

Appendix I:

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
- Lumbert 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.

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

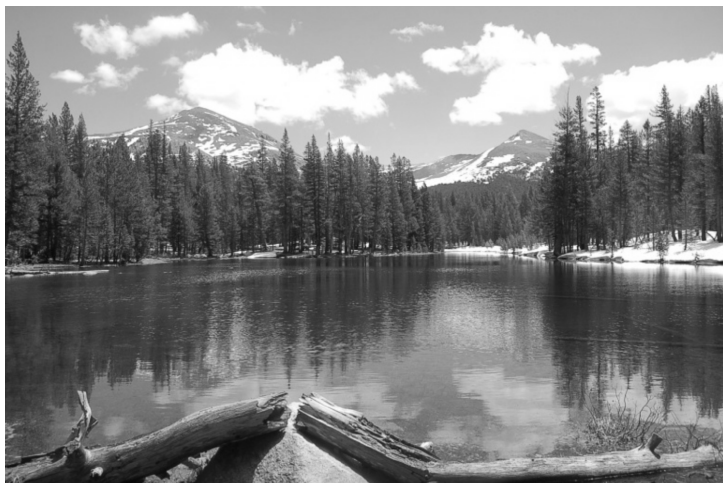


Figure I-1. Dana Gibbs Viewpoint.

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: 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.

Initial Management

This vista is located in a mixed conifer forest situated in the subalpine vegetation zone. Management

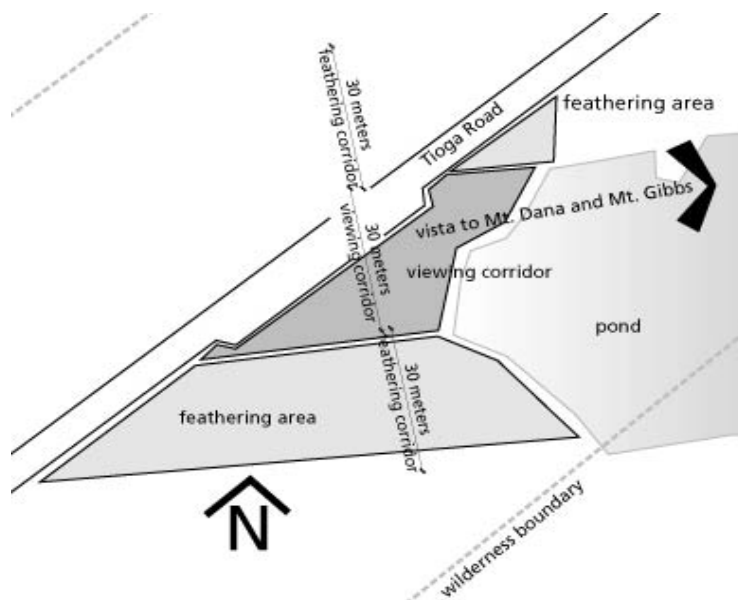


Figure I-2. Dana Gibbs view work area.

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.

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.



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

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: 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

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 I-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.

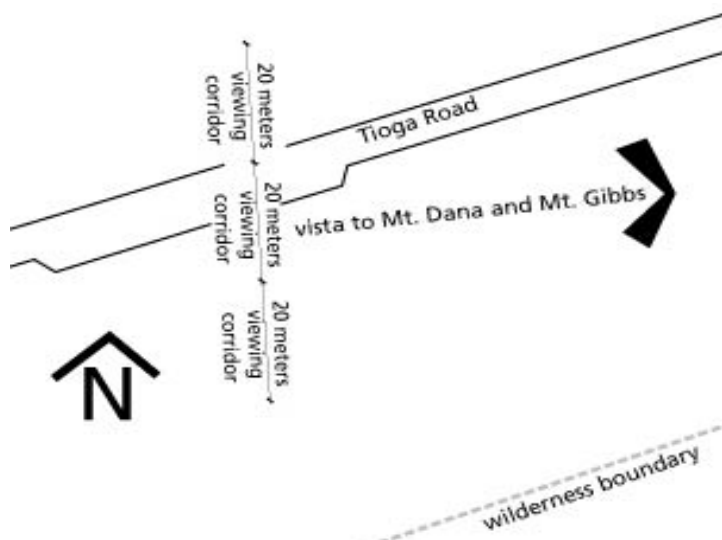


Figure I-4. Dana Fork of the Tuolumne work area.

Islands Above the Ice



Figure I-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 titled "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: 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

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.

Tree Species	< 6" dbh	<20" dbh	Total
Lodgepole Pine	119 (+/- 10% are saplings)	116	235
TOTAL TREES			235

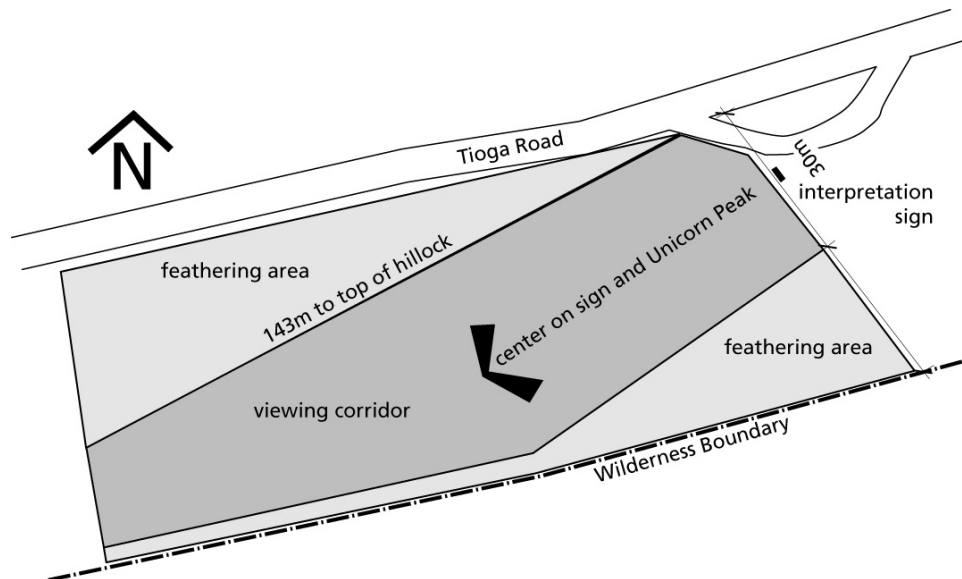


Figure I-6. Islands Above the Ice site work diagram. Not to Scale.

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

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.



Figure I-7. Viewpoint from Little Blue Slide.

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: 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.

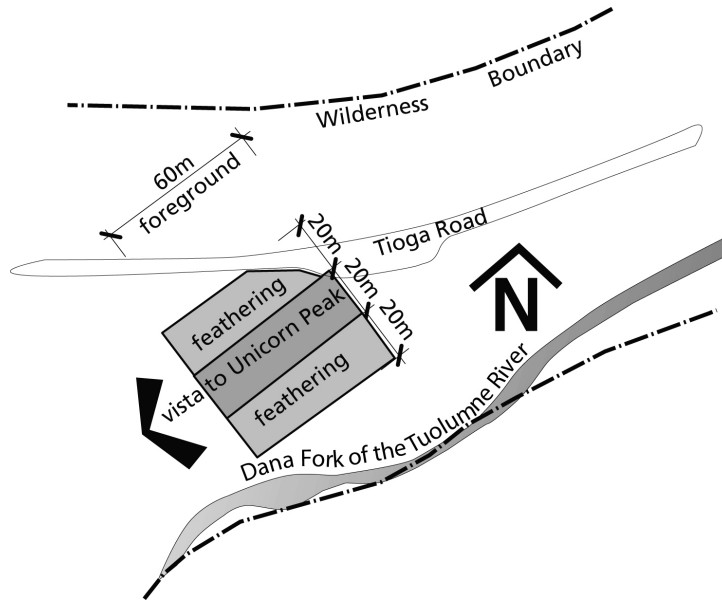


Figure I-8. Little Blue Slide work area.

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 I-9. 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: 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 I-9, 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 the Tuolumne River. As with other work plans for the

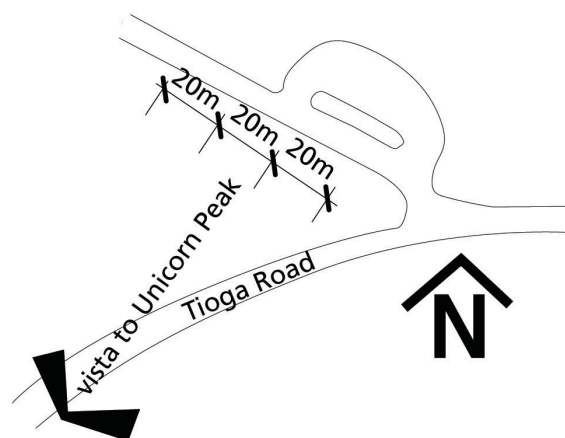


Figure I-10. Lembert Dome Parking work area.

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 Lambert Dome parking area. Lambert Dome to the east is the primary focal point of this vista, but the Cathedral Range can also be seen.

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.



Figure J-11. Viewpoint from Tuolumne Meadow Trail to Parsons Memorial Lodge.

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: 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.

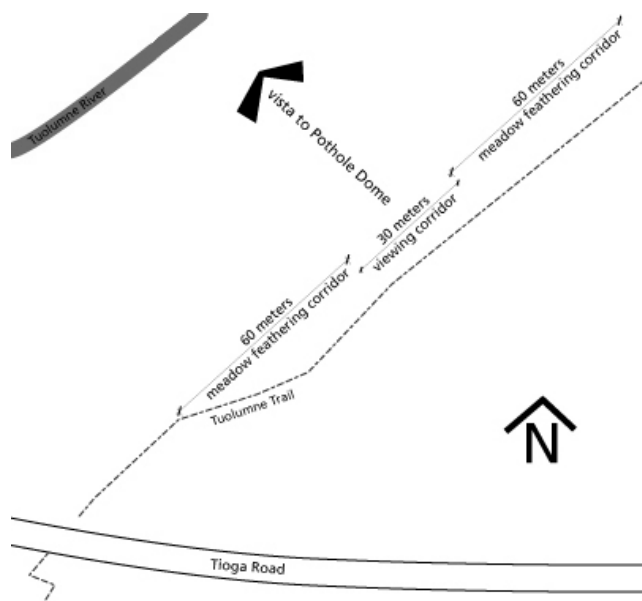


Figure I-12. Tuolumne Meadow Trail to Parsons Memorial Lodge site diagram. Not to Scale.

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.

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.

Tree Species	< 20" dbh	Total
Lodgepole Pine	10	10
TOTAL		10

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 I-13. 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: 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.

