



Tuolumne Wild and Scenic River

Outstandingly
Remarkable
Values

Draft Report



June 2006

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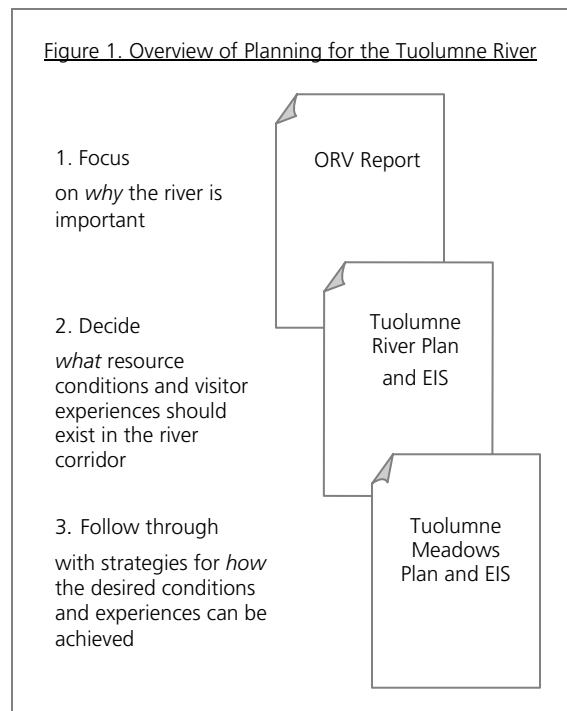
1. Outstandingly Remarkable Values: The Foundation for Wild and Scenic River Management

Outstandingly remarkable values (ORVs) are defined by the Wild and Scenic Rivers Act (WSRA) as the unique characteristics that make a river worthy of special protection. Accurately and adequately expressing a river’s outstandingly remarkable values provides a foundation for planning, management, and monitoring activities within a Wild and Scenic River corridor. This *Draft ORV Report for the Tuolumne Wild and Scenic River* (Draft ORV Report) represents the review and proposed revision of outstandingly remarkable values for the portion of the Tuolumne Wild and Scenic River located within Yosemite National Park. This review is undertaken as part of the National Park Service (NPS) comprehensive management planning for the river.

Outstandingly remarkable values were first considered for the Tuolumne River as part of the development of the 1979 *Tuolumne Wild and Scenic River Study Final Environmental Impact Statement and Study Report* (Tuolumne Final Study). That report, prepared cooperatively by the National Park Service and the U.S. Forest Service, established the eligibility of the Tuolumne River for inclusion in the National Wild and Scenic Rivers System.

Since the completion of the Tuolumne Final Study, the Interagency Wild and Scenic Rivers Coordinating Council (Interagency Council) has issued guidance for identifying and defining a river’s outstandingly remarkable values. The National Park Service has followed the Interagency Council’s guidance and used the most current scientific and scholarly information available for the river corridor in developing the proposed revisions to the Tuolumne River ORVs.

Definition of ORVs is a critical first stage in developing the *Tuolumne Wild and Scenic River Comprehensive Management Plan* (Tuolumne River Plan). In the *why/what/how* model of tiered decision making adopted by the National Park Service (see figure 1), outstandingly remarkable values describe *why* a river is important enough to be designated and managed as a unit of the National Wild and Scenic Rivers System. As the NPS planning team develops the Tuolumne River Plan, it will determine *what* combinations of resource conditions and visitor experiences will best protect and enhance these values. Closely coordinated implementation plans, including the Tuolumne Meadows Plan, will address *how* these conditions and experiences can be achieved. Although all aspects of the affected



environment will be considered during the development of the Tuolumne River Plan, preminent consideration will be given to those values that have been determined to be outstandingly remarkable.

This Draft ORV Report will be available at public scoping meetings and NPS open houses to solicit public input into the development of the river’s outstandingly remarkable values and to inform the comprehensive river management planning effort. A Final ORV Report will incorporate comments received during public scoping and review of the Draft Tuolumne River Plan and become the foundation for the Final Tuolumne River Plan.

The Final ORV Report will not represent a static set of ORVs; rather, these values will be open to review and revision if new scientific and scholarly information is revealed or further guidance is developed.



