Photos 9-10)

- Define parking and circulation routes for vehicles near campsites, comfort stations, and trash/recycling bin areas, to ameliorate soil impacts, encourage regrowth of screening vegetation, and improve campground naturalness.
- Selectively define the road edge with granite boulders or logs to discourage vehicles from parking along the side or the road, while still allowing places for two cars to pass on the narrow roadway.
- Use materials that blend with the natural environment and cultural landscape, such as granite boulders and logs.
- Confine vehicular impacts by providing parking areas adjacent to primary or secondary access routes rather than in the center of campsites or campsite clusters. (Campers may have to trade off some measure of convenience for increased naturalness and privacy at campsites.)
- Depending on site constraints and opportunities, provide parking either for individual campsites, or for clusters of several campsites.
- Provide small overflow parking areas for campgrounds guests (many sites will only have one parking space).

Provide Pedestrian Links Between Visitor Areas

- Provide designated unpaved trails to link the campground with the store/grill or shuttle system.

Improve Campground Entry and Provide Secondary Exit

- To improve vehicular circulation, reduce congestion, and provide an alternate emergency exit, reestablish a second campground exit in the vicinity of the one that was closed in the 1970s.
- Retain the one existing entry point to allow entrance kiosk staff to efficiently allocate campsites and orient new campers.
- The existing entry kiosk should be replaced. This facility is poorly aligned within the intersection and therefore vulnerable to vehicle impact. The replacement structure should be aligned with entry/exit traffic. The structure should reflect the campground's historic, rustic character; provide a landscape island with natural elements (rocks) to protect the structure and native plants.

Restore/Rehabilitate/Reuse Heavily Impacted Areas

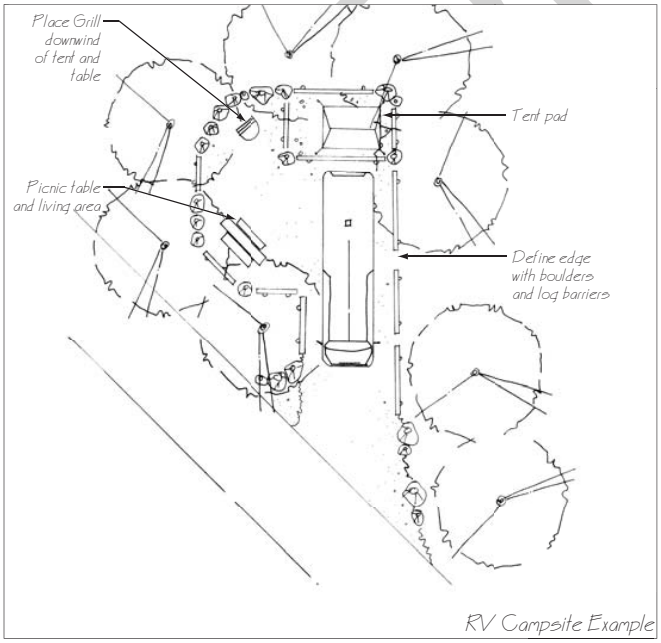
- Restore and re-vegetate heavily impacted areas that are not needed for vehicular access or parking, to improve naturalness, scenic quality, and privacy within the campground.
- Focus development in previously impacted areas.
- Additional information is needed to understand the cause of the large central barren area at the existing group camp area. Based on this research, the park should consider the appropriateness of rehabilitating, restoring, and/or reusing the large central barren area.

Redistribute/Relocate Selected Campsites

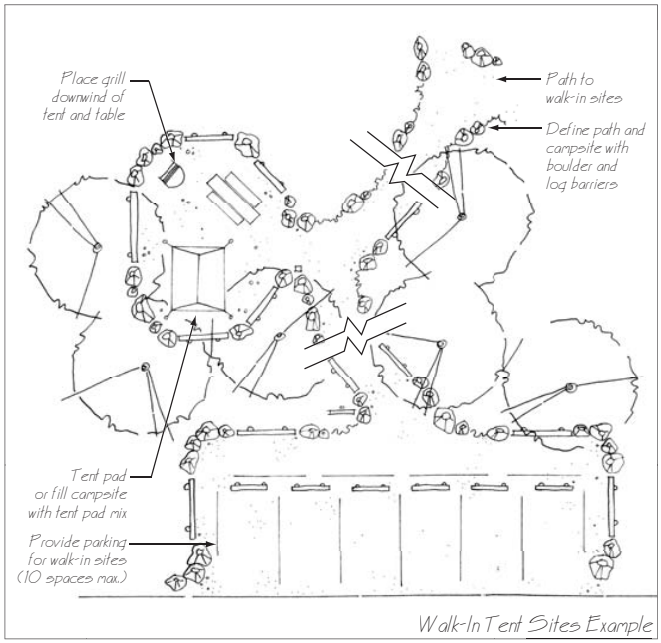
- Remove/relocate selected Loop A campsites from the heavy traffic zone near the campground entrance.
- Consider relocating the backpacker camping area further to the south so that it's closer to the John Muir Trail and further from the busier main part of the campground.

Diagram 1 (below). Example of RV campsite layout.

Diagram 2 (below). Example of walk-in tent site layout.



RV Campsite Example



Walk-In Tent Sites Example

11 Tuolumne Meadows Campground Design Guidelines

Photo 13 (left). Campground registration office.

Photos 11 and 12 (above). Examples of campsite with boundaries delineated.

Photos14 and 15 (above). Examples of tent pads.

Diagram 3 (right). Example of tent site layout.

Provide an Appropriate Range of Rustic Camping Experiences (Diagrams 1-3)

- Consider designated RV camping.
- Consider "tents only" areas that are more natural appearing due to the absence of RVs and the ability to situate tents further into the campsite.
- Consider walk-in tent camping areas with pod parking for more rustic camping experiences.

Delineate Campsites (Photos 11-12)

- Define campsite boundaries with natural materials, such as logs and granite boulders to reduce soil impacts, encourage regrowth of screening vegetation, and improve campground naturalness.

Screening and Boundary Delineation for Facilities

- Selection and spacing of vegetation and/or granite boulders for screening should be modeled after and integrated with the surrounding natural patterns.
- Plant native vegetation around existing Mission 66-era comfort stations to minimize their visual impact on the landscape.
- Use vegetation, downed trees, and/or granite boulders to provide boundaries between camp sites.
- Plant native vegetation and use granite rocks or curbing to define and secure new entry station kiosk.

Install Tent Pads (Photos 14-15)

- Install tent pads that blend with the natural environment in texture and color to reduce impacts from tents and foot traffic on soils and vegetation and to improve drainage.

Minimize and Design Artificial Lighting to Reduce Impacts on Night Skies

- Outdoor lighting for comfort station facilities should be the minimum amount required to provide for personal safety. Lights should also be shielded and/or directed downward to minimize impacts to the night sky.

Take Measures to Reduce Visitor-Caused Noise to Protect Natural Soundscapes and Improve the Visitor Camping Experience

- Maintain quiet hours between 10:00 p.m. and 6:00 a.m.
- Generator use is permitted sparingly between 7 a.m. and 7 p.m.

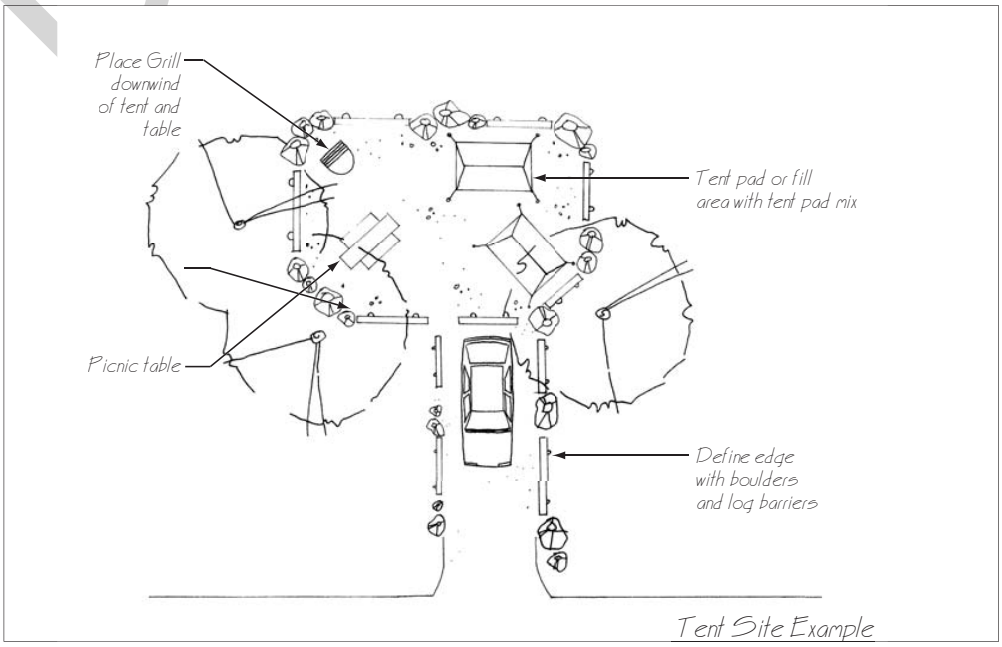


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Photo 16 (left). Camping at the Tuolumne Meadows Campground.

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Appendix L:
Class C Net Construction Cost Estimates for Implementing the Tuolumne Wild and Scenic River Comprehensive Management Plan

Class C construction cost estimates are conceptual cost estimates prepared with "big-picture" scopes of work. They are general in nature, representative of a broad-based vision rather than focused on specific details. The National Park Service typically creates Class C construction cost estimates for large-scale planning efforts such as general management plans and wild and scenic river comprehensive management plans. These Class C construction cost estimates are based on a combination of detailed installation analysis, typical assembly costs, lump sum and unit costs derived from similar projects.

The Class C net construction cost estimates for the *Tuolumne River Plan* were prepared by professional cost estimators from the National Park Service, Denver Service Center, Technical Services Branch in 2011. Cost data was compiled from *RS Means 2011 Building Construction Cost Data, Site Work and Landscape Cost Data, and Square Foot Costs Data*. In addition, some cost information was derived from recently completed Yosemite National Park projects and similar projects at other parks.

Implementation of the selected alternative for the *Tuolumne River Plan* would occur in phases over a period of several years. Cost estimates for each individual phase will be refined (i.e., Class B and Class A) in tandem with the design development process.