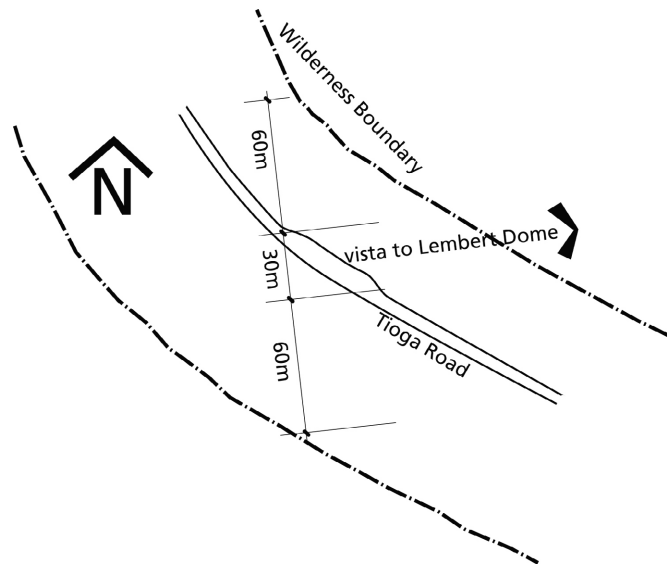


Figure I-14. Pothole Dome Parking work area.

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-15. 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: 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.

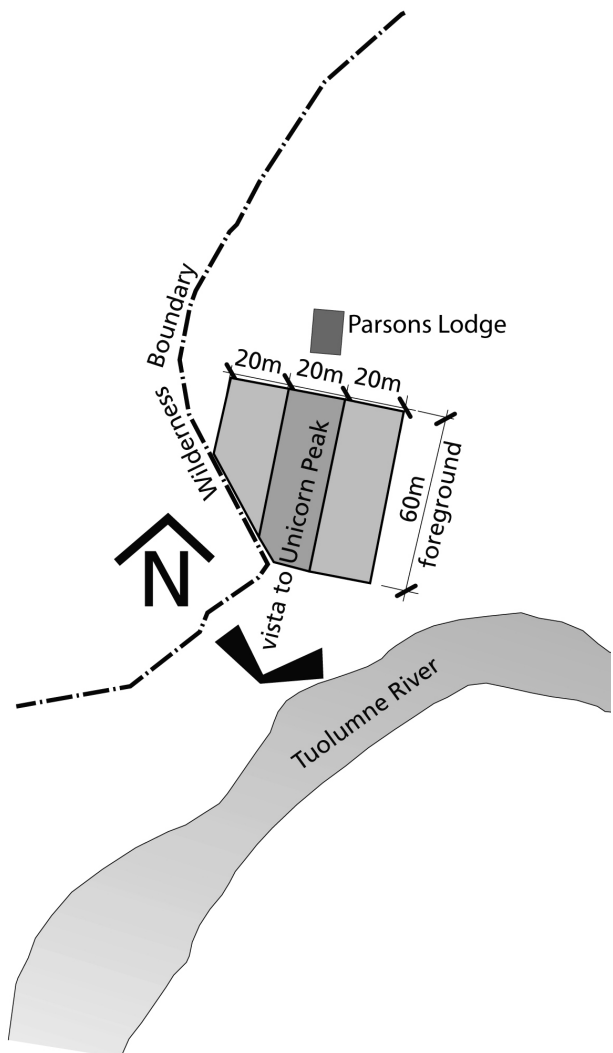
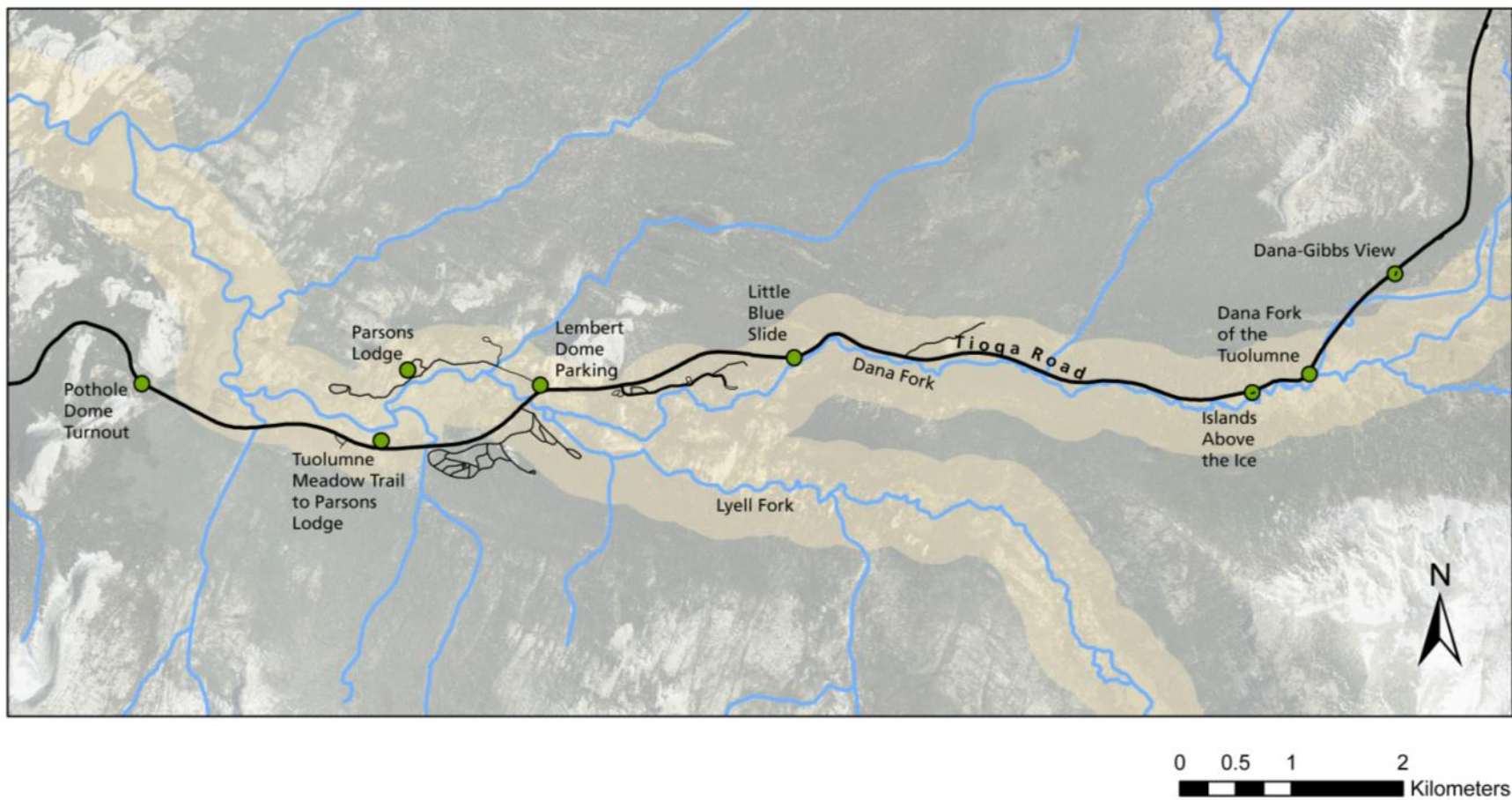


Figure I-16. Parsons Memorial Lodge work area.



Scenic Vista Points in the Tuolumne River Wild and Scenic River Corridor

Appendix J: 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

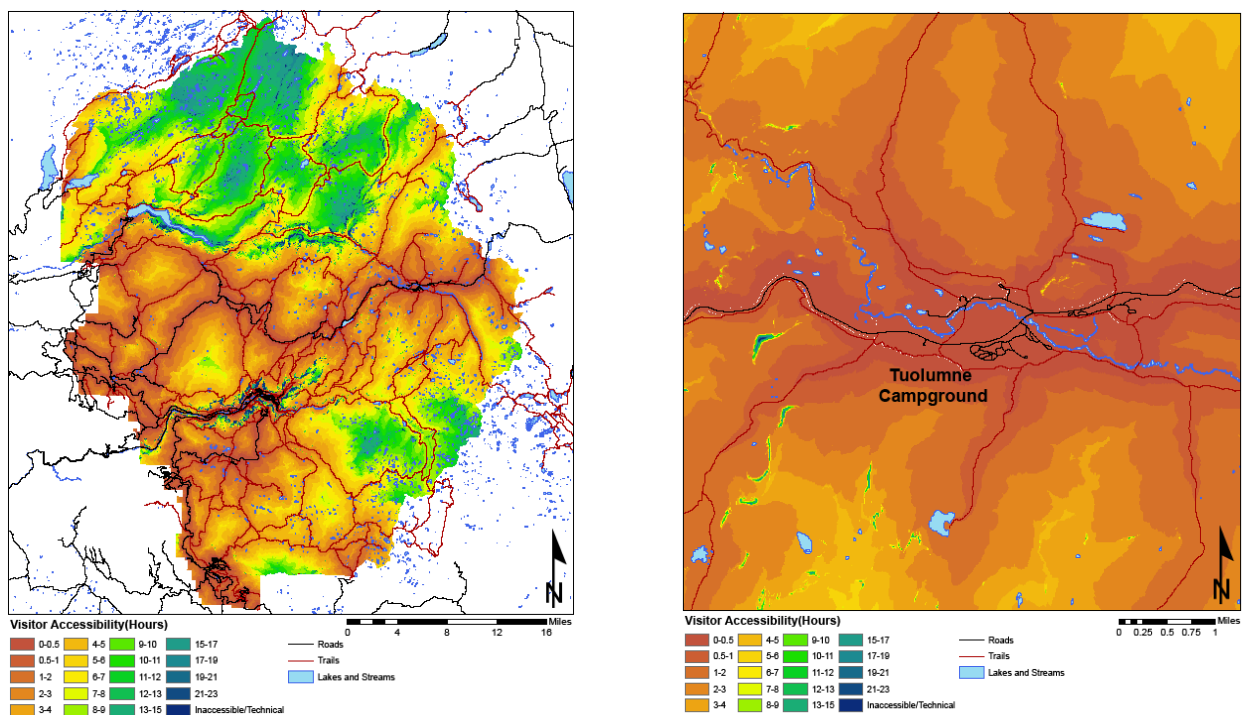
A park-wide, comprehensive study of visitor use in Yosemite was conducted in the summer of 2005 (Littlejohn, et al. 2005). This study provided a variety of visitor-related information including demographic and use characteristics. Data from this study were cut to draw a comparison between Tuolumne area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

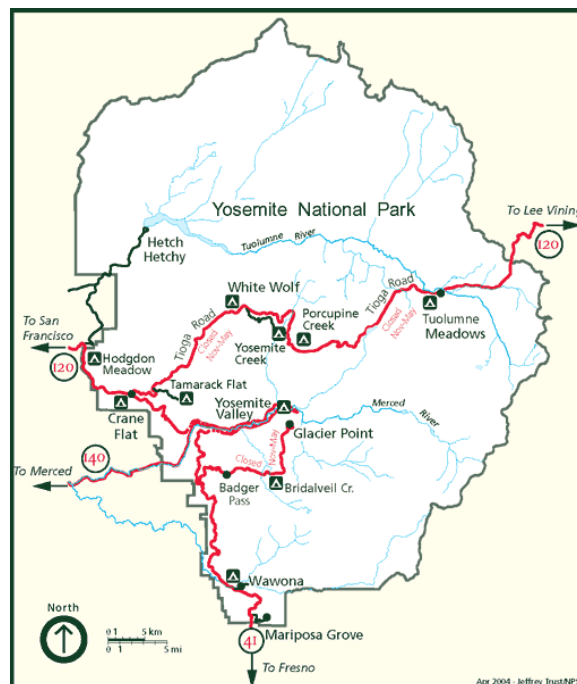


Figure 3. Map of Major Travel Routes in Yosemite National Park

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).