The Lyell Fork of the Tuolumne River, near Lyell Glacier
Photo courtesy of Kristina Rylands

2. ORV Identification Process and Criteria

Identification of outstandingly remarkable values for the Tuolumne River corridor has been informed by past planning efforts and updated to incorporate current data and expertise. Major considerations that have influenced the ORV refinement process are summarized below.

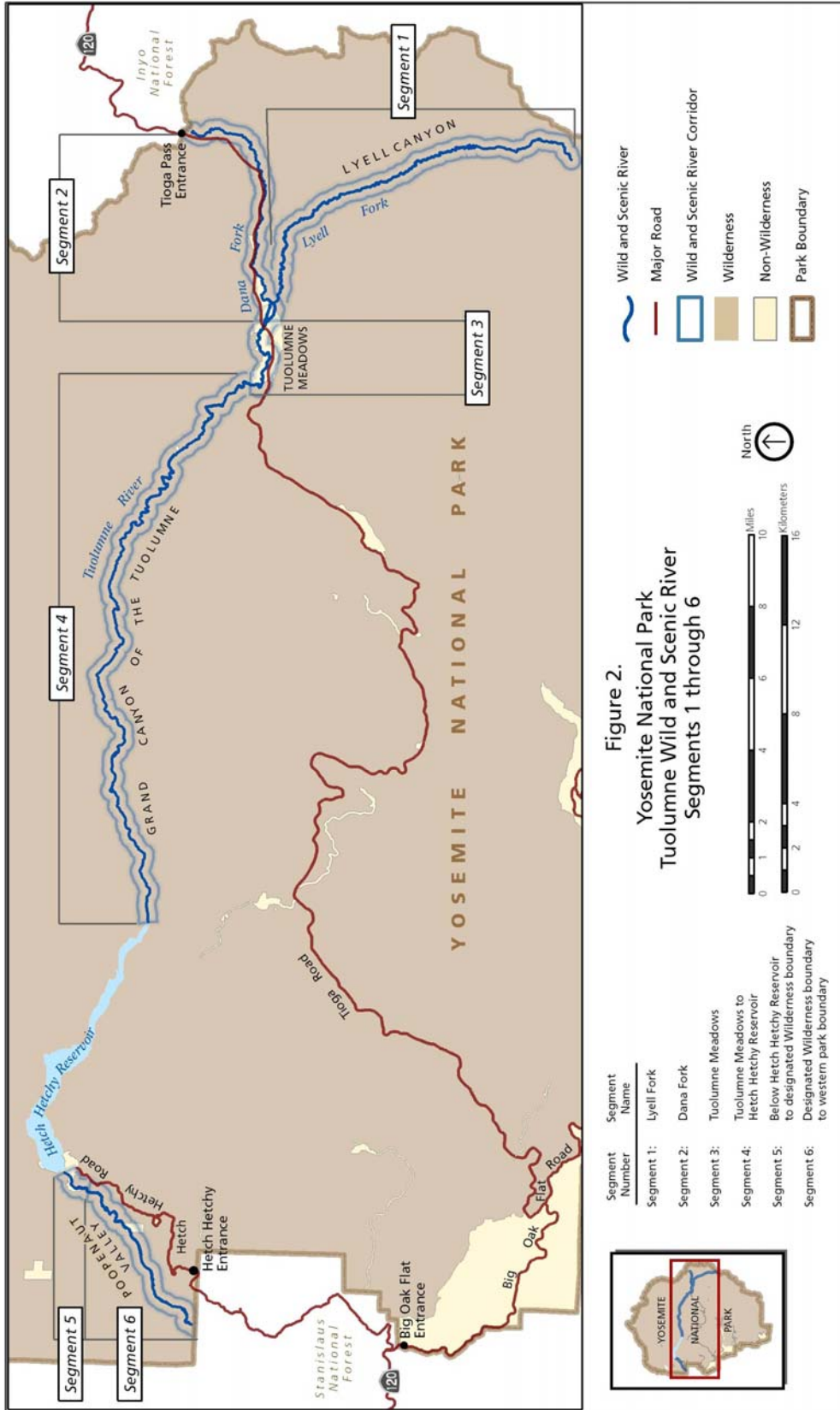
River Corridor Boundary and River Segments

The National Park Service has been managing the river corridor pursuant to the default boundaries specified in the Wild and Scenic Rivers Act. The Act provides that, unless otherwise designated by the managing agency, the boundaries of a river “shall generally comprise that area measured within one-quarter mile from the ordinary high water mark on each side of the river” (WSRA, §4(d), 16 USC 1275(d)). The National Park Service will review and possibly revise this boundary as part of the Tuolumne River Plan.