For detailed information pertaining to cost estimating standards, refer to the National Park Service *Cost Estimating Requirements Handbook* (NPS 2011):
www.nps.gov/dscw/loader.cfm?csModule=security/getfile&PageID=297684

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Class C Net Construction Cost Estimate for Implementing the Tuolumne River Plan				
Location	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4 (NPS preferred)**
1. Pothole Dome	228,903	465,316	382,418	465,316
2. Tioga Road through Tuolumne Meadows area	6,060,950	6,991,446	6,138,950	6,991,446
3. Existing Cathedral Lakes trailhead	246,394	246,394	246,394	246,394
4. Existing wastewater ponds and sprayfield	2,686,444	365,873	365,873	375,147
5. Area east of Budd Creek and west of existing visitor center	210,927	5,576,759	210,927	210,927
6. Existing visitor center and Road Camp	1,052,275	1,562,298	1,478,556	3,477,310
7. Existing wastewater treatment plant	4,392,455	5,015,304	9,180,709	5,432,953
8. Parsons Memorial Lodge	761,847	228,890	228,890	228,890
9. Area west of Unicorn Creek	323,160	1,295,836	315,676	7,417,275
10. Tuolumne Meadows Campground area	11,938,248	16,365,915	13,943,866	16,177,635
11. Existing commercial services core	3,114,506	12,065,015	1,454,740	3,272,812
12. Existing concessioner stable	1,870,888	1,116,404	203,495	2,033,888
13. Lembert Dome	955,539	1,247,303	1,357,736	1,357,736
14. Old Tioga Road/Great Sierra Wagon Road	763,641	763,641	763,641	763,641
15. Existing wilderness center and NPS stable	6,155,974	1,271,358	851,420	1,257,858
16. Existing ranger station and Ranger Camp	2,353,064	2,695,225	2,612,997	5,338,665
17. Bug Camp, Dog Lake/John Muir Trail parking	1,534,011	1,534,011	3,147,718	3,301,324
18. Tuolumne Meadows Lodge	1,161,617	232,090	4,156,879	4,062,741
19. Water treatment facility	175,000	1,250,000	1,250,000	1,250,000
20. Gaylor Pit	112,122	9,587,798	218,515	765,000
21. Glen Aulin High Sierra Camp	912,862	1,106,774	1,152,525	1,152,525
PROJECTED TOTAL COST	**$47,010,827**	**$70,983,650**	**$49,661,925**	**$65,579,483**

Appendix M:
Cumulative Plans and Projects List

This appendix presents a summarized list and subsequent detailed descriptions of past, present, and reasonably foreseeable projects that have been evaluated in conjunction with the impacts of an alternative to determine if they have any additive effects on a particular resource. These projects were included in the cumulative effects analysis presented in Chapter 7 of this document.

The National Park Service plans and projects listed in this appendix can be accessed through the agency's Planning, Environment and Public Comment website at: http://parkplanning.nps.gov/.

Summary

Reasonably Foreseeable Actions

There are no reasonably foreseeable actions that could potentially affect the Tuolumne River corridor at this time.

Current Actions

National Park Service

- Cathedral Peak Route Delineation
- Commercial Use Authorization for Commercial Activities
- Hetch Hetchy Communication System Upgrade Project
- High-Elevation Aquatic Ecosystem Recovery and Stewardship Plan
- Improve Parkwide Communications Data Network
- Informal Trail Removal and Ecological Restoration Actions at Tuolumne Meadows
- Invasive Plant Management Plan Update
- Merced Wild and Scenic River Comprehensive Management Plan
- Operational Fire Management Plan
- Sierra Nevada Bighorn Sheep Environmental Assessment (Sequoia and Kings Canyon National Parks)
- Scenic Vista Management Plan
- Tenaya Lake Area Plan
- Tioga Road Rehabilitation Project
- Tioga Road Corridor Campground Accessibility Improvements
- Tioga Trailheads Project
- Tuolumne Meadows Upgrade Shuttle Stop Signs
- Tuolumne Meadows Concessioner Stables Fence Modification
- Tuolumne Meadows Water Treatment System Improvements
- Vegetation Management Plan
- Wilderness Stewardship Plan

Other Agencies

- National Forest Travel Management Plan and Forest Plan Revisions
- Recreational Facility Analysis (U.S. Forest Service)

Past Actions

National Park Service

- Fire Management Plan
- Tuolumne Meadows Water Treatment Facility Regulatory Upgrade
- Gaylor Pit Lead Abatement
- Restoration of Disturbed Areas at Tuolumne Meadows Lodge
- Tuolumne Meadows Service Station Soil Gas Survey
- Tuolumne Meadows Service Station Vapor Recovery Installation
- Tuolumne Meadows Water Line Replacement
- Tuolumne Winter Ranger Residence Install Alternative Power Sources
- Pate Valley and Yosemite Valley Invasive Velvet Grass Control

Other Agencies

- Grazing Allotment Permit Renewals (U.S. Forest Service)
- O'Shaughnessy Diversion Tunnel Flap Gate Clearing Project (San Francisco Public Utilities Commission)
- Upper Tuolumne River Ecosystem Project - O'Shaughnessy Dam Instream Flow Evaluation Study Plan (San Francisco Public Utilities Commission)
- Water System Improvement Program (San Francisco Public Utilities Commission)

Reasonably Foreseeable Actions

There are no reasonably foreseeable actions that would potentially affect the Tuolumne River corridor at this time.

Current Actions or Plans

Agency Name: National Park Service, Yosemite National Park

Project Name: **Cathedral Peak Route Delineation**

Description: Cathedral Peak has long been a popular destination for both climbers and adventure hikers. After decades of consistent use, severe erosion, extensive informal trail networks, gullies caused by "scree skiing," loose footing, and major vegetation loss characterize the final quarter-mile of the approach, as well as the descent back to the base. These impacts have only accelerated over the last few years as several new guidebooks promote the peak as a "classic," "easy" introduction to Sierra climbing.

This project proposes to delineate one path from the junction of the Budd Lake Fisherman's trail to the base of the south east face of Cathedral Peak, as well as a single descent path from the north ridge of the summit back to the base. By delineating one path and using extensive ecological restoration, the multiple social trails would be restored to natural conditions.

Project implementation began in 2010 and is ongoing.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Commercial Use Authorizations for Commercial Activities**

Description: The purpose for the issuance of these Commercial Use Authorizations (CUA, previously titled Incidental Business Permit) is to regulate and oversee operations of permit holders involved in conducting commercially guided day hiking, overnight backpacking, fishing, photography workshops, stock use (pack animal trips and pack support trips for hikers), and Nordic skiing activities in Yosemite National Park. In addition to the base CUA, additional uses and activities may be allowed depending on the holder's request and compliance with all applicable laws, regulations and guidelines. Conditions for these additional activities are stipulated in the body of the individual permit for each activity. The permitted activities are to be conducted only in those areas of Yosemite National Park open to the public and authorized by the permit. The permit holder is required to obtain any additional permits or licenses as required by law. Permits are renewed annually.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Hetch Hetchy Communication System Upgrade**

Description: The San Francisco Public Utilities Commission in cooperation with the National Park Service and The US Forest Service is planning a communication system upgrade project. The purpose of the upgrade project is to 1) vacate the 2GHz band per Federal Communications Commission requirements; 2) replace and upgrade the obsolete and aging communication system with an improved system; 3) provide the video and radio bandwidth to allow for future installation of voice radio system; 4) provide the foundation infrastructure for housing NPS and USFS communication equipment associated with their individual communications systems.

Project implementation and construction began in summer 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **High-Elevation Aquatic Ecosystem Recovery and Stewardship Plan**

Description: The National Park Service is preparing a High-Elevation Aquatic Resources Management Plan to guide management actions to protect Yosemite's diverse high-elevation aquatic ecosystems and to restore natural composition, structure, and function to systems that have been disturbed by past or ongoing human activities. The plan is needed to provide a framework for restoring and maintaining high-elevation aquatic ecosystems in the park; to halt the decline of native amphibian populations and to restore species within their natural range; and to prepare for new challenges that may threaten these systems. The plan will include the lakes, ponds, wet meadows, and streams located above 6,000 feet in elevation and the diverse plants and animals that inhabit these environments.

The plan will consider: 1) Removal of non-native fish from targeted areas of the park to restore natural biodiversity in critical basins (chemical removal of non-native fish is not currently being considered in this plan); 2) Restoration of Sierra Nevada yellow-legged frogs and Yosemite toads to suitable locations within their

historic range; and 3) The development of Best Management Practices for recreational and administrative use of high-elevation aquatic ecosystems to ensure that park resources and values remain unimpaired. These would include preventative measures to avoid the introduction or spread of non-native species or pathogens that may threaten native species or habitats, and evaluation of human use within these environments to ensure that use does not result in the loss of ecological function.

Project planning and preparation of an environmental assessment is underway and is scheduled for public review in 2012.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Informal Trail Removal and Ecological Restoration Actions at Tuolumne Meadows**

Description: This project proposes to protect the meadow through restoring trampled areas of the meadow, removing informal trails and delineating trails and trailheads using logs, rocks, or fencing. Cultural resources will be documented for future restoration projects. The following actions for 2012 are scheduled in portions of the meadows (not all of the meadows will be treated):

- Remove informal trails in Tuolumne Meadows (the section from the Tuolumne Store and Grill to the bridge/Soda Springs area will not be removed) to restore hydrologic conditions and native plant communities
- Close sections of Tuolumne Meadows to protect restoration areas and prevent additional informal trailing.
- Delineate trails with logs or rocks around the Soda Springs area to reduce meadow fragmentation and damage to rare plant habitat
- Delineate trail and parking at the Soda Springs trailhead with logs, rocks or fencing
- Conduct site visits with subject matter experts of several divisions to prioritize, identify data gaps and develop methods for future work
- Develop interpretive materials to inform visitors of the project and the importance of protecting meadow habitat
- Conduct preliminary vegetation, wildlife, hydrology and visitor use monitoring to measure efficacy of proposed future restoration actions

A categorical exclusion for this project was completed in spring 2012, and project implementation is expected to occur in summer 2012.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Invasive Plant Management Plan Update**

Description: This plan is based upon the principles of integrated pest management and describes the tools and methods use to protect Yosemite's natural and cultural resources from degradation or displacement by non-native invasive species. This plan update was written to comply with the Wild and Scenic Rivers Act, including protection of outstandingly remarkable values and water quality. A methodology will also be created for assessing the efficacy and impacts of new herbicides, and assessing various management guidelines and tools.