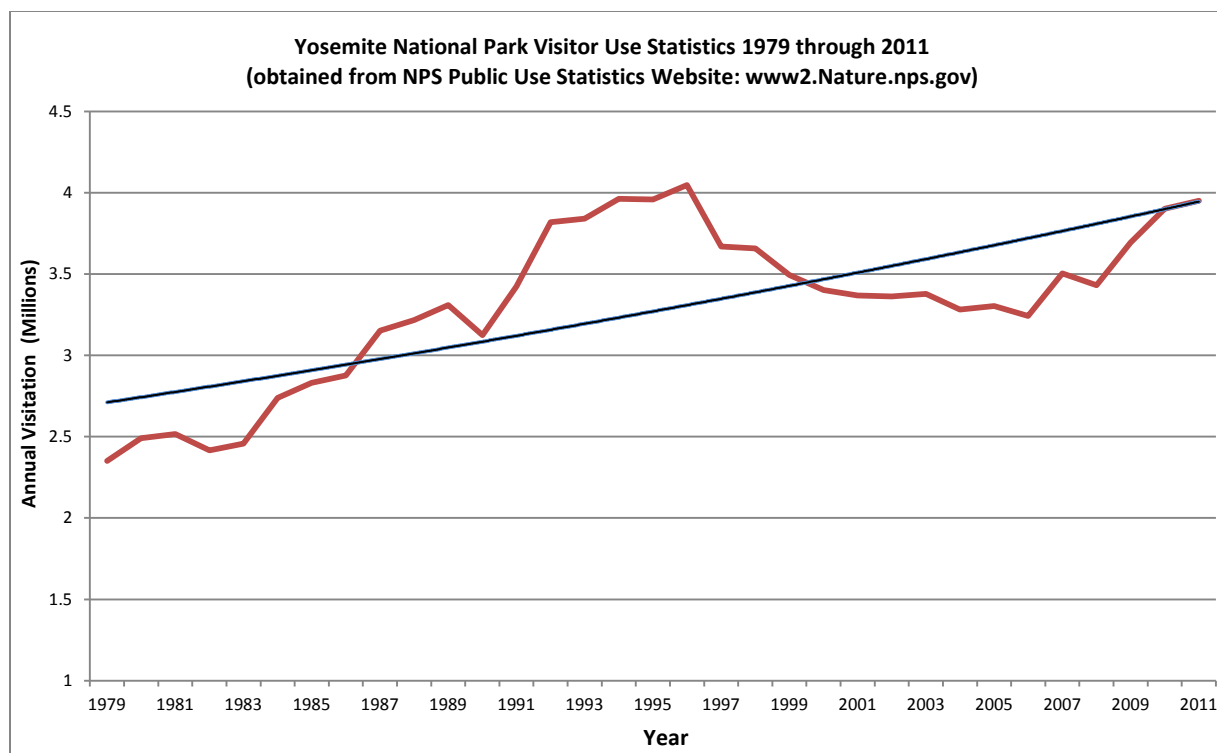


Figure 4. Overall Park Visitation by Year 1982-2011

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 K:

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). The *Tuolumne River Plan/Draft EIS* was released for public review and comment in January 2013.

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* (which was released for public review in January 2013), 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 10-2, park planners also accepted public comment and comments from culturally associated tribes and groups on the ORVs numerous times between 2005 and 2010. The park reviewed the ORVs again after the Draft EIS public comment period in winter-spring 2013. The final ORVs are listed in chapter 5, and their evolution over time is detailed in appendix G.

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*, which was released for public review in January 2013 and was subsequently revised pursuant to public comment. 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 initial 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 final 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* under WSRA are defined as a substantial reduction in the condition of a river value in relation to the management standard as a result of public use or development. 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*. Management concerns are correctable and do not necessarily bring the river value condition to the level of adverse effect or degradation. They may be indicative of a downward trend in river condition that is occurring so slowly that the river condition has not fallen below the management standard but might do so if the downward trend is not arrested and reversed. 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/ Final 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 chapter 7: *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 chapter 7, at least one facility met this description (the mountaineering shop), so it was 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 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-

¹ 47 *Federal Register* 173: 39459, Sept. 7, 1988.

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.

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 2013. 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 High Sierra Camp); 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 10.

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 65,000 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 were 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 step-by-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 8).

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Appendix L:

Cumulative Actions

This appendix presents a summary of the past, present, and reasonably foreseeable projects used in the analysis of cumulative effects in the *Final Tuolumne River Plan/EIS* (chapter 9). The Council on Environmental Quality (CEQ) describes a cumulative impact as follows (Regulation 1508.7):

A “Cumulative impact” is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative projects listed below include past and present actions, as well as planning or development activity currently being implemented or planned for implementation in the reasonably foreseeable future. The *Final Tuolumne River Plan/EIS* evaluated these actions in conjunction with the impacts of an alternative as part of the cumulative analysis to determine if they have any additive impacts on a particular resource. For additional information regarding the plans and projects in Yosemite listed below, visit the National Park Service Planning, Environment and Public Comment website at: <http://parkplanning.nps.gov/>.

Summary

Reasonably Foreseeable Actions

National Park Service

- Concessioner Prospectus
- Wilderness Stewardship Plan

Current Actions

National Park Service

- Commercial Use Authorization for Commercial Activities
- High-Elevation Aquatic Ecosystem Recovery and Stewardship Plan
- Invasive Plant Management Plan Update
- Merced Wild and Scenic River Comprehensive Management Plan
- Restoration of the Mariposa Grove of Giant Sequoias
- Scenic Vista Management Plan
- Tenaya Lake Area Plan
- Tioga Road Rehabilitation Project
- Tioga Trailheads Project
- Tuolumne Meadows Transit and Trail Sign Improvements
- Tuolumne Meadows Water Treatment System Upgrade
- Vegetation Management Plan
- Wilderness Sierra Nevada Yellow-legged Frog Reintroduction and Trout Eradication Project
- Yosemite National Park Annual Fire Management Plan (Operational Fire Management Plan)
- Yosemite Valley and Pate Valley Invasive Velvet Grass Control

Other Agencies

- Inyo National Forest Travel Management Plan and Forest Plan Revision (U.S. Forest Service)
- Recreational Facility Analysis (U.S. Forest Service)

- Upper Tuolumne River Ecosystem Project - O'Shaughnessy Dam Instream Flow Evaluation Study Plan (San Francisco Public Utilities Commission)

Past Actions

National Park Service

- Cathedral Peak Route Delineation
- Fire Management Plan
- Gaylor Pit Lead Abatement
- Hetch Hetchy Communication System Upgrade
- Improve Parkwide Communications Data Network
- Informal Trail Removal and Ecological Restoration Actions at Tuolumne Meadows
- Restoration of Disturbed Areas at Tuolumne Meadows Lodge
- Sierra Nevada Bighorn Sheep Environmental Assessment (Sequoia and Kings Canyon National Parks)
- Tioga Road Corridor Campground Accessibility Improvements
- Tuolumne Meadows Concessioner Stables Fence Modification
- Tuolumne Meadows Service Station Soil Gas Survey
- Tuolumne Meadows Service Station Vapor Recovery Installation
- Tuolumne Meadows Water Treatment Facility Regulatory Upgrade
- Tuolumne Meadows Winter Ranger Residence Install Alternative Power Sources
- Yosemite Environmental Education Campus

Other Agencies

- Grazing Allotment Permit Renewals (U.S. Forest Service)
- Water System Improvement Program (San Francisco Public Utilities Commission)

Reasonably Foreseeable Actions

National Park Service

Agency Name: National Park Service, Yosemite National Park

Project Name: Concessioner Prospectus

Description: The National Park Service (NPS) has continued the contract with Delaware North Companies (DNC) Parks and Resorts at Yosemite, Inc. to provide visitor services within the park from October 1, 2011 through January 31, 2015. The previous contract extension expired on September 30, 2011. The park is continuing the process of developing a new prospectus for visitor services. The continuation of the contact was deemed necessary to ensure that there is no disruption of visitor services while the park works on several planning efforts. The provisions of the current contract will not change. DNC Parks and Resorts at Yosemite, Inc. will continue to provide existing services from October 1, 2011 through January 31, 2015 or until such time as a new contract regarding the visitor services provided under the contract is awarded, whichever comes first.

Agency Name: National Park Service, Yosemite National Park

Project Name: Wilderness Stewardship Plan

Description: The NPS 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 protection of Yosemite's wilderness character, 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 within the Yosemite Wilderness. Public scoping for this plan is scheduled for 2014.

Current Actions or Plans

National Park Service

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 2014 or 2015.

This project is supplemented by the Wilderness Sierra Nevada Yellow-legged Frog Reintroduction and Trout Eradication Project (see below).

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: **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 Final EIS is expected to be released to the public in February 2014.

Agency Name: National Park Service

Project Name: **Restoration of the Mariposa Grove of Giant Sequoias**

Description: Nearly 150 years after U.S. Congress passed landmark legislation preserving both the Mariposa Grove of Giant Sequoias and Yosemite Valley, comprehensive actions are needed to ensure that the Mariposa Grove ecosystem continues to thrive and provide inspiration and enjoyment for future generations. The primary goals of this project are to restore degraded habitat and natural processes critical to the long-term health of the Grove and improve the overall experience for visitors. The park began public scoping for this project in fall of 2011.

A Record of Decision was signed in December 2013.

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 began 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 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, 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. Implementation will begin in 2014.

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 Transit and Trail Sign Improvements**

Description: This project will design and install seven porcelain maps to improve wayfinding in Tuolumne Meadows and complete minor improvements to trailhead and transit areas, designate day use and overnight parking; compile a staff reference notebook containing area and park information; and prepare printed maps with information for day and overnight visitors. In the most problematic areas, unendorsed parking will also be delineated as "no parking" or blocked through placement of wood and/or rock materials. The project will also remove and/or replace excessive or redundant signage.

Screens inside the existing sedimentation basin and within the existing intake will be replaced. Implementation is expected to begin in 2014.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows Water Treatment System Upgrade**

Description: This project will upgrade of the existing water treatment system serving the Tuolumne Meadows area. The key features of this treatment system are the intake structure; the sedimentation/screening basin, a treatment building, and key filtration equipment contained within the treatment building.

The major portion of the work will be inside the building. The building's electrical system will be removed and replaced in its entirety. Other work inside the building will include water filtration system upgrades and replacement of critical filtration components. The treatment building will remain within its current footprint. Control systems will be added to improve efficiencies and reduce impacts.

Screens inside the existing sedimentation basin and within the existing intake will be replaced. Implementation began in 2013.

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 Sierra Nevada Yellow-legged Frog Reintroduction and Trout Eradication Project**

Description: In Yosemite, there are as few as six populations of Sierra Nevada yellow-legged frogs with 50 or more individuals, 24 populations with 10 to 49 individuals, and 164 populations with one to nine individuals. The decline of the Sierra Nevada yellow-legged frog is being driven primarily by the introduction of non-native fish and the emerging infectious disease, chytridiomycosis. This project will increase the amount of high quality aquatic habitat for the Sierra Nevada yellow-legged frog and improve the success rate of Sierra Nevada yellow-legged frog reintroductions.