For purposes of ORV identification in this early stage of the planning effort, the planning team is using the river segments and classifications that were described in the 1979 Tuolumne Final Study and amended in a 1986 *Federal Register* notice. They divide the length of the river contained within Yosemite National Park into six segments (see figure 2), each of which is classified as directed by the Wild and Scenic Rivers Act according to the level of development within the river corridor (see table 1).

The section of the Tuolumne River between segments 4 and 5 (the Hetch Hetchy Reservoir) was found to be ineligible for Wild and Scenic River status and is therefore excluded from the Wild and Scenic River corridor.

Table 1		
Tuolumne National Wild and Scenic River Segments and Classifications		
Segment	Classification	Area
Segment 1	Wild	Lyell Fork
Segment 2	Scenic	Dana Fork
Segment 3	Scenic	Tuolumne Meadows
Segment 4	Wild	Tuolumne Meadows to Hetch Hetchy Reservoir
Segment 5	Scenic	Below Hetch Hetchy Reservoir to designated Wilderness boundary
Segment 6	Wild	Designated Wilderness boundary to western park boundary



Participants and Process

Internal scoping for the Tuolumne River Plan began with extensive discussion and consideration of the river's outstandingly remarkable values to ensure the broadest possible input from technical experts within the National Park Service and its partnering agencies.

Between May and November 2005 the NPS planning team discussed the most current guidance provided by the Interagency Council with each of the park's management divisions and in several all-employee meetings. Various divisions held work sessions to discuss these values. In November the planning team shared preliminary findings with an NPS Interagency Council representative and obtained additional guidance about the application of ORV criteria.

In December 2005 the National Park Service hosted an interagency Tuolumne River ORV workshop, which was attended by representatives of the National Park Service, the U.S. Forest Service, the U.S. Geological Survey, the City and County of San Francisco Public Utilities Commission, and an American Indian tribe that has cultural associations with the river corridor. The purpose of the workshop was to brainstorm all possible outstandingly remarkable



NPS photo

values of the Tuolumne River with experts familiar with the area and who represent a wide range of disciplines. Workshop participants considered potential ORVs based on current guidance provided by the Interagency Council and previous studies and discussions, including the findings of the 1979 Tuolumne Final Study and ideas generated during a one-day workshop held in 1997 as part of the Yosemite Water Management Planning effort.

Workshop results were summarized and reissued to the participants in January 2006 to begin a three-round, three-month process of synthesizing data and ideas into a single set of draft ORV statements for the Tuolumne River. During the first round of this process, participants were asked to critique values based on the ORV criteria established by the Interagency Council. During rounds two and three, participants reviewed and commented on how well an evolving set of ORV statements expressed those values. The ORV statements included in this report are the result of that refinement process.

Throughout the rounds of review and refinement, values that did not meet the ORV criteria were recorded and compiled for further analysis in forthcoming stages of the Tuolumne River planning process (see "Other Important Values Captured for Further Consideration," in Chapter 3).

ORV Criteria

General ORV Criteria

The Wild and Scenic Rivers Act states that outstandingly remarkable values can include scenery, recreation, fish and wildlife, geology, history, culture, and other similar values. While the legislative language describing outstandingly remarkable values is very general, more specific guidance is provided by the Interagency Council (1999, pp. 12-15). The reference guide is posted on the NPS website at <http://www.nps.gov/rivers/publications.html/study-process.pdf>. The ORV criteria developed by the Interagency Council can be summarized as follows:

- (1) The value must be river related. To be considered river related, a value must
 - Be located in the river or on its immediate shorelands (generally within ¼ mile on either side of the river) *and*
 - Contribute substantially to the functioning of the river ecosystem *or*
 - Owe its location or existence to the presence of the river
- (2) The value must be rare, unique, or exemplary in a regional or national context. To be considered rare, unique, or exemplary, a value should be a conspicuous example from among a number of similar values that are themselves uncommon or extraordinary.