An environmental assessment completed for this project and released for public review in 2010. A finding of no significant impact was approved by the NPS Regional Director in August 2010. Project implementation is underway.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Improve Parkwide Communications Data Network**

Description: Yosemite National Park plans to begin a Communications Data Network (CDN) infrastructure upgrade utilizing available, commercial off-the-shelf technology supporting a single "hybrid communication backbone" employed throughout the park -- to maximize existing equipment use, minimize current and planned costs, to fulfill the park's future operational and security needs. This "backbone" will be a microwave and fiber optic pipeline used to transfer computer LAN data, radio communications, security and safety video systems, telephony, burglar/intrusion, fire alarm systems, traffic collection data, and telemetry throughout Yosemite. Upgrading the network also serves to enhance compliance and utilization of the narrowband and digital P25 compliant radio infrastructure as well as providing enhanced LAN connectivity for remote areas such as Wawona, Crane Flat, Hodgdon Meadows, and Tuolumne Meadows.

The CDN is designed to serve six geographic areas of the park as well as the five park entrance stations. The geographic areas include El Portal, Yosemite Valley, Wawona, Crane Flat, Hodgdon Meadows, Tuolumne Meadows, and Hetch Hetchy. The final installation will be a hybrid infrastructure, based around proven microwave technology that linking the geographic areas with multiple T-3 level bandwidth managed as necessary by park staff. There will be no need to rely on an independent service provider for maintenance of the system, as the backbone will be maintained by park staff.

An environmental assessment completed for this project and released for public review in 2010. A finding of no significant impact was approved by the NPS Regional Director in April 2010. Project implementation is underway in the Crane Flat area.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Merced Wild and Scenic River Comprehensive Management Plan**

Description: The NPS has begun developing a new Comprehensive Management Plan and associated Environmental Impact Statement for the Merced Wild and Scenic River (Merced River Plan/EIS). In this plan, the agency will address resource protection and restoration; development (and/or removal) of lands and facilities; user capacities; and specific management measures that will be used to protect and enhance the river's outstandingly remarkable values. The Merced River Plan/EIS will address the quantity and mixture of recreation and other public uses that may be permitted without adverse impact to the river's outstandingly remarkable values, including a discussion of the maximum number of people that may be received in the river corridor.

The National Park Service is currently preparing a new comprehensive river management plan and environmental impact statement for the Merced Wild and Scenic River within Yosemite National Park.

Public scoping was reopened for the new plan in July and August 2009. Preparation of the environmental impact statement is underway and is scheduled for public review in 2012.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Operational Fire Management Plan**

Description: Yosemite National Park's fire management program employs a variety of methods to accomplish and support fire and resource management objectives and to reduce the risk of wildfire in and adjacent to the park. Strategies in this plan are based on knowledge gained from fire and fuels research and monitoring, and from experience gained in Yosemite National Park over the last 50 years. Over the last 30 years, federal fire policy has changed from suppression of all wildfires to a policy allowing a single fire to be used as a tool to meet multiple land management and public safety objectives. After decades more than 30 years of proactive response to wildland fire, the park is far from restoring natural fire regimes to the entire park landscape, though significant inroads have been made. While fuel reduction and prescribed burning have increased since the 1990 A-Rock Fire, developed areas are still at risk from uncontrolled wildland fires. The 2001 Federal Fire Policy specifically mandates public land agencies to reduce the amount of forest and shrubland fuels around areas with homes and buildings, and to restore ecosystems to a more natural, fire-tolerant balance. In response, the National Park Service has issued new fire management guidelines that require updated fire management plans. Yosemite National Park's 2009 Operational Fire Management Plan serves to utilize the new fire management guidelines in outlining procedures for managing fire in Yosemite National Park; for restoration and maintenance of ecosystems, for reduction of hazard fuels, for protection of natural and cultural resources, and for protection of wildland urban interface communities.

The 2009 Operational Fire Management Plan builds on the 2004 Yosemite National Park Fire Management Plan/EIS.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Scenic Vista Management Plan**

Description: The Scenic Vista Management Plan is a comprehensive strategy to prioritize viewpoints for management, identify which methods of vegetation clearing area appropriate at what times and in which places, and describe what trees and brush may need to be removed to restore the view at high priority vistas. Proposed vista management methods could include fire, mechanical thinning, and trimming.

An environmental assessment was completed for this project and released for public review in winter 2010-2011. A finding of no significant impact was approved by the NPS Regional Director in August 2011. Project implementation will begin in 2012.

Agency Name: National Park Service, Sequoia and Kings Canyon National Parks

Project Name: **Sierra Nevada Bighorn Sheep Environmental Assessment**

Description: The National Park Service, in cooperation with California Department of Fish and Game (CDFG), the US Geological Survey (USGS), and Inyo National Forest, is conducting a scientific study of Sierra Nevada Bighorn Sheep (*Ovis canadensis sierrae*), a federally endangered subspecies endemic to the parks. This study will provide scientific data needed to inform development of a new Wilderness Stewardship Plan (and environmental impact statement) for Sequoia and Kings Canyon National Parks and to implement key tasks of the Recovery Plan for Sierra Nevada Bighorn Sheep (USFWS 2007).

An environmental assessment was completed for this project and released for public review in June 2011. A finding of no significant impact was approved by the NPS Regional Director in August 2011. Project implementation is scheduled to begin in 2012.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tenaya Lake Area Plan**

Description: The purpose of this plan is to guide management of the Tenaya Lake Area. Because of its remarkable scenic qualities, its inviting blue water, and its proximity to Tioga Road, Tenaya Lake is one of the most popular destinations for summer visitors in Yosemite. Problems associated with visitor use, visitor safety, and resource impacts have been occurring for decades. The selected alternative includes ecological restoration of 9.7 acres within areas currently affected by visitor use, creation of volunteer trails, and stormwater erosion control. The trail systems around the lake and north of Tioga Road will be realigned to avoid sensitive natural and cultural resources and support protection and restoration, and pedestrian bridges and boardwalks over waterways and wetland habitat will be used to restore hydrological function of major waterways.

The Selected Alternative (Tenaya Confluence) includes the following modifications:

- Adjustments to and realignment of parking areas
- Creation of an accessible trail along the northern edge of the lake between East Beach and Murphy Creek and within the East Beach, Murphy Creek, and Sunrise Trailhead areas
- Removal and restoration of existing trails located within ecologically and culturally sensitive areas
- Removal of existing culverts and construction of a box culvert at the Tioga Road/Murphy Creek crossing, which will allow Murphy Creek to flow unimpeded under the roadway and into the lake
- Provision of interpretive materials and improved connections to the trail along the southern edge of the lake and Sunrise and Murphy Creek trailheads to facilitate wayfinding, minimize visitor confusion, and reduce the potential for volunteer trails and subsequent adverse effects to natural and cultural resources.

An environmental assessment was completed for this project and released for public review in 2010-2011. A finding of no significant impact was approved by the NPS Regional Director in April 2011. Project implementation began in summer 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tioga Road Rehabilitation Project**

Description: The Tioga Road Rehabilitation project in Yosemite proposes analyzes rehabilitating approximately 41 miles of the Tioga Road. This road provides access to Tuolumne Meadows, Tioga Pass, U.S. Route 395 and numerous popular trailheads including: John Muir, Pacific Crest, Yosemite Creek, Lukens Lake, and others. The following goals guided development of alternatives for the proposed Tioga Road rehabilitation:

- Improve the safety of visitors and employees traveling on Tioga Road.
- Maintain the character of the road corridor, including significant cultural landscape characteristics such as the curvilinear alignment, grade, and road features including culverts, retaining walls, and turnouts.
- Restore drainage features to control erosion and to protect natural and cultural resources.
- Increase accessibility for park visitors and reduce confusion regarding designated roadside turnouts.
- Manage roadside parking and traffic flow through improved turnouts.
- Reduce rockfall potential along Tioga Road by scaling rock at select locations.
- Manage and improve the Tuolumne Grove parking area.

At Tuolumne Meadows, the *Tuolumne River Plan* will determine what specific actions will be taken along the road corridor. If a Record of Decision for the *Tuolumne River Plan* is not available when construction is ready to start f, then this proposed project will solely address the resurfacing and repaving of the current road at Tuolumne Meadows.

An environmental assessment was completed for this project and released for public review in 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tioga Road Corridor Campground Accessibility Improvements**

Description: This project will correct accessibility deficiencies at 20 campsites along the Tioga Road corridor as outlined in Yosemite National Park's Self Evaluation and Transition Plan. Sites to be improved include 12 Tuolumne Meadows sites, four Tamarack Flat sites, two White Wolf sites, one Yosemite Creek site, and one Porcupine Flat site. The exact 12 sites to be improved at Tuolumne Meadows Campground will be selected by a team of subject matter experts.

Preparation of environmental compliance documents was completed in 2010. Implementation began in 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tioga Trailheads Project**

Description: The Tioga Pass Road provides access to many High Sierra trailheads. Some of the trailheads lack designated parking, requiring backcountry users to park their vehicles on roadsides. Dozens, sometimes hundreds, of vehicles can be parked alongside the road in this manner in July and August, leading to congestion and detracting from scenic views for other park users. This project addresses the site maintenance and design

elements that would improve visitor safety and experience, while also protecting natural and cultural resources, at eight formal trailheads: Gaylor Lakes at Tioga Pass, Mono Pass, Snow Creek, May Lake/Weston Pond, Porcupine, Yosemite Creek/Ten Lakes, Lukens Lake, and Tamarack Flat/Aspen Valley. Actions proposed vary according to the specific issues and concerns of each trailhead site. In general, categories and types of actions include the following:

- Site Delineation - curbing, split rail fencing, and adding boulders/logs to delineate parking areas.
- Way finding and Circulation - adding trailhead signs along roadways, adding trail signs, realigning or adding short trail segments, adding walkways.
- Visitor Safety - adding crosswalks to select trailhead areas, removing small vegetation or trees at ingress/egress to parking areas to improve sight lines.
- Visitor Experience - adding log rounds for seating at shuttle bus stop waiting areas, basic picnic facilities, adding or reinstalling some wayside interpretive exhibits, adding or expanding restroom facilities, providing appropriate parking capacity including overflow areas where needed, and adhering to the Americans with Disabilities Act regulations to promote visitor accessibility.
- Site Maintenance - repaving parking surfaces, replacing concrete curbing, trail reconstruction.
- Ecological Restoration - decompacting soils, revegetating, and allowing natural recovery where appropriate

Project planning and environmental compliance for this project were completed in 2010. Implementation began in 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Upgrade Shuttle Stop Signs**

Description: The Tuolumne Meadows Shuttle bus stop signs along the Tioga Road from Olmstead Point to the Tioga Pass entrance station are being upgraded, as the signs are aged and have limited space for information. Signs are consistent with the Yosemite Valley Shuttle sign design. Signs will display a routing map, time schedule, and other information as deemed necessary.