This project entails: 1) eradicating fish from 10 to 18 lakes, ponds, and marshes using gill nets, electrofishers, and fish traps; 2) transporting equipment and gear to restoration sites using pack stock; 3) temporarily installing bear boxes at restoration sites at the beginning of each season and packing them out at the end of the season; 4) conducting experimental translocations including augmenting 2 existing translocation sites and conducting one new translocation; 5) transporting translocated frogs by helicopter; 6) treating frogs prior to translocation with antifungal drug Itraconazole; 7) experimenting with bioaugmentation using the naturally occurring bacteria, *Janthinobacterium lividum*; 8) continuing long-term monitoring at approximately 130 sites annually and approximately 450 sites during summer 2012 using VES, continuing to PIT tag and swab individuals at 13 long-term mark-recapture sites, temporarily installing 1 digital recording device at each of two sites; and 9) salvaging egg masses and tadpoles from populations threatened by drought.

This project will occur over the course of five years, ending in December 2016.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Yosemite National Park Annual Fire Management Plan (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. Federal fire policy has changed in the past 30 years 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. Fuel reduction and prescribed burning have increased since the 1990 A-Rock Fire, and the fuels management program focuses on the wildland-urban interface to protect developed areas from uncontrolled wildfires. Yosemite National Park's 2008 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.

Agency Name: National Park Service, Yosemite National Park

Project Name: Yosemite Valley and Pate 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 and is ongoing.

Other Agencies

Agency Name: U.S. Forest Service, all California national forests

Project Name: Inyo 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 which forms of travel are allowed in which areas of the national forests. Forest plans guide where and under what conditions an activity or project on national forest lands can generally proceed. The Inyo National Forest has begun work toward a new forest plan, slated to be completed in 2016.

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.

Agency Name: San Francisco Public Utilities Commission

Project Name: Upper Tuolumne River Ecosystem Project - O'Shaughnessy Dam Instream Flow Evaluation Study Plan

Description: The San Francisco Public Utilities Commission (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.

Past Actions

National Park Service

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 complete.

Agency Name: National Park Service, Yosemite National Park

Project Name: Fire Management Plan (2004)

Description: This plan guides a complex fire management program, including 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 calls for the use of prescribed fire and passive fuel reduction techniques to achieve protection and ecosystem restoration goals. More aggressive treatment strategies are prescribed in developed areas, if needed. Managed wildland fires (lightning-ignited fires) are allowed to burn where practicable, if specific conditions are present.

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: **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: 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 conducted a communication system upgrade project. The purpose of the upgrade project was 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 and is complete.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Improve Parkwide Communications Data Network**

Description: Yosemite National Park performed 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" is 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 was 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 complete.

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 were scheduled in portions of the meadows (not all of the meadows were 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 occurred in summer 2012.

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, Sequoia and Kings Canyon National Parks

Project Name: **Sierra Nevada Bighorn Sheep Environmental Assessment**

Description: Sequoia and Kings Canyon National Parks, 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 began in 2012.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tioga Road Corridor Campground Accessibility Improvements**

Description: This project corrected accessibility deficiencies at 20 campsites along the Tioga Road corridor as outlined in Yosemite National Park's Self Evaluation and Transition Plan. Sites improved included 12 Tuolumne Meadows sites, four Tamarack Flat sites, two White Wolf sites, one Yosemite Creek site, and one Porcupine Flat site.

Preparation of environmental compliance documents was completed in 2010 and implementation is complete.

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 severe summer thunderstorms (defined as 2" or more of rainfall).

To address the SFPUC's concern, the National Park Service and the park concessioner relocated 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 was moved slightly to the west and a permeable retaining wall was 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. There were no archeological concerns with excavation in this already impacted corral area. The SFPUC approved the concept.

This project was completed in 2011.

Agency Name: National Park Service, Yosemite National Park

Project Name: **Tuolumne Meadows 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 Treatment Facility Regulatory Upgrade**

Description: This project added a flocculation process to ensure adequate cryptosporidium removal compliance and meet the increased regulatory requirements. Adding an engineered 4,100 gallon pressure detention tank allows proper time, flow baffling and particle collision for polymer reaction, ensuring proper pathogen removal. The Department of Health services approved this process addition. The new tank is 10' long and 8' wide and is located on the south side of the water treatment building in a currently disturbed area containing underground water piping. No vegetation or trees were 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: **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 Meadows Winter Ranger Residence Alternative Power Sources

Description: Numerous power outages occur in Tuolumne Meadows due to winter storms. Southern California Edison also preemptively cuts off power when wind is predicted, and they have indicated that they will not fix power lines that come down in Lee Vining Canyon in the winter. Winter rangers are necessary at Tuolumne Meadows to prevent resource damage and give information to winter backcountry users. They also shovel roofs and prevent damage to structures from snow loading in addition to collecting snow survey data monthly.

To support winter rangers and convert the ranger residence to a power system independent of the electrical grid, the National Park Service installed an alternative power system on this cabin. 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

Project Name: Yosemite Environmental Education Campus

Description: NatureBridge, an NPS nonprofit park partner, has provided environmental education programs in Yosemite National Park since 1971 at the NPS facility at Crane Flat. Most of the campus structures and utilities are more than 60 years old, energy inefficient, and difficult to retrofit to achieve modern standards for health, safety, and accessibility. In addition, the facility can accommodate only a fraction of the students in the program; the remainder must be based elsewhere in the park, in expensive commercial lodging. To address these issues, NatureBridge and the NPS considered options to provide better facilities by redeveloping the existing campus (Crane Flat) or constructing a new education center at a different location (and restoring the Crane Flat campus to natural conditions). The draft environmental impact statement (EIS) was released in May 2009, proposing to develop a new educational facility at Henness Ridge, near Yosemite West, and to restore Crane Flat to natural conditions and provide habitat for sensitive species. The Record of Decision, formalizing the agency's decision to develop the Henness Ridge site and restore the Crane Flat site, was signed by the Regional Director on April 2, 2010. Construction has begun.

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 SFPUC 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: **Water System Improvement Program**

Description: The SFPUC approved its Water System Improvement Program (WSIP) in 2008, which limits water deliveries from all water sources to Bay Area water customers to 265 million gallons per day through 2018 (with the goal of no more than 223 million gallons per day as a five year running average from the Tuolumne River itself). By 2018, SFPUC and its wholesale customers in the San Francisco Bay Area will be required to meet additional demands by conservation and recycling. The SFPUC water supply program includes up to a 20% reduction in water service system wide during extended droughts. This program was approved in 2008. The WSIP includes an associated mitigation measure, which directs the SFPUC to study Poopenaut Valley meadow and wetland vegetation and modify spring snowmelt spill releases to provide higher magnitude and/or prolonged inundation of Poopenaut Valley wetlands. This mitigation measure is being implemented via the instream flow management plan for O'Shaughnessy Dam, currently being prepared by the SFPUC in collaboration with the NPS and other stakeholders as part of the Upper Tuolumne River Ecosystem Program.

Appendix M:

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* (NPS 2011) 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* (NPS 2011) 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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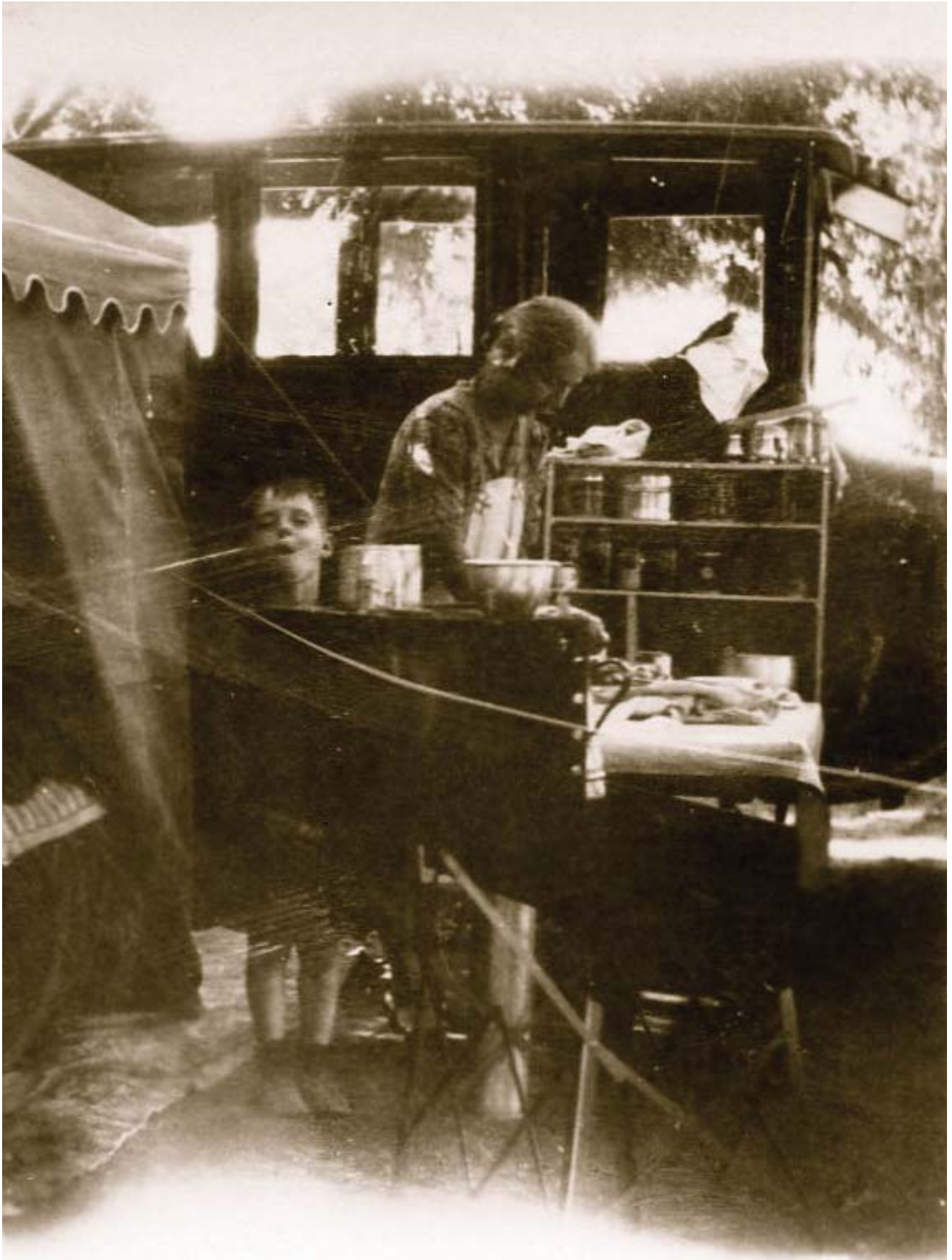
National Park Service
U.S. Department of the Interior

Yosemite National Park
Tuolumne River Plan



Tuolumne Meadows Campground Design Guidelines - Draft July 2009





1 Tuolumne Meadows Campground Design Guidelines

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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.