The Interagency Council provides additional criteria for these assessments for each ORV category listed in the Wild and Scenic Rivers Act, noting that these criteria may be modified to make them more meaningful to a particular river. The Interagency Council also notes that while no specific national evaluation guidelines have been developed for the “other similar values” mentioned in the Wild and Scenic Rivers Act, agencies may assess additional river-related values, including but not limited to hydrology, paleontology, and botany resources, consistent with the guidance provided.

Specific ORV Criteria by Category

The National Park Service has identified outstandingly remarkable values for the Tuolumne River in ten categories.

Two of these categories are intended to contain the values that can only be discerned at a macro level: the ecologic and sociocultural values of the river corridor as a whole. Technical experts familiar with the Tuolumne River have emphasized that the river's remarkable values include synergistic interactions among natural systems and features, and the outstandingly remarkable connections and relationships that people have formed with the river corridor over time. Criteria for these two categories were developed and applied corridorwide to describe those characteristics that distinguish the Tuolumne River corridor from all other rivers in the Sierra Nevada and the nation.

A third category, scientific values, was also considered to be a broad corridorwide category because of the vast research potential for multiple disciplines that exists throughout the river corridor.

As important as these three broad concepts are to the understanding and management of the river as a whole, the remaining seven ORV categories are intended to provide equally important, detailed information about specific features, processes, and opportunities in each river segment.

The specific criteria that were used to assess values in each of the ORV categories are listed in table 2.

Table 2	
ORV Criteria for the Tuolumne Wild and Scenic River	
Category	ORV Criteria
CORRIDORWIDE	
Ecologic Values	Geologic, hydrologic, and biologic processes are relatively undisturbed in the river corridor and have exceptionally high integrity, resulting in healthy ecosystems that are rare, unique, or exemplary in the Sierra Nevada.
Sociocultural Values	Distinctive characteristics that span across prehistoric, historic, scenic, and/or recreational values of the river corridor distinguish the Tuolumne River from other rivers in the Sierra Nevada.
Scientific Values	Ecologic and sociocultural values offer unique, rare, or exemplary opportunities to conduct scientific research having regional or national significance.
INDIVIDUAL RIVER SEGMENTS	
Hydrologic Values	Hydrologic features are unique, rare, or exemplary within the Sierra Nevada, either individually or in combination. Hydrologic processes are relatively undisturbed and have exceptionally high integrity, contributing to healthy ecosystems that are rare, unique, or exemplary in the Sierra Nevada.
Geologic Values	Examples of geologic features, processes, or phenomena are unique or rare within the Sierra Nevada, either individually or in combination.
Biologic Values	The area within the river corridor provides exceptionally high quality habitat for plants or animals of national or regional significance and/or a remarkable diversity of habitats.
Prehistoric and American Indian Cultural Values	Prehistoric archeological sites are listed (or are eligible or potentially eligible for listing) on the National Register of Historic Places and have unique or rare characteristics, have regionally significant research potential, or have importance for American Indians as a tangible link to their ancient heritage. Traditional cultural resources play a significant role in the perpetuation of cultural traditions among groups of American Indian people affiliated with the Tuolumne River.
Historic Values	Historic resources are listed (or are eligible or potentially eligible for listing) on the National Register of Historic Places, have either national or regional significance, and do not divert the free flow of the river.
Scenic Values	Landscape elements visible from the river and its banks result in notable views that characterize the Tuolumne River in Yosemite National Park.
Recreational Values	Recreational opportunities are, or have the potential to be, rare or popular enough to attract visitors from around the world.

Comparison with the Findings of the 1979 Tuolumne Final Study

The outstandingly remarkable values identified in the 1979 Tuolumne Final Study are included in the Appendix. That study found that each river segment had outstandingly remarkable values in the following categories: scenic, recreational, geologic, wildlife, historic/cultural, and scientific/educational. The current findings are consistent with those findings (although the heading “wildlife” has been incorporated into a broader category of “biologic values,” which includes plants and animals).