Project planning and environmental compliance for this project were completed in 2010. Project implementation began in 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Concessioner Stables Fence Modification**

Description: The San Francisco Public Utilities Commission (SFPUC) identified the drainage at the east side of the concessioner corrals at Tuolumne Meadows as an area of concern in 2009. Inspection indicated that the corrals are cleaned daily and there is no significant manure buildup within the corrals. However, potential water contamination by manure being washed downstream may occur during sever summer thunderstorms (defined as 2" or more of rainfall).

To address the SFPUC's concern, the National Park Service and the park concessioner will relocate the water trough from the eastern edge of the existing fenceline to the side of the barn so that the animals congregate in an area well away from the drainage/depression. The fenceline will be moved slightly to the west and a permeable retaining wall will be built along the east side of the corral to allow water during significant rain events to drain more gradually, permitting better percolation into the soils. The park archeologist has confirmed there are no archeological concerns with excavation in this already impacted corral area. The SFPUC has approved the concept. After the implementation, revegetation or landscape treatment will occur in the denuded area.

Project implementation was scheduled to begin in June 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Water Treatment System Improvements**

Description: The water treatment system in the Tuolumne Meadows area requires periodic improvements and repairs. In the last few years the NPS has replaced the water line to Tuolumne Meadows Lodge in order to provide sufficient water pressure to the show house at the lodge. The project required a small amount of ground disturbance. Similar projects are expected to continue for the foreseeable future, some of them requiring ground disturbance.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Vegetation Management Plan**

Description: The Vegetation Management Plan is an addendum to the Yosemite National Park Resource Management Plan (RMP) (1993) and is guided by the 1980 General Management Plan. The purpose of the plan is to:

- Delineate the legislative and administrative requirements that guide development of vegetation management objectives;
- Refine the goals and objectives for vegetation management that are established in the RMP;
- Describe the dynamic environment of vegetation within the park and the social, cultural and natural processes that influence the vegetation;
- Discuss the current vegetation management issues, define management objectives, management techniques and strategies for achieving objectives, and information needed; and
- Provide a summary of vegetation management planning needs to be addressed in the future, including the roles and responsibilities for planning and implementation.

The framework of the plan provides guidance for specific implementation plans to be developed for vegetation management in Yosemite. Vegetation management projects are ongoing.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Wilderness Stewardship Plan**

Description: The National Park Service will be updating the 1989 Yosemite National Park Wilderness Management Plan. The objective of updating the plan is to provide guidance to park operations for the successful management of Yosemite's designated wilderness, which comprises over 95% of the park. The plan will address land management issues within the wilderness including visitor use, vegetation associations, air resources, noise issues, watershed, soils, cultural landscapes, and other natural, cultural, and social resource variables. The plan update will also address the use of the five High Sierra camps in Yosemite National Park. The development of the EIS is scheduled to begin in 2012 -2013.

Other Agencies

Agency Name: U.S. Forest Service, all California national forests

Project Name: **National Forest Travel Management Plan and Forest Plan Revisions**

Description: The U.S. Forest Service will be developing Travel Management Plans and Forest Plans for all national forests in California over the next few years. Travel Management Plans specify what forms of travel are allowed in what areas of the national forests. Forest Plans guide where and under what conditions an activity or project on national forest lands can generally proceed. Some of the forests have completed one or both of these tasks

The environmental impact statement was completed in 2010 and the record of decision was available in late 2010.

Agency Name: U.S. Forest Service, Sierra, Stanislaus, and Inyo National Forests

Project Name: **U.S. Forest Service Recreational Facility Analysis**

Description: In 2007, the U.S. Forest Service completed an analysis of its public recreation sites. The analysis examined existing demand for the recreational resources, the need to update or change the sites to meet the demand (including closing some sites that no longer have demand for them), and the agency's ability to make the recommended changes. The analysis concluded with a program of work to reduce the deferred maintenance on the sites by 20% in the ensuing five years. The work will include everything from improvements at some sites to closure of others.

The project is ongoing.

Past Actions

National Park Service

Agency Name: National Park Service, Yosemite National Park

Project Name: **Fire Management Plan**

Description: The purpose of this plan is to guide the implementation of a complex fire management program. The program includes wildland fire suppression, wildland fire used to achieve natural and cultural resource benefits, fire prevention, prescribed fire, fire ecology research, and the use of mechanical methods to reduce and thin vegetation in and around communities. The plan updated an existing 12-year-old fire management plan, and was called for by the National Fire Policy. The plan proposed alternatives for managing wildland and prescribed fire. The chosen alternative calls for the use of prescribed fire and passive reduction techniques in all areas to achieve protection, fuel reduction, and ecosystem restoration goals. More aggressive treatment strategies are to be used in developed areas if needed. Managed wildland fire (lightning-ignited fires) are to be allowed to burn where practicable, under specific conditions. The park is divided into two units, Fire Use and Suppression, which determine appropriate fire management treatments. Additionally, there are buffer zones around areas of Wildland/Urban Interface, which have specific fuel reduction techniques available depending on the distance from the Wildland/Urban Interface and whether it falls within congressionally designated Wilderness.

The Final Yosemite Fire Management Plan/Environmental Impact Statement was completed in 2004 and guides current park fire policy.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Water Treatment Facility Regulatory Upgrade**

Description: This project proposes to add a flocculation process to ensure adequate cryptosporidium removal compliance and meet the increased regulatory requirements. Adding an engineered 4,100 gallon pressure detention tank will allow proper time, flow baffling and particle collision for polymer reaction ensuring proper pathogen removal. The Department of Health services has approved this process addition.

The new tank is 10' long and 8' wide and would be located on the south side of the water treatment building in a currently disturbed area containing underground water piping. The slab or footings for the tank will be 8' x 10' or smaller, dependent upon seismic code requirements. No vegetation or trees will be removed in this process addition. This area is not visible to the public.

This project was completed in 2010.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Gaylor Pit Lead Abatement**

Description: During the construction of the new Tioga Road, Gaylor Pit was created as a borrow pit and quarry for road material. Since the 1950s the pit and surrounding area was used by the NPS for various administrative uses. In 1984, the California Wilderness Act designated 95% of Yosemite National Park as wilderness. Once the wilderness boundary near Gaylor Pit was validated, the entire Gaylor Pit area was decommissioned in 2003; ceasing such uses as storage, dumping, temporary native plant nursery, wood yard, staging, and shooting range.

In 2004, a three year project began to restore the area in both wilderness and non-wilderness to a more natural setting. Completed in 2006, the project proposed to restore the morphology and hydrology of the area, and to revegetate it in a manner that would reestablish wilderness character. Additionally, the project aimed to modify the slope edge of the helipad (which is in non-wilderness and still in use), fill the old barrow pit, and revegetate it to reduce erosion. The shooting range (0.15 acre), due to possible lead contamination, was not part of this effort.

The site contains approximately forty cubic yards of contaminated soil along with twenty logs used as a backstop for the range. Soil samples were collected from the range and surrounding area and analyzed for lead content in 2004. All samples except those from the backstop contained lead concentrations below 100 ppm. Samples from the backstop contained lead concentrations of 150-3600 ppm. The EPA's standard for lead in bare soil in playground areas is 400 ppm by weight and 1200 ppm for non-playground areas. This regulation applies to cleanup projects using federal funds. Measured lead solubility at the shooting range of 400 mg/l is 1,000 times higher than native lead solubility. The Dana Fork of the Tuolumne, which is federally protected as Wild and Scenic and also provides drinking water to the Tuolumne Meadows area, is 0.2 miles from the wooden backstop.

The goal of this project was to mitigate environmental lead contamination while protecting wilderness values at the abandoned Gaylor Pit shooting range. The objective of this project was to remove the wooden backstop, the litter of bullets and casings, and all soil contaminated with lead from bullets and casings. After removal, the area was restored to its wilderness appearance.

This project was completed in 2006.

Agency Name: Delaware North Companies Parks and Resorts at Yosemite

Project Name: **Restoration of Disturbed Areas at Tuolumne Meadows Lodge**

Description: The park's primary concessioner, Delaware North Companies Parks and Resorts, performed restoration work at Tuolumne Meadows Lodge in 2008 and 2009. The restoration work included soil decompaction, trail delineation, planting of indigenous vegetation, correcting site drainage and improving the existing service road through camp.

This project was completed in 2009.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Service Station Soil Gas Survey**

Description: The purpose of the soil gas survey at the Tuolumne Meadows Service Station (TMSS) was to characterize the presence or lack of Volatile Organic Compounds (VOC) within the shallow soil zone to support underground clean-up activities related to the 1998 removal and replacement of underground fuel tanks. The Regional Water Quality Control Board was interested in this characterization because remediation at the site was nearing conclusion and the agency requires this type of data at sites such as this before they will grant official closure.

This project was completed in 2008.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Service Station Vapor Recovery Installation**

Description: The purpose of this project was to comply with California air quality environmental regulations for fuel dispensing systems at the Tuolumne Meadows Service Station. California Air Resources Management set April 30, 2009 as the final date to convert to a new vapor recovery system in order to improve California air quality. The existing dual-hose fuel dispenser units were removed and replaced with the approved single-hose dispenser having the Healy Vapor Recovery System. Concrete islands and pads were be demolished and replaced with new double contained dispenser pans, piping, and an upgraded electronic monitoring system. Excavation occurred in existing trench lines and pre-disturbed areas from a 1998 project to upgrade the underground tank systems at the Tuolumne Service Station.

This project was completed in 2008.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Water Line Replacement**

Description: The purpose of this project was to restore sufficient water pressure at the Tuolumne Meadows Lodge (TML) shower house. The project involved "hot tapping" a new water valve into the 4" water main that services Tuolumne Meadows. Park utility staff performed the valve installation in the existing Tuolumne utility corridor. The work involved excavating approximately 30" deep to the main water line, installing the valve and backfilling with the excavated materials. In addition, a 250' above ground temporary water line was installed from the new valve to the TML shower house for water service at the showerhouse/restroom. The temporary line was replaced with a permanent solution in 2008.