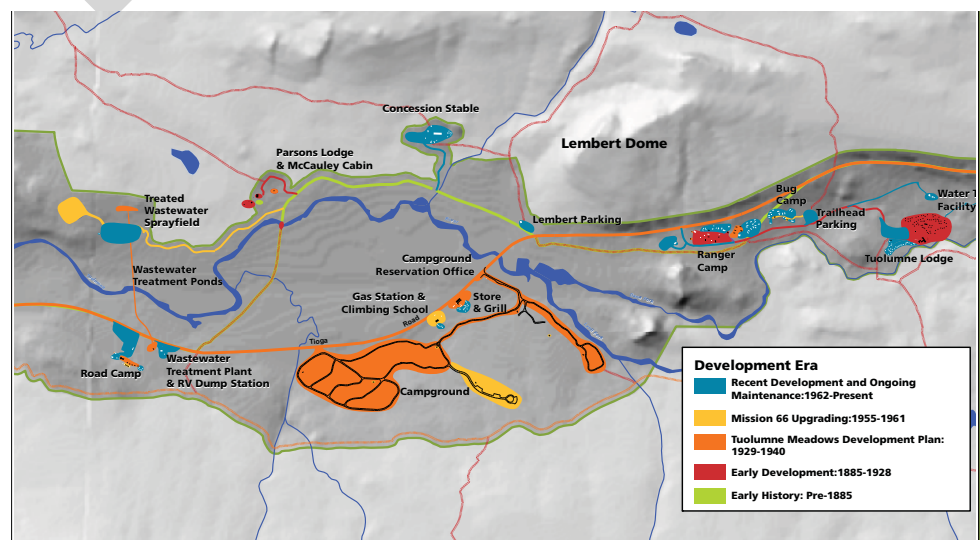


Photo 3 (left). Main campground road in the vicinity of Loop B.

Map 1. Development stages in Tuolumne Meadows.

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.

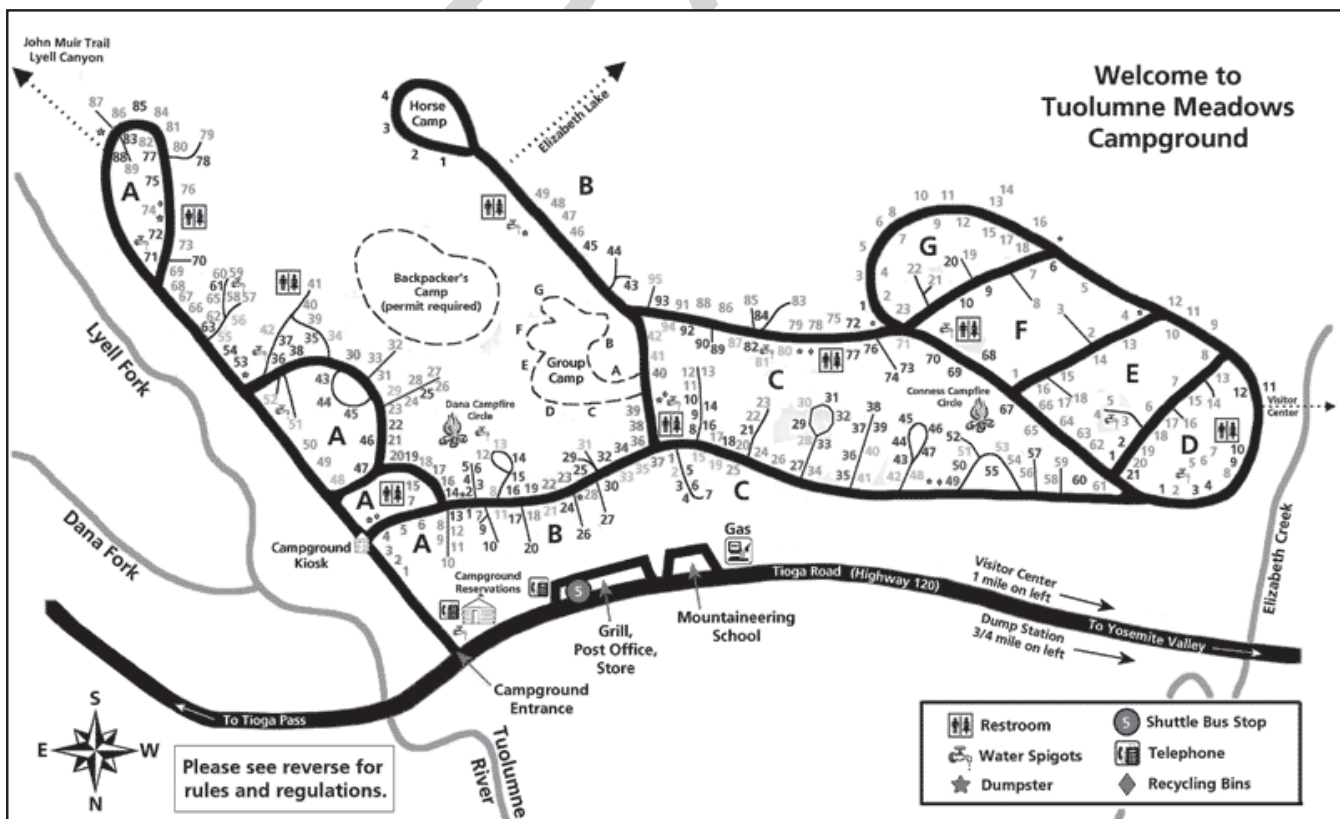
Condition: Because parking areas and vehicular access areas within the campground are not well defined, visitors in vehicles can drive virtually anywhere within a campsite. Many areas in the campground, including the terrain around comfort stations, are bare of vegetation because they are repeatedly 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



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.



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.

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.

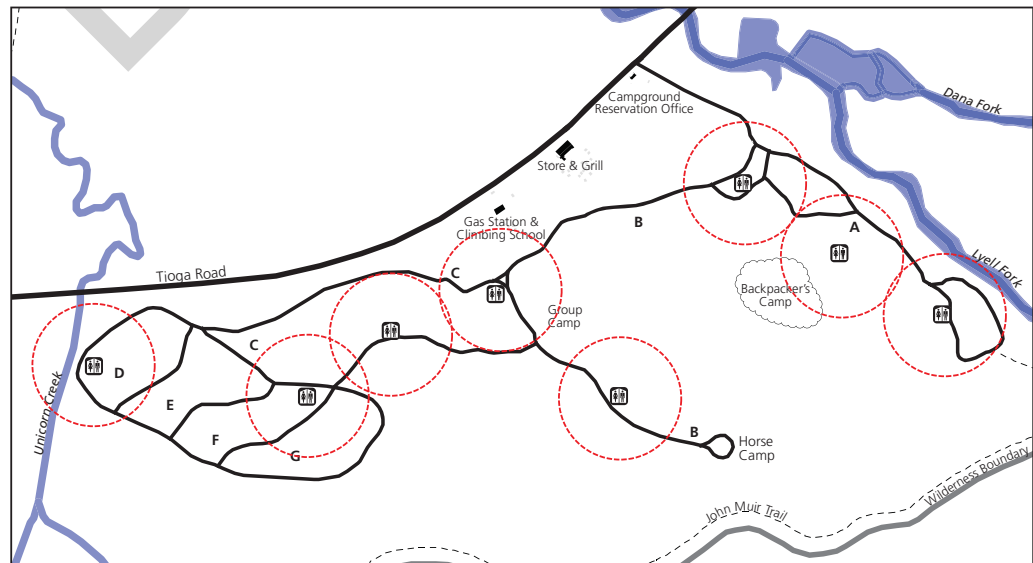


Photo 7 (left). CCC-era comfort station.

Map 3. 300' travel distance from existing comfort stations.

○ 300' Travel Distance From Existing Comfort Stations

Tuolumne Meadows Campground

National Park Service 8



Photo 9. Example of defined small parking area.

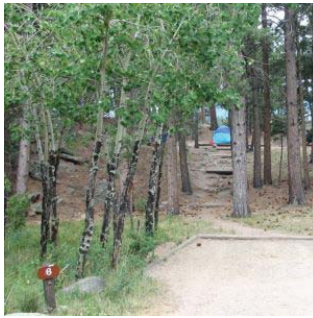


Photo 10. Example of defined edge of parking and path to walk-in campsite.

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 be 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.

Diagram 1 (below). Example of RV campsite layout.

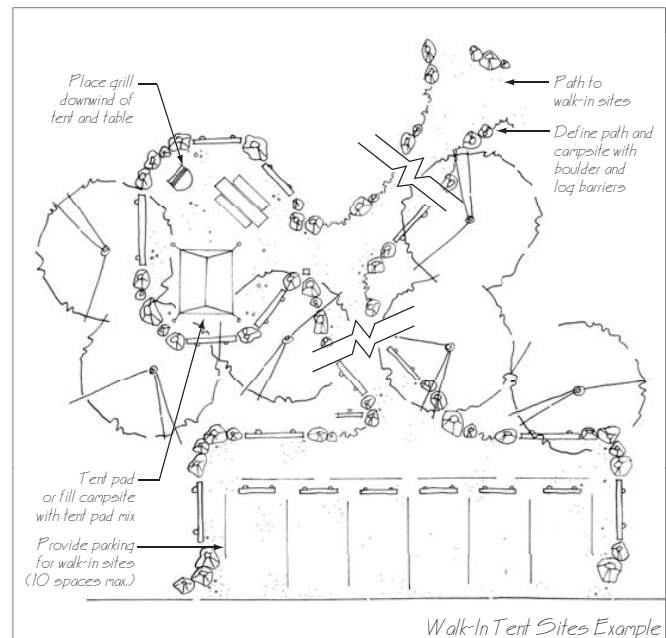
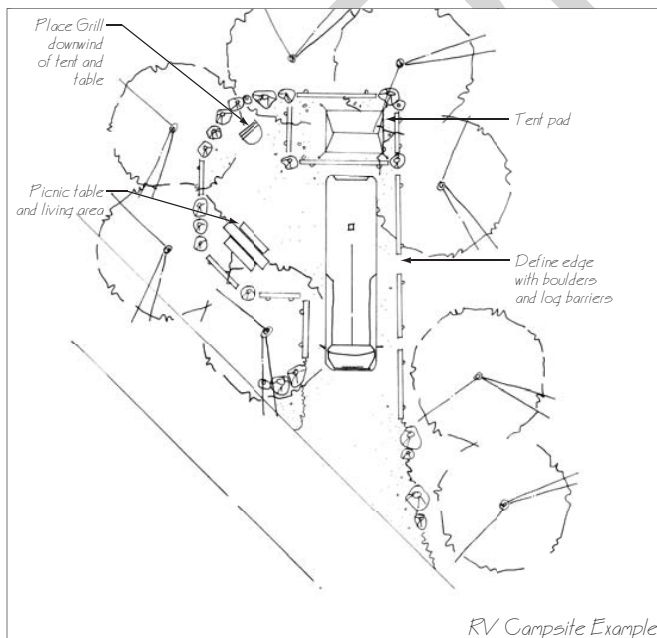
Diagram 2 (below). Example of walk-in tent site layout.

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.





11 Tuolumne Meadows Campground Design Guidelines



Photo 13 (left). Campground registration office.

Photos 11 and 12 (above). Examples of campsites with boundaries delineated.