In addition, the 1979 study found that certain segments of the river had outstandingly remarkable fishery and wilderness values. The current findings differ from the 1979 findings in the following ways:

Fisheries: The Tuolumne River inside Yosemite National Park has been determined to have no outstandingly remarkable fisheries. Glaciation eliminated all fish from the high country thousands of years ago, and the glaciated landscape has prevented natural repopulation by fish through upstream migration. Current fish populations are nonnative, and they pose threats to native amphibians and other species, including special-status species.

Wilderness: The 1979 study concluded that wilderness characteristics were not an outstandingly remarkable value of the river below Hetch Hetchy Reservoir. However, the current study concludes that wilderness, although not identified as a discrete category, contributes to and protects the outstandingly remarkable values in segment 6, which begins a mile below the reservoir and extends to the park boundary. All segments of the river except segment 5 (the mile immediately below the reservoir) include land and water that is designated Wilderness in the National Wilderness Preservation System.



Seasonal flooding in Poopenaut Valley, below Hetch Hetchy Reservoir
Photo courtesy of Kristina Rylands

3. Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River

The outstandingly remarkable values of the Tuolumne Wild and Scenic River are first summarized by ORV category. A more detailed listing of the individual ORVs, identifying which particular values occur in each of the six river segments and including more specific examples, is provided in table 3.

Outstandingly Remarkable Values Summarized by Category

Natural Values

Corridorwide Ecologic Values

From the alpine headwaters of the Tuolumne River, through the river's steep descent into the Sierra Nevada foothills, interactions among geologic, hydrologic, and biologic processes sustain a rare diversity of robust, interrelated, and largely intact ecosystems. The entire river corridor is either within or surrounded by designated Wilderness, which protects the ecological integrity of these systems.

The unusual extent and influence of glaciation in the Tuolumne River corridor has resulted in extensive low-relief areas, primarily meadows, separated by steep sections of river flowing over bedrock. This *stairstep morphology*, in combination with exceptional water quality, a seasonal flood regime, and a largely undisturbed river corridor, sustains systems that are remarkable in their size and diversity:

- Tuolumne Meadows, Dana Meadows, and the meadows along the Lyell Fork comprise one of the most extensive subalpine meadow/wetland complexes in the Sierra Nevada. In addition, the lower elevation meadow/wetland complex at Poopenaut Valley is unique in its relative lack of human impact and development compared to other low-elevation riparian areas in the Sierra Nevada. These meadow systems sustain an exceptional diversity of river-related habitat types.
- Dramatic stairstep river morphology creates highly diverse river canyon communities below Tuolumne Meadows and below Hetch Hetchy Reservoir. Spectacular systems of falls, cascades, basins, riffles, and pools bounded by towering cliffs contribute to a remarkable diversity of largely intact habitat types.

Hydrologic Values

Largely intact hydrologic processes in the Tuolumne River corridor create a diversity of exceptional hydrologic features and contribute to the integrity of river-related ecosystems:

- The exceptional water quality of the headwaters of the Tuolumne River, along the Lyell and Dana Forks, is maintained throughout the river corridor.
- Exemplary glacial kettle ponds are located along the Dana Fork.

- Unusually large basins of alluvial fill, perennially high groundwater conditions, seasonal flooding, and active channel migration combine to sustain some of the most extensive subalpine meadow/wetland complexes in the Sierra Nevada at Tuolumne Meadows and along the Lyell Fork.
- A classic and well-known example of an alkaline spring occurs at Soda Springs.
- An unusually long stretch of classic stairstep river morphology from below Tuolumne Meadows to the Hetch Hetchy Reservoir results in many spectacular cascades and waterfalls that surpass those of any other canyon in the Sierra Nevada.
- A transition zone from a glacially carved U-shaped valley to a river-incised V-shaped canyon contributes to seasonal flooding and the maintenance of an unusual diversity of riparian habitats at Poopenaut Valley, one of the few undeveloped low-elevation meadow/wetland complexes in the region.