This project was completed in 2008.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Winter Ranger Residence Install Alternative Power Sources**

Description: Numerous power outages occur in Tuolumne Meadows due to winter storm cycles. Southern California Edison also preemptively cuts off power when wind is predicted, and they have indicated that they will not fix power lines which come down in Lee Vining Canyon in the winter. Winter rangers are necessary at Tuolumne Meadows to prevent resource damage and give information for winter backcountry users. They also shovel roofs and prevent damage to structures from snow loading in addition to collecting snow survey data monthly.

Therefore, an alternative power system was installed to support winter rangers and convert the ranger residence to a power system independent of the electrical grid. This system involved installation of solar panels on the south facing roof of the ranger residence, and installation of a propane tank to fuel a propane generator to augment the solar power.

This project was completed in 2007.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Pate Valley and Yosemite Valley Invasive Velvet Grass Control**

Description: Highly-invasive non-native velvet grass (Holcus lanatus) is a new serious threat to intact mid-elevation riparian, meadow, and fen communities in Yosemite. It has not reached the point of no return in Yosemite, but if left unchecked, velvet grass will continue its spread throughout moist or disturbed areas throughout mid-elevations in the park. This project proposed to control velvet grass in three top-priority sites- the fen at Happy Isles, Mirror Lake, and Pate Valley (located in the Tuolumne Wild and Scenic River corridor, below the Grand Canyon of the Tuolumne). The goal of the project was to reduce velvet grass at these sites to a maintenance level, and to gather information and make informed decisions on the best management of velvet grass in the future.

This project was implemented in 2006.

Other Agencies

Agency Name: U.S. Forest Service, all national forests in the Yosemite area.

Project Name: **Grazing Allotment Permit Renewals**

Description: When grazing allotments on the national forests are close to expiration, the agency examines the environmental impacts of continued grazing allotment by allotment. Based on this examination, the agency will then adjust allotments as needed. For example, the Inyo National Forest closed an area to continued cattle grazing to protect bighorn sheep populations. Another management change the agency may require is for the permit holder to construct fencing along creeks or around riparian areas to protect these sensitive areas from trampling by cattle.

The Inyo National Forest Mono Basin Grazing Allotments Environmental Assessment (EA) was available for comment in October 2010. The proposed action would authorize continued livestock grazing on the Dexter Creek, June Lake, and Mono Mills sheep and goat allotments, along with the Mono Sand Flat cattle and horse allotment. The proposed action is designed to maintain or improve trends in vegetation, watershed conditions, and ecological sustainability relative to livestock grazing by incorporating adaptive management strategies on the allotments. The decision document was signed in 2011.

Agency Name: San Francisco Public Utilities Commission

Project Name: **O'Shaughnessy Diversion Tunnel Flap Gate Clearing Project**

Description: In 2006, the San Francisco Public Utilities Commission restored the Tuolumne River streambed within 200 feet downstream and 200 feet upstream of the O'Shaughnessy Diversion Tunnel. The commission removed about 5,000 cubic yards of material (gravel, cobbles, and boulders) from the channel, disposing of it on nearby lands within Yosemite National Park granted to the commission under the Raker Act. This project was completed in 2006.

Agency Name: San Francisco Public Utilities Commission

Project Name: **Upper Tuolumne River Ecosystem Project - O'Shaughnessy Dam Instream Flow Evaluation Study Plan**

Description: The SFPUC initiated the Upper Tuolumne River Ecosystem Project with the goal of conducting a set of long-term, collaborative, science-based investigations designed to (1) characterize historical and current river ecosystem conditions, (2) assess their relationship to Hetch Hetchy Project operations, and (3) provide recommendations for improving ecosystem conditions on a long-term, adaptively managed basis. The Ecosystem Project will provide data and analyses to (1) support implementation of the Water Enterprise Environmental Stewardship Policy on the Upper Tuolumne River, (2) support ongoing Yosemite National Park Tuolumne Wild and Scenic River planning and management efforts, (3) provide the scientific basis for resolving outstanding issues with the U.S. Department of the Interior related to the 1987 Stipulation under the Raker Act, and (4) implement mitigation and monitoring requirements specified in the Final Programmatic Environmental Impact Report for the Water System Improvement Program (WSIP PEIR). Primary partners include the SFPUC, Yosemite National Park, Stanislaus National Forest, and the U.S. Fish and Wildlife Service.

This plan was published in 2009.

Agency Name: San Francisco Public Utilities Commission

Project Name: **Water System Improvement Program**

Description: The San Francisco Public Utilities Commission (SFPUC) approved its Water System Improvement Program (WSIP) in 2008, which caps diversions from the Tuolumne River at Hetch Hetchy to 265 million gallons per day through 2018. SFPUC and its wholesale customers in the San Francisco Bay Area will be

required to meet additional demands by conservation and recycling; however such measures would be limited to a 20% reduction in water service system wide during extended droughts. While withdrawals at Hetch Hetchy have been capped at current levels until 2018, additional withdrawals resulting from extended drought conditions could affect downstream flows at Poopenaut Valley.

This program was approved in 2008.

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Appendix N: Mitigation Measures Applicable to all Action Alternatives

The National Park Service places a strong emphasis on avoidance, minimization, and mitigation of impacts. To help ensure that field activities associated with the *Tuolumne River Plan* protect natural, cultural, and social resources and the quality of the visitor experience, mitigation measures have been developed. The following section discusses mitigation measures that would occur prior to, during, and after construction of the proposed improvements.