Photos 14 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)

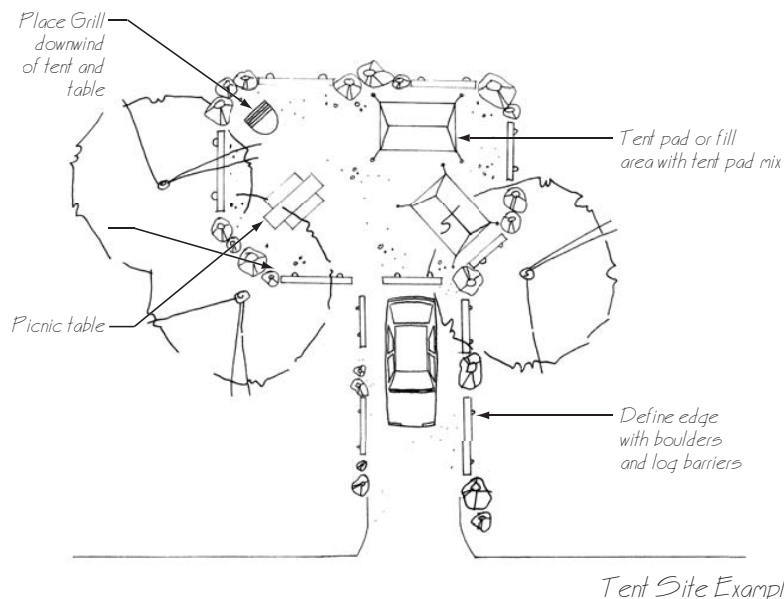
- Install tent pads that blend with the natural environment in texture and color to reduce impacts from tents and foot traffic on soils and vegetation and to improve drainage.

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.





13 Tuolumne Meadows Campground Design Guidelines

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Photo 16 (left). Camping at the Tuolumne Meadows Campground.

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Appendix N:

Cost Estimates and Phasing for 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 *Final Tuolumne River Plan/EIS* (table N-1) 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. 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/upload/CostEstimatingHandbook_2-3-11.pdf

Implementation of the selected alternative for the *Tuolumne River Plan* would occur in phases over a period of several years as proposed in Figure N-1. Following Figure N-1 is a more detailed table of what elements of the *Tuolumne River Plan* could be implemented with no further environmental compliance, and which elements of the plan would require additional compliance prior to implementation (table N-2).

Table N-1.
Class C Net Construction Cost Estimates (in U.S. dollars) 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	382,418
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	571,853
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	1,441,607	1,951,630	1,907,888	1,436,538
7. Existing wastewater treatment plant	4,392,455	5,015,304	9,180,709	5,432,953
8. Parsons Memorial Lodge	628,411	95,427	95,427	95,427
9. Area west of Unicorn Creek	323,160	1,295,836	315,676	6,451,083
10. Tuolumne Meadows Campground area	11,938,248	16,365,915	13,943,866	17,646,918
11. Existing commercial services core	3,170,567	12,065,015	1,510,801	3,320,284
12. Existing concessioner stable	1,870,888	1,163,897	203,495	2,081,381
13. Lumbert Dome	955,539	1,247,303	1,357,736	958,249
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	1,118,770	851,420	1,105,270
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	1,472,918	3,853,670	3,198,194
18. Tuolumne Meadows Lodge	1,161,617	232,090	4,156,879	4,666,537
19. Gaylor Pit	112,122	9,587,798	218,515	765,000
20. Glen Aulin High Sierra Camp	912,862	1,106,774	1,152,525	1,152,525
21. Ecological Restoration*	2,776,993	2,776,993	2,776,993	2,776,993
PROJECTED TOTAL COST	\$49,924,777	\$72,600,324	\$52,246,800	\$65,592,696

* Includes meadow and riparian restoration not otherwise funded by projects in the Class C Cost Estimates for the first five years of plan implementation. Restoration will be as described in the Ecological Restoration Plan (Appendix H) and Chapter 5.

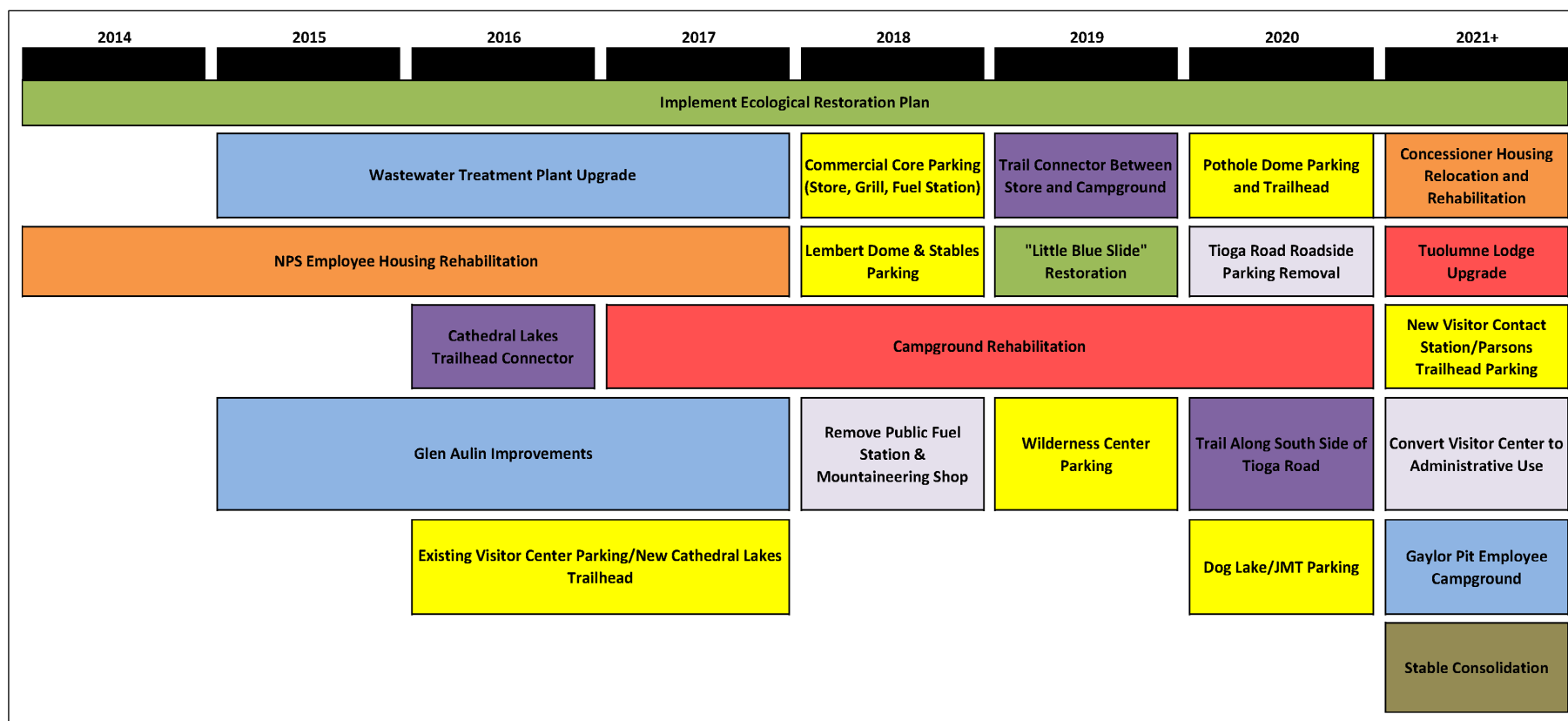


Figure N-1. Project Phasing-Major Actions. Actual years of implementation may be adjusted based on park-wide planning priorities and funding availability.
 The project coloring corresponds with the colors used in the Tuolumne Meadows Site Plan in Chapter 8, Alternative 4, Scenic Segment

Table N-2.
Project phasing and compliance requirements for major actions in the *Tuolumne River Plan*

Action	Year Scheduled	Location ^a	Historic Property Affected	Compliance Completed by TRP/FEIS ROD	Additional Compliance Required
Implement the Ecological Restoration Plan for Tuolumne Meadows and Remove Threats to Water Quality and Impediments to Free Flow.	2014 - ongoing				
Restore riparian vegetation along riverbanks.	2014 - ongoing	Throughout the river corridor	--	X	
Mitigate hydrologic effects of Tioga Road culverts and historic Great Sierra Wagon Road bed.		Throughout Tuolumne Meadows	Tuolumne Meadows Historic District, and Soda Springs Historic District (segments of the Great Sierra Wagon Road contribute to both districts). Tioga Road Historic District; contributing culverts.	X	
Stabilize the road cut east of Tuolumne Meadows along Tioga Road to reduce erosion into the Dana Fork.	2019	Tioga Road east of Tuolumne Meadows	Tioga Road Historic District	X	
Modify the Tuolumne River bridge and abutments to mitigate a ponding effect at the meadows.		10	Tuolumne Meadows Historic District and Tioga Road Historic District: Tuolumne River Bridge (1937) is a contributing feature to both historic districts.		X
Remove the boulder riprap from approximately 150 feet of riverbank near the campground A-loop road to restore natural river flow.		10	--	X	
Remove nonhistoric structures inappropriately sited near the riverbank or in wet areas	2021	11, 18	--		X
Expand designated parking and eliminate undesignated roadside parking.					
Construct new Cathedral Lakes trailhead, parking, and trail segment connecting the main trail to the new trailhead; restore existing Cathedral Lakes trailhead to natural conditions.	2016	3, 5, and 6	Tuolumne Meadows Historic District circulation features; new development within the historic district	X	
Demolish the historic public fuel station/mountaineering shop building; redevelop site for day parking.	2018	11	Tuolumne Meadows Historic District; historic gas station (1959)		X
Widen road between the turnoff to the stable and the stable to accommodate designated parking.	2018	12	--	X	
Expand parking at the wilderness center.	2019	15	--	X	

^a Location numbers correspond with the Tuolumne Meadows Site Plan in chapter 8, figure 8-11.

Action	Year Scheduled	Location ^a	Historic Property Affected	Compliance Completed by TRP/FEIS ROD	Additional Compliance Required
Expand designated parking and eliminate undesignated roadside parking, (continued)					
Expand parking at the Dog Lake/JMT trailhead.	2020	17	--	X	
Formalize parking at Pothole Dome: Designate day parking with trailhead on north side of road; improve trail to Pothole Dome; construct new parking area east of Pothole Dome.		1	Tioga Road Historic District contributing parking area	X	
Prohibit parking along Tioga Road; add roadside curbing or other barriers to prevent illegal parking; construct approximately four viewing turnouts (four vehicles each; no parking).	2021	2	Tioga Road Historic District contributing turnouts	X	
Construct a foot trail paralleling the south side of Tioga Road.	2020	2	Tuolumne Meadows Historic District circulation features; new circulation feature within the district.	X	
Upgrade utilities					
Upgrade the wastewater treatment plant.	2015	7	--		X
Implement water conservation measures, including installation of low-flow fixtures.		Throughout Tuolumne Meadows	--	X	
Repair/replace water and wastewater lines		Throughout Tuolumne Meadows	--		X
Convert pit toilet for winter skiers to a vault toilet.		10	--	X	
Upgrade ventilation systems in the existing vault toilets at Lembert Dome		13	--	X	
Replace vault toilets at Lembert Dome with flush toilets if water capacity is available after implementation of campground rehabilitation and associated water – conserving actions.		13	--		X
Upgrade restroom at commercial service core		11	--	X	

Action	Year Scheduled	Location ^a	Historic Property Affected	Compliance Completed by TRP/FEIS ROD	Additional Compliance Required
Reduce localized impacts associated with the Glen Aulin High Sierra Camp.					
Reduce the capacity and levels of service at the High Sierra Camp to reduce water use and number of resupply trips.		Glen Aulin High Sierra Camp	Glen Aulin High Sierra Camp Historic District	X	
Modify Glen Aulin utilities: Replace all flush toilets with composting toilets; replace the composting toilet at the backpacker campground; relocate the water intake to its previous locations inside the camp boundary; upgrade the water treatment system; remove the water line and water tanks serving the corrals.	2015	Glen Aulin High Sierra Camp	Glen Aulin High Sierra Camp Historic District	X	
Move the employee tent nearest Conness Creek to be more than 100 feet from the creek and from the Tuolumne River, to protect water quality.	2015	Glen Aulin High Sierra Camp	Glen Aulin High Sierra Camp Historic District	X	
Rehabilitate the Tuolumne Meadows campground while enhancing protection of other river values.					
Rehabilitate the campground, providing better site delineation, improving campground roads, rehabilitating and adding restrooms, upgrading the wastewater collection system if necessary, repairing or replacing leaking water and wastewater lines, and installing low-flow fixtures.	2017	10	Tuolumne Meadows Historic District circulation features; individual campsites are not contributing; 3 CCC rustic comfort stations listed on the NRHP that also contribute to the Tuolumne Meadows Historic District.		X
Relocate campground entrance road and kiosk out of floodplain	2017	10	Tuolumne Meadows Historic District circulation feature; entrance kiosk is noncontributing (after 1961)		X
Realign the campground A-loop road and relocate the 21 campsites that are currently within 100 feet of the Lyell Fork.		10	Tuolumne Meadows Historic District circulation feature; individual campsites are not contributing.		X
Construct new trail from campground to store.	2019	10, 11	Tuolumne Meadows Historic District circulation feature	X	
Formalize connection to John Muir Trail.		10	--	X	

Action	Year Scheduled	Location ^a	Historic Property Affected	Compliance Completed by TRP/FEIS ROD	Additional Compliance Required
Improve the Tuolumne Meadows Lodge at its current capacity while enhancing protection of other river values.					
Relocate three guest tent cabins and possibly the dining hall/kitchen to a location more than 150 feet from the river; upgrade the shower house.	2021	18	Kitchen/Dining Hall (1939) and camp bath house (1939) contribute to the Tuolumne Meadows Historic District. 3 guest tent cabins specified are noncontributing (ca 1984)		X
Relocate/upgrade/expand the concessioner employee housing north of the lodge, consolidating all concessioner employee housing at this location.	2021	18	New development within the Tuolumne Meadows Historic District		X
Relocate the visitor contact station to improve the visitor experience.					
Construct new visitor contact station, picnic area, trailhead for Parsons Memorial Lodge, and day parking on south side of Tioga Road.	2021	9	New development within Tuolumne Meadows Historic District		X
Expand and rehabilitate NPS employee housing.					
Replace nonhistoric (not contributing to the Tuolumne Meadows Historic District) NPS employee housing at Ranger Camp and Bug Camp with hard-sided structures.	2014	16, 17	New development within Tuolumne Meadows Historic District	X	
Renovate or replace historic tent cabins at Road Camp and Ranger Camp in consultation with the California state historic preservation officer.		6, 16	Tuolumne Meadows Historic District: Road Crew Camp: four contributing tent cabins (1945-57) and Ranger Camp: seven contributing cabins (two ca 1930 and five ca 1960).		X
Provide additional NPS employee housing at stable site, if needed; retain and adaptively use the historic stable structures if possible.		12	Tuolumne Meadows Historic District: contributing barn (1924)		X
Construct employee campground at Gaylor Pit	2021	20	--	X	
Construct additional housing at Road Camp, if needed.		6	New development within the Tuolumne Meadows Historic District		X
Construct bunkhouse at site of existing NPS stable		15	New development within the Tuolumne Meadows Historic District.		X

Action	Year Scheduled	Location ^a	Historic Property Affected	Compliance Completed by TRP/FEIS ROD	Additional Compliance Required
Provide administrative facilities needed to support visitor use while enhancing protection of other river values.					
Rehabilitate the historic ranger station.		16	NRHP-listed Ranger Station (1924).		X
Convert CCC mess hall building to administrative use.	2021	6	NRHP-listed CCC mess hall (ca 1930s)		X
Co-locate the NPS stable with the concessioner stable; provide parking for up to two private or commercial stock trailers at the stables.	2021	12		X	
Add aboveground administrative fuel tanks near the wastewater treatment plant.		7	New development within the Tuolumne Meadows Historic District	X	
Manage visitor use					
Allow limited recreational whitewater boating on portions of the river to provide opportunities for people with expert paddling skills to experience and connect with the Tuolumne in a uniquely adventurous pursuit.		Between Pothole Dome and Pate Valley	--	X	
Manage day use levels along wilderness trails to achieve specific trail section standards specified in chapter 5.		Corridorwide	--	X	
Discontinue concessioner stock day rides into wilderness to reduce stock impacts on trails used by hikers; limit overnight saddle trips passing through Glen Aulin to 80 riders and 120 packstock per season.		Corridorwide	-	X	
Allow commercial use in wilderness, with restrictions on types and levels of use based on a determination of extent necessary as discussed in appendix C.		Corridorwide	--	X	
If park visitation and demand for day parking in the Tuolumne Meadows area continues to increase, implement a parking reservation system in the future.		Tuolumne Meadows	--		X
Implement a wilderness day-use permit system if necessary to ensure that use remains within the standard.		Corridorwide	--		X

Appendix O:

Mitigation Measures Applicable to all Action Alternatives

The National Park Service places a strong emphasis on measures to avoid, minimize, and mitigate potential impacts. The following mitigation measures were developed to protect natural, cultural, and social resources and the quality of the visitor experience during implementation of the *Tuolumne River Plan*. Mitigation measures are considered part of the project, and must occur prior to, during, and after project implementation.