Mitigation Measure	Responsibility	Critical Milestones
CONSTRUCTION MITIGATION MEASURES		
Prior to entry into the park, steam-clean heavy equipment to prevent importation of non-native plant species, tighten hydraulic fittings, ensure hydraulic hoses are in good condition and replace if damaged, and repair all petroleum leaks.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Inspect the project to ensure that impacts stay within the parameters of the project area and do not escalate beyond the scope of the environmental impact statement, as well as to ensure that the project conforms with all applicable permits or project conditions. Store all construction equipment within the delineated work limits.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Implement compliance monitoring to ensure that the project remains within the parameters of National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance documents.	Yosemite National Park, Project Manager; Contractor	Concurrent with project activities
Provide a project orientation for all construction workers to increase their understanding and sensitivity to the challenges of the special environment in which they will be working.	Yosemite National Park, Project Manager	Prior to and concurrent with project activities
If deemed necessary, demolition/construction work on weekends or federal government holidays may be authorized, with prior written approval of the Superintendent.	Yosemite National Park, Project Manager	Prior to and concurrent with project activities
Remove all tools, equipment, barricades, signs, surplus materials, and rubbish from the project work limits upon project completion. Remove all debris from the project site.	Yosemite National Park, Project Manager; Contractor	Upon completion of project activities
The Construction Contractor shall prepare a Health and Safety Plan to address all aspects of Contractor health and safety issues compliant with OSHA standards and other relevant regulations. The Plan shall be submitted for park review and approval prior to construction.	Contractor	Prior to and concurrent with project activities
A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared by the Construction Contractor and implemented for construction activities to control surface run-off, reduce erosion, and prevent sedimentation from entering water bodies during construction. The SWPPP shall be submitted for park review and approval prior to construction. The plan will include measures such as: ▪ Take measures to control erosion, sedimentation, and compaction, and thereby reduce water pollution and adverse water quality effects. Use silt fences, sedimentation basins, etc. in construction areas to reduce erosion, surface scouring, and discharge to water bodies. ▪ To the extent possible, schedule the use of mechanical equipment during periods of low precipitation to reduce risk of accidental hydrocarbon leaks or spills. When mechanical equipment is necessary outside of low precipitation periods, use NPS–approved methods to protect soil and water from contaminants. ▪ Dispose of volatile wastes and oils in approved containers for removal from construction sites to avoid contamination of soils, and drainages. Inspect equipment for hydraulic and oil leaks prior to use on construction sites, and implement inspection schedules to prevent contamination of soil and water Keep absorbent pads, booms, and other materials on site during projects that use heavy equipment to contain oil, hydraulic fluid, solvents, and hazardous material spills.	Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
CONSTRUCTION MITIGATION MEASURES (CONTINUED)		
Develop and implement a comprehensive Spill Prevention/Response Plan that complies with federal and state regulations and addresses all aspects of spill prevention, notification, emergency spill response strategies for spills occurring on land and water, reporting requirements, monitoring requirements, personnel responsibilities, response equipment type and location, and drills and training requirements. The spill prevention/response plan will be submitted to the park for review/approval prior to commencement of construction activities.	Contractor	Prior to project activities
A construction work schedule shall be prepared by the Construction Contractor for the project that minimizes effects on wildlife in adjacent habitats and peaks in visitation. The work schedule shall be submitted for park review and approval prior to construction.	Contractor	Prior to and concurrent with project activities
Supervisory construction personnel shall attend an Environmental Protection briefing provided by the park prior to working on site. This briefing is designed to familiarize workers with statutory and contractual environmental requirements and the recognition of and protection measures for archeological sites, sensitive habitats, water resources, and wildlife habitats.	Contractor	Prior to and concurrent with project activities
The park shall develop a Communications Strategy Plan to alert necessary park and concessioner employees, residents and visitors to pertinent elements of the construction work schedule.	Yosemite National Park, Project Manager	Prior to and concurrent with project activities
Identify locations of existing utilities prior to removal activity to prevent damage to utilities. The NPS maintenance staff will be informed 10 working days prior to any ground disturbance. The Underground Services Alert will be informed 72 hours prior to any ground disturbance. Construction-related activities will not proceed until the process of locating existing utilities is completed (water, wastewater, electric, communications, and telephone lines). An emergency response plan will be required of the contractor.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Promptly reconnect utility services that are interrupted because of construction activities and provide advance notification if utility service will be disrupted.	Yosemite National Park, Project Manager; Contractor	Concurrent with and following project activities
Provide proper and timely maintenance for vehicles and equipment used during construction to reduce the potential for mechanical breakdowns.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
HYDROLOGY AND WATER QUALITY		
Where working areas are adjacent to or encroach on live streams, construct barriers that are adequate to prevent the discharge of turbid water in excess of specified limits.	Contractor	Prior to and concurrent with project activities
Stabilize all disturbed soil and fill slopes in an appropriate manner.	Contractor	Prior to and concurrent with project activities
Store equipment and materials away from all waterways.	Yosemite National Park, Project Manager; Contractor	Concurrent with project activities
Construction limits in the vicinity of wetlands should be clearly delineated with construction fencing	Contractor	Prior to and concurrent with construction activities
Waters shall be free of changes in turbidity that cause a nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits, as described in *The Water Quality Control Plan* for the Central Valley Regional Water Quality Control Board (CVRWQCB 1998). In determining compliance with the limits below, appropriate averaging periods may be applied, provided that beneficial uses will be fully protected ▪ Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU. ▪ Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20%. ▪ Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs. ▪ Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10%.	Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
HYDROLOGY AND WATER QUALITY (CONTINUED)		
Wastewater contaminated with silt, grout, or other by-products from construction activities shall be contained in a holding or settling tank to prevent contaminated material from entering watercourses.	Contractor	Concurrent with project activities
Remove hazardous waste materials generated during implementation of the project from the project site immediately.	Contractor	Concurrent with project activities
Dispose of volatile wastes and oils in approved containers for removal from the project site to avoid contamination of soils, drainages, and watercourses. Keep absorbent pads, booms, and other materials onsite during projects that use heavy equipment to contain oil, hydraulic fluid, solvents, and hazardous materials spills.	Contractor	Concurrent with project activities
Use silt fencing at drainages to prevent construction materials from escaping work areas.	Contractor	Concurrent with project activities
Incorporate trench plugs into new and abandoned utility corridors through meadow and wetland areas to prevent formation or continuation of groundwater conduits.	Yosemite National Park; Project Manager; Contractor	Concurrent with project activities
Design surface drainage facilities to transport runoff in a non-erosive manner.	Yosemite National Park; Project Manager; Contractor	Prior to and concurrent with project activities
Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.	Yosemite National Park, Project Manager; Contractor	Prior to, concurrent with and following project activities
Collect and cover material from construction work, and avoid depositing it where it could be eroded and carried to tributaries or the river by surface runoff or high stream flows.	Contractor	Concurrent with project activities
Minimize disturbance area at the banks of drainages. Salvage excavated materials for replacement after construction. The banks of drainages will be restored to their pre-existing contours.	Contractor	Concurrent with project activities
At utility corridors, provide adequate drainage to prevent surface water or subsurface seepage from saturating the subgrade utility corridor.	Contractor	Concurrent with project activities
VEGETATION AND WETLANDS (INCLUDING SPECIAL STATUS PLANTS)		
Measures will be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway or wetlands (see Construction, above). All actions will be consistent with state water quality standards and Clean Water Act Section 401 certification requirements.	Yosemite National Park, Project Manager; Contractor	Prior to project activities
Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve preconstruction elevations	Yosemite National Park, Project Manager; Contractor	Prior to concurrent with project activities
Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semi-permeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. The material must be stabilized with straw bales, filter cloth, or other appropriate means to prevent reentry into the waterway or wetland	Yosemite National Park, Project Manager; Contractor	Concurrent with project activities
Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their pre-existing elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable.	Yosemite National Park, Project Manager; Contractor	Concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
VEGETATION AND WETLANDS (INCLUDING SPECIAL STATUS PLANTS), CONTINUED		
A Park Botanist will oversee placement of construction fencing to avoid impacts to sensitive plants and wetlands.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Preconstruction surveys will be conducted to identify special status species within the construction disturbance zone. If special-status plant species are identified within the construction disturbance zone, the project manager will work with the Park Botanist to avoid impacts.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Wetlands have been delineated and will be clearly marked prior to work. Perform activities in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Minimizing shade impacts, to the extent practicable, should be a consideration in designing boardwalks and similar structures.	Yosemite National Park, Project Manager; Contractor	Prior to concurrent with project activities
Ensure that all earth moving equipment and hand tools enter the park free of mud or seed-bearing material to prevent the introduction of non-native plants. The NPS will inspect all equipment prior to use on the project. Map and treat noxious weeds prior to construction. Certify all seeds and straw material as weed-free. Ensure that imported top-soil is weed-free. The NPS will approve sources of imported fill material that will be used within the top 12 inches of the finished grade. Monitor and treat invasive plants for three years post-construction.	Yosemite National Park, Project Manager; Contractor	Prior to, concurrent with and following project activities
Install temporary fencing (black silt fencing or orange construction fencing) around the entire project area to protect natural surroundings (including trees, and root zones) from damage. Avoid fastening ropes, cables, or fences to trees.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities
Use native seed mix or seed-free mulch to minimize surface erosion and the introduction of noxious weeds.	Contractor	Concurrent with project activities
Contractor will develop a Revegetation Plan in conjunction with the park's Resources Management and Science Division, to be approved prior to construction activities.	Yosemite National Park, Project Manager; Contractor	Prior to project activities
Revegetation of disturbed soil areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.	Contractor	Concurrent with project activities
Where actions could impact wetlands, wetland restoration proposals must, at a minimum, provide one-for-one (1:1) wetland function replacement (i.e., no net loss of wetland functions).	Yosemite National Park	Prior to project activities
WILDLIFE (INCLUDING SPECIAL STATUS WILDLIFE)		
General: Provide information to the contractor regarding protection of special status species wildlife at the project briefings and provide contractor specifications and Best Management Practices to avoid activities that are destructive to wildlife and habitats. Project Manager will consult with the park biologist to schedule construction activities with seasonal consideration of wildlife lifecycles to minimize impacts during sensitive periods. Construction personnel will adhere to park regulations concerning food storage and refuse management. All food will be properly stored during the work day and will be removed from the site at the end of each work day.	Yosemite National Park, Project Manager; Contractor	Concurrent with and following project activities
For owls: Limit the effects of light and noise on adjacent habitat. No outdoor construction activities are to occur between dusk and dawn, to eliminate the need for outdoor construction lighting, and to avoid disruption of mating, nesting, or foraging owls.	Yosemite National Park, Project Manager; Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
WILDLIFE (INCLUDING SPECIAL STATUS WILDLIFE), CONTINUED		
For birds: A wildlife biologist will conduct bird surveys and review current owl reports to determine whether special status species are present and may be mating, nesting, or foraging in the project vicinity. If trees are to be trimmed or removed, the biologist will first survey (within 4 days prior to any such work) to determine whether there are any nests present, and advise as to whether the activity must be delayed to ensure that sensitive species such as nesting migratory birds are protected and not disrupted. If nesting birds are observed (during bird surveys, or discovered by workers) that are not special-status species, the project manager will notify the park wildlife biologist who will recommend steps to avoid undesirable impacts to the nest or young.	Yosemite National Park, Project Manager working with the park wildlife biologist	Prior to construction
For bats: A park biologist will conduct bat surveys in the vicinity (for maternity colonies) and in fall (for potentially roosting/hibernating bats), and will provide specific directions for avoiding their disturbance if they are found. If bats are detected, the specific area will be protected and work on that particular area will be delayed until the bats vacate or can be excluded from the area in a manner that does not adversely affect their survival or that of their young. If surveys conducted immediately prior to construction do not reveal any bat species present within the project area, then the action will begin within three days to prevent the destruction of any bats that could move into the area after the survey.	Yosemite National Park, Project Manager, Contractor	Prior to and concurrent with project activities
For mountain beaver, Yosemite toads, and Sierra Nevada yellow-legged frogs: The contractor will adhere to 401/404 permits to prevent increased turbidity in the creek from occurring during construction activities. Water output design will dissipate water slowly, and avoid concentrated outflows to the meadow or tributaries. Continuous water flows and water quality will be maintained for tributaries of the wild and scenic river. Only minimal and temporary holding or diversion of water for immediate and specific construction work will be allowed. If water is retained during construction, the containment will include wildlife escape ramps and the containment will be inspected in the morning before beginning work and at the end of the day to ensure that no animals have become trapped. Suitable habitat for Yosemite toads and Sierra Nevada yellow-legged frogs exists in Tuolumne Meadows. A biologist will survey for these species prior to construction. If adults, tadpoles, or eggs are discovered, the biologist will inform the Project Manager how best to avoid harm during construction activities, and may recommend delaying/rescheduling work in that particular section or minimizing the diversion of water.	Yosemite National Park, Project Manager	Prior to and concurrent with project activities
FEDERAL AND STATE PERMIT REQUIREMENTS		
The NPS will apply for and comply with all federal and state permits required for construction-related activities, including the California Regional Water Quality Control Board and the U.S. Army Corps of Engineers.	Yosemite National Park, Project Manager	Prior to project activities
AMERICAN INDIAN TRADITIONAL CULTURAL RESOURCES AND PRACTICES		
Culturally associated tribes will be given notice prior to ground disturbing activities at the project site and may be present at the project site to monitor ground disturbance during construction.	Yosemite National Park, Project Manager, Contractor	Prior to and concurrent with project activities
The NPS would continue to consult with culturally associated American Indian tribes and groups throughout the project to avoid or mitigate damage to American Indian traditional resources.	Yosemite National Park, Project Manager	Prior to, concurrent with and following project activities

Mitigation Measure	Responsibility	Critical Milestones
HISTORIC PROPERTIES		
The Park will adhere to the *Park Programmatic Agreement Among the National Park Service at Yosemite, the California State Historical Preservation Officer, and the Advisory Council on Historic Preservation Regarding Planning, Design, Construction, Operations, and Maintenance, Yosemite National Park, California* (1999 PA) to resolve adverse effects. Standard mitigation measures, as defined in the 1999 PA, include photo documentation, salvage, and reevaluation of National Register status	Yosemite National Park, Project Manager	Prior to and concurrent with project activities
All treatments within historic landscapes will be in keeping with the *Secretary of The Interior's Standards for the Treatment of Historic Properties*.	Yosemite National Park, Project Manager	Prior to project activities
Design all new construction within historic districts and landscapes or adjacent to historic sites to be compatible in terms of architectural elements, scale, massing, materials, and orientation.	Yosemite National Park, Project Manager	Prior to project activities
Archeological sites will be fenced off with orange hazard fencing by a professional archeologist. All project personnel would be briefed to stay out of areas with sensitive archeological resources.	Yosemite National Park, Project Manager, Contractor	Prior to project activities
The possibility of inadvertent discovery of archeological resources would be addressed through monitoring and discovery stipulations as defined in the 1999 PA.	Yosemite National Park, Project Manager, Contractor	Prior to and concurrent with project activities
DUST ABATEMENT MEASURES		
Cover and/or seal truck beds and stockpiles to minimize blowing dust or loss of debris.	Contractor	Concurrent to project activities
Limit truck and related construction equipment speeds in active construction areas to a maximum of 15 miles per hour and strictly adhering to park regulations and posted speed limits in other areas while inside park boundaries.	Contractor	Concurrent to project activities
Maintain adequate dust suppression equipment and use clean water to control excess airborne particulates at staging areas, active construction zones, and unpaved roads leading to/from active construction areas.	Contractor	Concurrent with project activities
EMERGENCY NOTIFICATION MEASURES		
Develop an emergency notification plan that complies with park, federal, and state requirements and allows contractors to properly notify park, federal, and/or state personnel in the event of an emergency during construction activities. This plan will address notification requirements related to fire, personnel, and/or visitor injury, releases of spilled material, evacuation processes, etc. The emergency notification plan will be submitted to the park for review/approval prior to commencement of construction activities.	Yosemite National Park, Project Manager	Prior to project activities
HAZARDOUS MATERIALS MEASURES		
An Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan shall be prepared by the Construction Contractor for the project to address hazardous materials storage, spill prevention and response. The Plan shall be submitted for park review and approval prior to construction.	Contractor	Prior to and concurrent with project activities
Store and use all hazardous materials in compliance with federal regulations. All applicable Materials Safety Data Sheets will be kept on site for inspection.	Contractor	Concurrent with project activities
HAZARDOUS MATERIALS MEASURES (CONTINUED)		
Hazardous or flammable chemicals shall be prohibited from storage in staging areas, except for those substances identified in the Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan. Hazardous waste materials shall be immediately removed from project site in approved containers.	Contractor	Concurrent with project activities
Comply with all applicable regulations and policies during the removal and remediation of asbestos, lead paint, and polychlorinated biphenyls, as applicable.	Contractor	Concurrent with project activities
SOUNDSCAPES		
Ensure that all construction equipment has functional exhaust/muffler systems.	Contractor	Concurrent with project activities
Submit a construction work plan/schedule that minimizes construction-related noise in noise-sensitive areas to the park for review/approval prior to commencement of construction activities.	Contractor	Prior to project activities