Mitigation Measure	Responsibility	Critical Milestones
CONSTRUCTION MITIGATION MEASURES		
Take measures to prevent the introduction of exotic species in the project area and staging areas. 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. Ensure all earth moving equipment enters the Park free of dirt, dust, mud, seeds, and other potential contaminants. Ensure the park inspects all heavy equipment entering the park prior to commencing work.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
Inspect project boundaries to ensure that impacts stay within the project area and do not escalate beyond the scope of the environmental impact statement. Ensure that the project conforms with applicable permits or project conditions. Store all construction equipment within the delineated work limits.	Yosemite National Park, 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, 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	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	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, Contractor	Upon completion of project activities
Prepare a Health and Safety Plan to address health and safety issues, compliance with OSHA standards, and other regulations relevant to contracted work. Submit the plan for NPS review and approval prior to construction.	Contractor	Prior to and concurrent with project activities
<p>Prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activities to control surface run-off, reduce erosion, and prevent sedimentation from entering water bodies during construction, if required by federal and State permits. If prepared by a contractor, submit the SWPPP for park review and approval prior to construction. The plan will include measures such as:</p> <ul style="list-style-type: none"> 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. 	Yosemite National Park, 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. Submit the spill prevention/response plan to the park for review/approval prior to commencement of construction activities.	Contractor	Prior to project activities
Prepare a construction work schedule that minimizes effects on wildlife in adjacent habitats, and avoids periods of time with high levels of visitation. Submit the work schedule 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
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	Prior to and concurrent with project activities
Identify locations of existing utilities prior to removal activity to prevent damage to utilities. Inform the NPS maintenance staff 10 working days prior to any ground disturbance. Inform the Underground Services Alert at least 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, 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, 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, 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 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, Contractor	Concurrent with project activities
Clearly delineate construction limits in the vicinity of wetlands with construction fencing	Contractor	Prior to and concurrent with construction activities
Ensure that waters are 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 <i>The Water Quality Control Plan</i> for the Central Valley Regional Water Quality Control Board (CVRWQCB 1998): <ul style="list-style-type: none"> 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%. In determining compliance with the limits above, appropriate averaging periods may be applied, provided that beneficial uses are fully protected.	Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
HYDROLOGY AND WATER QUALITY (CONTINUED)		
Contain wastewater contaminated with silt, grout, or other by-products from construction activities 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, Contractor	Concurrent with project activities
Design surface drainage facilities to transport runoff in a non-erosive manner.	Yosemite National Park, 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, 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
Drain and flush all pumps, tanks, live wells, buckets and other containers that might carry water contaminated with exotic plants and animals, such as the zebra mussel, prior to bringing equipment into the park.	Contractor	
VEGETATION AND WETLANDS (INCLUDING SPECIAL STATUS PLANTS)		
Employ measures to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway or wetlands (see Construction, above). Ensure all actions are consistent with state water quality standards and Clean Water Act Section 401 certification requirements.	Yosemite National Park, Contractor	Prior to project activities
Avoid heavy equipment use in wetlands to the extent possible. Place heavy equipment used in wetlands on mats, or take other similar measures to minimize soil and plant root disturbance and to preserve the preconstruction topography of the wetland.	Yosemite National Park, Contractor	Prior to concurrent with project activities
Whenever possible, place excavated material on an upland site. When this is not feasible, stockpile excavated material on a temporary basis on filter cloth, mats, or other semi-permeable surface, or take comparable measures to ensure that underlying wetland habitat is protected. Stabilize material with straw bales, filter cloth, or other appropriate means to prevent reentry into the waterway or wetland.	Yosemite National Park, Contractor	Concurrent with project activities
Remove temporary soil stockpiles in wetlands 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 topography and soil configurations. Restore wetland soil, hydrology, and native vegetation as soon as practicable.	Yosemite National Park, Contractor	Concurrent with project activities
Ensure that a Park Botanist oversees placement of construction fencing to avoid impacts to sensitive plants and wetlands.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
Conduct preconstruction surveys 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, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
VEGETATION AND WETLANDS (INCLUDING SPECIAL STATUS PLANTS), CONTINUED		
Delineate, clearly mark, and ensure all wetland-related permits are in place prior to work. Perform activities in wetlands in a cautious manner to prevent damage caused by equipment, erosion, siltation, etc.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
Minimize shade impacts to the extent practicable when designing boardwalks and similar structures.	Yosemite National Park, 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, 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, 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, Contractor	Prior to project activities
Salvage and store topsoil, and reuse in restoration efforts in accordance with NPS policies and guidance. Store topsoil 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
Delineate wetlands in project areas of Lyell Canyon prior to implementation of the TRP.	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, 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. A wildlife biologist will conduct standardized Great Gray Owl surveys prior to implementing project-related activities on the western end of Tuolumne Meadows. The NPS will use the survey protocol by Keane et al. (2011) that improves on the Beck and Winter (2000) protocol. The NPS will conduct 2 broadcast surveys in one season for which a 77% probability of detection is expected.	Yosemite National Park, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
WILDLIFE (INCLUDING SPECIAL STATUS WILDLIFE), CONTINUED		
<p>For other birds:</p> <p>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.</p> <p>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.</p> <p>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.</p>	Yosemite National Park, including park wildlife biologist	Prior to construction
<p>For bats:</p> <p>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.</p> <p>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.</p>	Yosemite National Park, Contractor	Prior to and concurrent with project activities
<p>For mountain beaver, Sierra Nevada red fox, Yosemite toads, and Sierra Nevada yellow-legged frogs:</p> <p>Adhere to 401/404 permits to prevent increased turbidity in the creek from occurring during construction activities.</p> <p>Design water outputs to dissipate water slowly, and avoid concentrated outflows to the meadow or tributaries.</p> <p>Maintain continuous water flows and water quality 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.</p> <p>Suitable habitat for Sierra Nevada red fox, Yosemite toads, and Sierra Nevada yellow-legged frogs exists in Tuolumne Meadows. A qualified wildlife biologist will survey for these species prior to project implementation. If adults, young, 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.</p>	Yosemite National Park	Prior to and concurrent with project activities
FEDERAL AND STATE PERMIT REQUIREMENTS		
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	Prior to project activities
AMERICAN INDIAN TRADITIONAL CULTURAL RESOURCES AND PRACTICES		
<p>If cultural resources are discovered, stop work immediately and report the discovery to the Contracting Officer.</p> <p>Stop Work: Cease all activities in the area of discovery and protect the resources discovered. In the event the discovery represents human remains or any objects subject to the Native American Graves Protection and Repatriation Act (NAGPRA), the NPS will follow procedures outlined in NAGPRA regulations. This will require a stoppage of work in the area of work for a minimum of 30 calendar days. In the event of an inadvertent discovery of Cultural Resources, be prepared to stop work and continue in other areas. See 'Archeological Resources', below.</p>	Yosemite National Park, Contractor	Prior to and concurrent with project activities.
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, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
AMERICAN INDIAN TRADITIONAL CULTURAL RESOURCES AND PRACTICES, CONTINUED		
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	Prior to, concurrent with and following project activities
HISTORIC RESOURCES		
<p>Contractor shall undertake the following historic resource protection measures:</p> <ul style="list-style-type: none"> Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation. Ensure that supervisory personnel are present when work begins and during its progress. Protect existing materials during installation of temporary protections and construction. Not deface or remove existing materials. Obtain Contracting Officer approval prior to attaching temporary protection to existing construction. Protect landscape work adjacent to or within work areas as follows: <ul style="list-style-type: none"> Provide barriers to protect tree trunks. Bind spreading shrubs. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time. Set scaffolding and ladder legs away from plants. Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify Contracting Officer immediately of drains or systems that are stopped or blocked. Do not begin work until the drains are in working order. Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed on corresponding project. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass. 	Yosemite National Park, Contractor	Prior to and concurrent with project activities
All treatments within historic landscapes will be in keeping with the <i>Secretary of The Interior's Standards for the Treatment of Historic Properties</i> .	Yosemite National Park, Contractor	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, Contractor	Prior to project activities
Before any actions take place, historic resources must be researched and existing conditions documented in the field by qualified staff.	Yosemite National Park, Project Manager	Prior to project activities
When narrowing the Great Sierra Wagon Road 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.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
Maintain the current alignment of historic remnants of the Great Sierra Wagon Road.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
If modifications are necessary to historic culverts and their associated headwalls, efforts should be undertaken to ensure that modifications meet the <i>Secretary of the Interior's Standards for Treatment of Historic Properties</i> . Measures can include retaining materials, construction style, and workmanship that matches the historic character. These efforts should be combined with photo-documentation, contracting with a qualified stonemason, numbering headwall stones for reconstruction and locating granite that matches the color and texture of the existing stone masonry granite.	Yosemite National Park, Contractor	Prior to and concurrent with project activities
New culverts (if added) should be built to complement historic culverts along Tioga Road, 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.	Yosemite National Park, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
HISTORIC RESOURCES, CONTINUED		
Once work is completed on the Great Sierra Wagon Road, the historic road should be documented to capture the changes.	Yosemite National Park, Contractor	Concurrent with and following project activities
The ditches that lead from and drain many of the area's kettle ponds are not documented as historic features and should be investigated and documented before filling and regrading.	Yosemite National Park, Contractor	Prior to project activities
Removed and salvaged historic materials should be handled in accordance with the following: <ul style="list-style-type: none"> ▪ Clean salvaged historic items. ▪ Pack or crate items after cleaning. Identify contents of containers. ▪ Store items in a secure area until delivery to the NPS. ▪ Transport items to storage area approved by Contracting Officer. ▪ Protect items from damage during transport and storage. ▪ Do not dispose of items removed from existing construction without prior written consent of Contracting Officer. 	Yosemite National Park, Contractor	Prior to and concurrent with project activities
Removed and reinstalled historic materials should be handled in accordance with the following: <ul style="list-style-type: none"> ▪ Clean and repair historic items to functional condition adequate for intended reuse. ▪ Pack or crate items after cleaning and repairing. Identify contents of containers. ▪ Protect items from damage during transport and storage. ▪ Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated. 	Yosemite National Park, Contractor	Prior to and concurrent with project activities
ARCHEOLOGICAL RESOURCES		
<p>Train all members of the restoration/construction teams in proper handling of inadvertent discovery of archaeological resources. Training would involve information regarding the types of archaeological materials that are likely present in the specific project area, how to identify archeological materials, and the procedures for contacting the appropriate parties in the event that archeological materials are encountered during restoration/construction activities.</p> <p>All restoration/construction personnel would be required to participate in the training, and written guidelines would be prepared and distributed to aid in identification of archeological materials and to inform workers of the procedures to follow in case of a discovery or potential discovery. If buried archeological resources such as flaked stone or groundstone, historic debris, building foundations, midden soils or human bone are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within a 100-foot radius of the find until a qualified archeologist can assess the significance of the find.</p> <p>Inadvertent discoveries would be treated in accordance with 36 CFR 800.13 (Protection of Historic Properties: Post-review discoveries). The archeological resource would be assessed for its eligibility for listing on the National Register in consultation with the SHPO and representatives of traditionally associated American Indian tribes and groups (if it is an American Indian archeological site), and a determination of the project effects on the site would be made. If the site would be adversely affected, a treatment plan would also be prepared as needed during the assessment of the site's significance. Assessment of inadvertent discoveries may require archeological excavations and/or archival research to determine resource significance. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.</p> <p>If human skeletal remains are encountered, protocols under federal and state law would apply. All work shall stop in the vicinity of the discovery, and the find would be secured and protected in place. The appropriate county coroner and Park Archeologist would both be immediately notified. If analyses determine that the remains are American Indian, and that no further coroner investigation of the cause of death is required, the coroner would then be required to contact the NAHC (pursuant to Section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs. The remains would also be treated in accordance with the Native American Graves Protection and Repatriation Regulations at 43 CFR 10.4 (Inadvertent discoveries).</p>	Yosemite National Park, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
ARCHEOLOGICAL RESOURCES, CONTINUED		
<p>Management actions involving moderate to severe ground disturbance (trail reroutes or trail construction; excavations for subsurface utilities; redevelopment of the campgrounds; removal of infrastructure and/or facilities, construction of buildings, structures; expansion of roads; decompaction and plant salvage) within or adjacent to the boundaries of known archeological sites shall be preceded by intensive surface survey and/or controlled subsurface testing, as determined appropriate given past studies and findings.</p> <p>Initial limited testing shall be conducted in the area(s) proposed for ground disturbance, to first determine if the presence of site components can be verified. If so, the methods of achieving the proposed action may be modified and/or relocated, if possible. If effects could not be avoided, archeological treatment measures would be site-specific and contingent on previous studies' results and the level of work proposed.</p>	Yosemite National Park, Contractor	Prior to project activities
<p>Ensure that a professional archeologist fences archeological sites with orange hazard fencing. Brief all project personnel to stay out of areas with sensitive archeological resources.</p>	Yosemite National Park, Contractor	Prior to project activities
<p>A Government provided Archeological Monitor, and as necessary, Native American Monitor, will observe all ground-disturbing site work, including construction of temporary facilities at all culturally sensitive areas, from a safe location mutually agreed on by Contractor, Contracting Officer and Monitors. As new ground is broken, Monitors will examine excavated materials, using construction layout centerline and perimeter staking as a reference point to record locations of findings.</p> <p>Monitoring may also be included as part of a treatment plan for individual resources following initial testing, as per above.</p> <p>Prior to construction, mark with flagging all sensitive cultural resources to be protected within the project area identified per the requirements of the plans and specifications. Proper placement of flagging shall be verified by the Contracting Officer. Upon verification, erect necessary fencing to identify and protect cultural resources from disturbance.</p> <p>Do not begin ground-penetrating work such as excavation, trenching, drilling, or stump and root removal in culturally sensitive areas without the presence of Archeological Monitor, and if required, Native American Monitor.</p> <p>The archeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis. If the monitor determines that any portion of the proposed action could have an adverse effect on the site, alternative methods of accomplishing the action shall be discussed with the restoration personnel. Restoration activities within site boundaries shall be conducted using manual tools rather than mechanized equipment whenever possible, and no stock animals or wheeled vehicles used for transport of workers and tools shall be allowed within 10 meters of the known site boundary.</p> <p>If Archeological Monitor or Native American Monitor discovers resources, immediate relocation of the work to a non-sensitive area may be required to allow Monitors to take soil samples and record resources. While Monitors are documenting resources in sensitive areas, Contractor shall relocate work to non-sensitive areas.</p> <p>If an Archeological Monitor requires access to a construction area the contractor shall furnish safe access, free from recognized hazards, to enable the monitor to complete his/her duties. This will commonly involve trench access when soil sampling is deemed necessary by the Archeologist.</p> <p>If resources are discovered while Monitors are absent, stop work immediately and report the discovery to the Contracting Officer.</p> <p>Stop Work: Cease all activities in the area of discovery and protect the resources discovered. In the event the discovery represents human remains or any objects subject to the Native American Graves Protection and Repatriation Act (NAGPRA), the NPS will follow procedures outlined in NAGPRA regulations. This will require a stoppage of work in the area of work for a minimum of 30 calendar days. In the event of an inadvertent discovery of Cultural Resources, be prepared to stop work and continue in other areas.</p> <p>The Contractor shall plan, schedule, and execute the work to prevent stoppages at one area from stopping all work at the construction site.</p>	Yosemite National Park, Contractor	Prior to and concurrent with project activities

Mitigation Measure	Responsibility	Critical Milestones
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	Prior to project activities
HAZARDOUS MATERIALS MEASURES		
Prepare an Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan to address hazardous materials storage, spill prevention and response. Submit 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. Keep all applicable Materials Safety Data Sheets on site for inspection.	Contractor	Concurrent with project activities
Hazardous or flammable chemicals are prohibited from storage in staging areas, except for substances identified in the Oil and Hazardous Materials Spill Prevention, Control, and Countermeasure Plan. Immediately remove hazardous waste materials from the 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
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

Mitigation Measure	Responsibility	Critical Milestones
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, 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	Concurrent with and following project activities



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



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(Photo by Greg Lawler)*

*Front cover: Near Parsons Lodge
(Photo by Randy Fong)*