Mitigation Measure	Responsibility	Critical Milestones
SOUNDSCAPES, CONTINUED		
Use hydraulically or electrically powered construction equipment, when feasible.	Contractor	Concurrent with project activities
Locate stationary noise sources as far from sensitive receptors as possible.	Contractor	Concurrent with project activities
Limit the idling of motors except as necessary (e.g., concrete mixing trucks).	Contractor	Concurrent with project activities
To the extent possible, perform all on-site noisy work above 76 A-weighted decibels (dBA) (such as the operation of heavy equipment) between the hours of 8:30 a.m. and 5:00 p.m. to minimize disruption to nearby park users.	Contractor	Concurrent with project activities
SCENIC RESOURCES PROTECTION MEASURES		
Fence construction staging areas and construction activity areas to visually screen construction activity and materials.	Contractor	Concurrent with project activities
Consolidate construction equipment and materials to the staging areas at the end of each work day to limit the visual intrusion of construction equipment during nonwork hours.	Contractor	Concurrent with project activities
Conduct contrast analysis for any proposed structures	Yosemite National Park	In the design and proposal phase
TRAFFIC CONTROL AND VISITOR PROTECTION MEASURES		
Provide protective fencing enclosures around construction areas, including utility trenches, to protect public health and safety.	Contractor	Concurrent with project activities
WASTE MANAGEMENT MEASURES		
Require construction personnel to adhere to park regulations concerning food storage and refuse management.	Yosemite National Park, Project Manager; Contractor	Concurrent with project activities
Properly secure trash during the workday and remove all trash from site at the end of each workday.	Yosemite National Park, Project Manager	Concurrent with and following project activities

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Appendix O:
The Process Used to Develop the Alternatives

The Tuolumne River Planning Framework

The National Environmental Policy Act (NEPA) requires federal agencies to rigorously explore a range of reasonable alternatives when planning for a major federal action. NEPA also mandates an early and open process to determine the scope of issues surrounding the proposed action, to develop options for addressing those issues, and to provide for public review and comment on the environmental analyses presented in the project's Draft Environmental Impact Statement (Draft EIS).

Using a full complement of park personnel, including experts in park operations, facilities, and cultural and natural resources, the Tuolumne River planning team (planning team) devoted several years of effort, from 2005 to 2012, to develop four action alternatives for managing the river corridor. In building the alternatives, the team worked within a planning framework that included eight major steps, which are explained below. Although this framework is described as a series of sequential activities, planning is fundamentally iterative. At each step, new information is uncovered and new insight is gained that can trigger changes to prior decisions. In the case of the Tuolumne, some of these steps were revisited almost yearly. Although time-consuming, this process of review and revision ultimately lead to a stronger end product, both in form and content.

The National Park Service (NPS) began the Tuolumne Wild and Scenic River Comprehensive Management Plan (*Tuolumne River Plan*) process in 2005, following the release of the *Revised Merced River Plan* (2005). The NPS had initiated the park's first comprehensive river management planning process for the Merced Wild and Scenic River corridor with the *Merced River Plan* (2000) and *Revised Merced River Plan* (2005). An outstanding lawsuit against the NPS in response to these plans was settled, and a legally binding settlement agreement was executed between National Park Service and former plaintiffs, in September 2009. The Settlement Agreement, and its preceding court decisions, provided direction on wild and scenic river planning not only for Yosemite and the NPS, but for all agencies managing wild and scenic rivers—direction that caused NPS to revise the alternatives development process.

Additionally, extensive internal review and public input affected the process, occasioning still more revisions to it. Additional steps were added while some other earlier steps were eventually found to be unnecessary (such as management zoning in the Tuolumne River corridor). In the end, the key steps taken to develop the *Tuolumne River Plan* alternatives mirrored those for the *Merced River Plan* (slated for public review in fall 2012), with the steps below revisited several times in both plans. As noted previously, however, it was not so much the order of the steps to be followed that was critical so much as it is that all steps be taken, with revisions to other steps taken as needed—so long as protection and enhancement of river values always be ensured. Each of the Tuolumne River Plan alternatives accomplishes this requirement.

The following sections describe the objectives for each step in the Tuolumne River planning process and NPS actions to meet those objectives.

Step 1. Define River Values to be Protected and Enhanced

The Wild and Scenic Rivers Act (WSRA) mandates that each wild and scenic river "…shall be administered in such manner as to protect and enhance the values which caused it to be included in said system" (WSRA, Section 10 (a)). The values to be protected include the river's free-flowing condition, water quality, and those values that are "outstandingly remarkable." The Interagency Wild and Scenic Rivers Coordinating Council (Interagency Council) criteria for outstandingly remarkable values (ORV) state that the value must be river related and rare, unique, or exemplary in a regional or national context.

The NPS began the process of identifying the ORVs for the Tuolumne River in 2005. After completing other steps in the alternative development process (below), park planners revisited the ORVs several times (every year since 2005). Each time, park planners revised and updated the list, with further definitional clarification from the Interagency Council.

The planning team conducted internal ORV workshops using available research and monitoring information, subject-matter expertise, peer review, government partners, management input, and expert guidance from other wild and scenic river professionals. As detailed on Table 9-2, park planners also accepted public comment and comments from culturally associated tribes and groups on the ORVs numerous times between 2005 and 2010. The ORVs are listed in chapter 5, and their evolution over time is detailed in appendix F.

Because river values are a foundational element of the plan, they remain constant across all alternatives.

Step 2. Assess Baseline Condition of River Values

Once river values have been identified, it is critical to assess their condition, so that any problems can be remedied in the plan (if possible). Park planners assessed the condition of the Tuolumne River ORVs beginning in 2006. Information used to evaluate the baseline condition of the Tuolumne River ORVs included research studies and models of natural systems developed specifically for this planning effort; historic photos, maps, and archival materials; and the professional judgment of subject matter experts with extensive experience in their field. Park managers sought external peer reviews of specific research findings and the conclusions for overall river conditions where appropriate. The public also identified potential areas of concern related to the ORVs, during project scoping and in later public outreach efforts (see again chapter 9).

The planning team consolidated all of this information into the *Tuolumne River Values and Baseline Conditions,* which was released to the public in spring 2011. The assessment was also incorporated into chapter 5 of the *Tuolumne River Plan/Draft EIS*. To the extent information was available, the report contains an assessment of river values at the time of designation (1984) and today. This important step in the planning process provides a baseline for comparison with the expected outcome of the actions described in the management alternatives. It was also essential for identifying areas where immediate action must be taken to improve conditions in the river corridor.

Although the baseline conditions assessment report was not completed until 2011, the evaluation of baseline conditions began in 2005 and preliminary results were shared with the public as early as 2006, with associated

opportunities for public input. Park planners were aware of river value conditions early in the planning process and structured and revised the alternatives to address management concerns currently found in the report.

Step 3. Define Desired Condition, Adverse Impact and Degradation for River Values

In concert with assessing river values, park managers determined what the desired condition should be for those values, based on guiding legislation, available research and monitoring information, best professional judgment of subject matter experts, and current trends in the relevant academic and public land management fields. Further, a comprehensive river management plan must contain provisions designed to prevent any adverse impacts or degradation from occurring to the river values. Specific thresholds must be stated for mandatory management action that will occur ahead of any such impacts or degradation, to keep river value conditions at or above the desired condition state.

For each river value, desired conditions are called *Management Standards*, as discussed in chapter 5. NPS subject matter experts determined management standards attainable under current trends, given the most up-to-date understandings from their respective fields and implementation of all the actions discussed in this draft EIS. The management standard is an aspirational state, the condition to which park managers aspire to bring the value if its condition is diminished (step 4 in the process applies these definitions to the assessment of conditions detailed in step 2). If a river value is within its management standard, it is considered to be both protected and enhanced.

If a river value exhibits conditions that do not meet the management standard, it may be suffering adverse impacts, degradation, or management concerns. The severity of such declines in river condition may vary, so it is critical to develop benchmarks of river condition that quantify the deterioration (which can help to guide restoration efforts; see step 4 below). *Adverse impacts* are defined to be a substantial reduction in the condition of a river value in relation to baseline conditions as a result of public use, development, and/or administrative use. An adverse impact is a segment-wide effect and requires immediate attention by the agency. *Degradation* is worse; it is defined as the state in which a river value has been fundamentally altered by public use or development to the point that its value is lost for at least a decade. Degradation is a long-term, segment-wide condition. A river value has been degraded when recovery would only be possible through a sustained change in park management and a significant investment of financial and natural capital. Other reductions in river value condition may not be as severe as adverse impact or degradation, yet may still drop river value condition down to a point at which management action is warranted (the trigger points identified in chapter 5). Such reductions in river value are considered *management concerns*. For all river values, it is essential to quantitatively define these terms to the extent possible, so that future protection and enhancement of their conditions can be assured.

Along with these terms, park managers also developed indicators of river value condition that are sensitive to change, along with monitoring protocols. Such indicators and protocols are intended to accurately reflect river value condition and are easily repeatable. By following such protocols, park managers will have early warnings should any river value condition begin to exhibit a downward trend. In some cases, a river value may not lend itself easily to monitoring, such as stairstep river morphology, which is affected only by massive geologic forces well outside of human control. Consequently, park managers did not define these terms for that river value. Most river values, though, had indicators developed.

For the Tuolumne wild and scenic river values, these terms were defined in 2011. As planning is an iterative process, park planners promptly and thoroughly reassessed all alternatives once these terms were defined, to confirm that all action alternatives identified any river values experiencing adverse impact, degradation, or management concerns. Planners then revised the alternatives accordingly. This reassessment also ensured that the alternatives would reverse any downward trends and provide protection and enhancement of the river values.

Step 4. Identify Management Concerns and Corrective Actions

This step involves applying the definitions of river condition (management standard, adverse impact, degradation, and management concern, from step 3) to the existing river value conditions identified in step 2. By comparing the actual river condition to the management standard from step 3, park managers obtain a clear picture of which values need remedial action to bring them up to the management standard.

This step involved a systematic review of the river corridor to identify management concerns related to the free-flowing condition of the river, water quality, hydrologic/geologic, cultural, biological, recreational, and scenic ORVs. The planning team used scientific and geospatial data such as floodplain maps, visitor use surveys, and other monitoring information to support this review. The team also reviewed all of the public comments received during scoping to ensure that location-specific concerns were identified and paired with corrective measures. Finally, subject matter experts used their personal knowledge of the river system to supplement and clarify the findings of the baseline conditions report.

Using this information, managers then devised corrective actions, using the expertise of NPS subject matter experts, current research and monitoring information, the latest restoration techniques, and best professional judgment. The ecological restoration program (detailed in appendix H) forms the centerpiece of such restoration actions in the *Tuolumne River Plan/Draft EIS*, though there are others (such as removing some structures from riparian areas). Such actions must also correct past impacts, to the extent possible (some earlier impacts can be irreversible—it is possible that some of the effects of historic sheep grazing on Tuolumne Meadows may never be reversed, for example).

By identifying management concerns and corrective actions, managers ensured that all alternatives would protect and enhance river values. Indeed, such actions form the core of the alternatives.

Step 5. Determine Location and Size of Necessary Facilities

The WSRA guidelines state that, "Major public use facilities such as developed campgrounds, major visitor centers and administrative headquarters will, where feasible, be located outside the river area. If such facilities are necessary to provide for public use and/or to protect the river resource, and location outside the river area is infeasible, such facilities may be located within the river area provided they do not have an adverse effect on the values for which the river area was designated."[1] Pursuant to this guideline, the National Park Service evaluated all existing major facilities and services within the river corridor for their necessity and relocation potential. A summary of the evaluation is provided in Appendix A: *Site Facility Analysis for the Tuolumne Wild and Scenic River Corridor*. This evaluation consisted of, first, examining facilities to determine if any were absolutely not essential (not directly related to the park mission). As explained in appendix A, no facilities met this description, so no facilities were removed across all alternatives. The second part of the examination consisted of determining whether facilities were necessary within the context of the visitor experience desired

[1] 47 *Federal Register* 173: 39459, Sept. 7, 1988.

in an alternative (this part of the examination, then, can only be done after alternatives have been roughed out). In this case, several structures would be removed under alternative 1 to provide the self-reliant experience envisioned in that alternative; similarly, the gas station would be removed in alternatives 3 and 4 to provide additional space to accommodate the parking amounts envisioned in those alternatives.

As part of this step, park planners also evaluated the effects of existing facilities and services on river values. Any structures found to have negative effects were identified for removal, alteration to eliminate the effect, or mitigation. For example, the Tioga Road bridge over the Tuolumne River in Tuolumne Meadows has a small effect on the river's free-flowing condition, so all alternatives propose to modify the bridge to accommodate peak flows.

Also, extensive studies and site analyses were conducted at the primary visitor service areas (visitor center, Tuolumne Meadows campground, and Tuolumne Meadows Lodge) to identify other major site constraints that restrict development, redesign and/or relocation of facilities. Such constraints include the locations of floodplains, wetlands, meadows, riparian habitat, rare plants, archeological sites, historic structures, and areas of known impact. Park planners analyzed all existing structures to determine if they were causing impacts to such resources, and proposed mitigation measures or alterations to the structures to eliminate such effects. For example, the concessioner housing behind the store and grill is proposed for removal in all alternatives as it is located in a wetland.

Step 6. Solicit Public Input on Organizing Themes for Alternatives

From the outset of the alternatives development process, park managers solicited public input into the scope of the plan. While such input is mentioned in some of the foregoing steps, it is singled out here because it was such a fundamental part of the alternatives development in this process. Public input was regularly sought throughout the project, from public scoping in 2006 through the public comment period on the draft EIS in 2012. Major topics discussed included outstandingly remarkable values, their conditions, and indicators for their monitoring; other planning issues the alternatives needed to address (such as water treatment at Glen Aulin); and organizing concepts or themes for the alternatives, site plan concepts, and the preliminary alternatives themselves.

Once a set of draft alternatives was developed, park managers specifically sought public input on those alternatives through two planning workbooks and several "Planner for a Day" workshops utilizing those workbooks. The first workbook, the *Tuolumne Planning Workbook (2007),* described a set of four draft management alternatives. The workbook provided room for the public to comment on the draft alternatives and to create their own alternative plans. Following input received from the public, the planning team further refined these draft alternatives to develop a set of five action alternatives, presented in a second Tuolumne Planning Workbook in 2008. With the workbooks in hand, planners conducted more "Planner for a Day" Public workshops from 2007 and 2010 in Tuolumne Meadows, Yosemite Valley, El Portal, Lee Vining, and Groveland to discuss the alternatives and to provide an opportunity for the public to work with the same data being utilized by the planning team to move through incremental steps in the process of developing alternatives for the Tuolumne River Plan. Planners hosted site visits and webinars during the same timeframe. For a complete description of the public involvement history, please refer to chapter 9.

As noted above, early in the planning process, park planners were developing the alternatives around management zones that addressed the various concerns raised by the public and in the river value condition assessment. As the planning process progressed, the concept of organizing alternatives around zoning concepts

was discontinued, with the river values becoming the focus of planning attention and alternatives development. Still, some of the original zoning concepts presented to the public in 2007 and 2008 remain in the alternatives; for example, park employee housing is still clustered in certain zones (Bug Camp, Ranger Camp, Road Camp, and Tuolumne Meadows Lodge), with NPS and concessioner housing segregated from each other.

Step 7. Evaluate Operational and Implementation Feasibility of Draft Alternatives

Once draft alternatives were completed, park planners put them through several rounds of review and critique by park managers, field staff, resource experts, and the public. Planners examined all site proposals and management actions, ensuring that no conflicts were present within individual alternatives. Through this analysis, planners realized, for example, that excessive housing was called for by one of the alternatives, so the housing levels were adjusted accordingly. Also, planners occasionally had to revise the draft alternatives to reflect new information or evolving on-the-ground situations. For example, a 2011 transportation study at Tuolumne Meadows indicated that many more cars were parking in undesignated locations than during the 2006 season, when the last parking study was conducted, so park planners adjusted the estimates of parking supply and demand accordingly.

Planners also developed cost estimates for the alternatives, subjecting those estimates to scrutiny as well. Through this analysis, planners realized that one draft alternative would be economically and operationally infeasible to implement. Consequently, the NPS eliminated it from further consideration (which dropped the number of action alternatives back down to four).

Most importantly, planners compared the preliminary alternatives to the constraints to which all alternatives were subject—wilderness boundaries, wild and scenic segment classification directives, site constraints like the presence of wetlands or rare plants, water withdrawal limits (for domestic consumption), and wilderness experience. Through this reanalysis, for example, planners realized that one iteration of alternative 2 would withdraw too much water from the Dana Fork of the Tuolumne River. Consequently, planners adjusted the proposals within that alternative to bring water consumption down to the water withdrawal constraints common to all alternatives (an estimated 70,000 gallons per day).

Step 8. Establish User Capacities Consistent with Protection of River Values

The Wild and Scenic Rivers Act and Secretaries' Guidelines direct managing agencies to address user capacity and "the kinds and amounts of public use which the river area can sustain without impact to the values for which it was designated." Consequently, the last of the steps described herein—but again, not the last step completed; all steps can be taken concurrently and iteratively—is to establish the user capacities consistent with river value protection and enhancement, and the parameters of each alternative.

As with the other steps above, public input was a fundamental part of this step. During the scoping period for the Tuolumne River Plan, the NPS asked the public to describe what activities they enjoy in the Tuolumne River corridor, to help define the recreational ORV and begin to address the issue of kinds and amounts of use the river can sustain. The public scoping report (NPS 2006m) summarized public interest in different recreational uses, both those that members of the public would like to preserve as well as those that some would prefer to reduce or restrict. This feedback was complemented by contemporary research, constraint

maps, and best professional judgment, all of which provided up-to-date information into the types of activities and experiences visitors preferred.

User capacity experts developed a seven step process to address user capacity mandates (see chapter 6). They integrated that process into this alternative development process, which helped define the estimates of the maximum use levels sustainable in the Tuolumne River corridor, given the constraints present therein (wilderness boundaries and experience, water supply, and other resource constraints). Adjusting those use levels to the experiences envisioned within each alternative, planners produced a range of user capacities and recreation types, all within the existing constraints and all protective of river values. In one alternative, visitor use levels are much lower than current conditions, and some commercial activities would be reduced or removed. In other alternatives, the kinds and amounts of visitor use proposed requires expanding recreational opportunities and facilities, such as campgrounds and parking areas.

Conclusion

Park managers and the public developed the four alternatives evaluated in this document by performing the tasks under each of the above steps, reviewing findings, and repeating the tasks as other steps were completed (necessitating revisions to earlier steps). The NPS has identified its preferred alternative, but all alternatives protect and enhance river values while providing for kinds and amounts of visitor use that are protective of river values. The alternatives represent a wide range of choices for future management of the Tuolumne Meadows area, from dramatically reduced use to expansion of use to the limits of the domestic water supply at Tuolumne Meadows (as explained in chapters 5, 6, and 7).

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117/100321 January 2013 Printed on recycled paper

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January 2013

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Back cover: **Poopenaut Valley (Photo by Kristina Rylands)**

Front cover: **Tuolumne Meadows, Unicorn Peak and Cockscomb (Photo by Randy Fong)**