Geologic Values

The Tuolumne River corridor represents one of the most extensive examples of stairstep river morphology in the Sierra Nevada. This glacially carved morphology extends over an unusually long gradient from the headwaters of the river to the lower elevations at the western park boundary. Exceptionally well-preserved geologic features provide some of the best evidence of glacial processes in the entire Sierra Nevada:

- The geomorphology of Lyell Canyon provides a textbook example of a meandering river through a glaciated U-shaped valley.
- Dramatic evidence of glaciation along the Dana Fork, Tuolumne Meadows, and the Grand Canyon of the Tuolumne includes glacial erratics, moraines, roches moutonnées, striations, hanging valleys, and some of the best examples of glacial polish in the United States.
- The exceptionally large basin at Tuolumne Meadows, along with glacial striations and erratics, is geologic evidence of the remarkable convergence of several large glaciers during the last major glacial period.
- Poopenaut Valley contains the lowest elevation evidence of glaciation found anywhere in the western Sierra.

Biologic Values

The robust, interrelated, and largely intact ecosystems along the Tuolumne River corridor provide habitat for a remarkable diversity of native plants and animals, including special-status species:

- Largely intact alpine habitat along the Lyell and Dana Forks, characterized by high plant diversity, is important for numerous plant and animal species, including migratory bird populations and special-status plant, amphibian, and small mammal species.
- Mineral springs in Lyell Canyon and Tuolumne Meadows provide habitat for localized populations of special-status plant species.
- Subalpine meadow and riparian complexes at Tuolumne Meadows, Dana Meadows, and along the Lyell Fork provide habitat for a diversity of plant and animal species, including migratory bird populations and special-status plant, amphibian, and bat species.

- Largely intact pool, riffle, and steep cliff habitat below Tuolumne Meadows and below Hetch Hetchy Reservoir supports a diversity of species, including special-status bird and bat species.
- Largely intact low-elevation riparian and meadow communities at Poopenaut Valley, which are uncommon in the Sierra Nevada due to impacts from settlement in other low-elevation areas, provide habitat for an exceptionally diverse assemblage of bird species and several special-status bat species.

Sociocultural Values

Corridorwide Sociocultural Values

The Tuolumne River’s unique combination of prehistoric, historic, scenic, and recreational values distinguishes it from other rivers in the Sierra Nevada and throughout the nation. The sociocultural values of the Tuolumne River corridor extend back at least 6,000 years and span generations of diverse groups of people. Visible evidence testifies to the evolving importance of the river corridor as a seasonal hunting and gathering ground, a trans-Sierra trade and travel route, a destination for recreation and leisure, and a place to connect with nature in a wilderness setting.

From prehistoric through modern times, people have developed powerful and enduring relationships with the Tuolumne River corridor. The corridor plays a significant role in maintaining cultural traditions among groups of American Indian people. In a contemporary context, the corridor engenders deep personal connections to the area and figures prominently in the lives, stories, and traditions of generations of visitors.

Prehistoric and American Indian Cultural Values

The Tuolumne River corridor contains prehistoric archeological sites with regionally significant research potential that makes them eligible or potentially eligible for listing on the National Register of Historic Places. Certain prehistoric resources within the corridor are important for maintaining cultural traditions among groups of American Indian people affiliated with the Tuolumne River.

- Archeological sites along the Lyell and Dana Forks and in Tuolumne Meadows provide evidence of high-elevation travel, trade, and settlement by groups of American Indian people dating back thousands of years. The oldest known sites, along the Dana Fork, provide evidence of continuous human use and possible environmental change in the region. Tuolumne Meadows and the Grand Canyon of the Tuolumne are flanked by concentrations of pre-contact archeological sites containing materials that are uncommon in the region.
- Pre-contact archeological sites in the low-elevation flats, particularly Poopenaut Valley, represent possible year-round use by groups of American Indian people.
- Traditional use sites and features that are important for maintaining cultural traditions of American Indian people are found along the Lyell and Dana Forks, in Tuolumne Meadows, at Pate Valley, and below Hetch Hetchy Reservoir.

Historic Values

The Tuolumne River corridor contains numerous sites that are listed (or eligible or potentially eligible for listing) on the National Register of Historic Places as places of regional or national significance:

- Historic sites along the Lyell and Dana Forks attest to their status as regionally important trade and travel routes between the eastern and western Sierra.
- Historic sites in Tuolumne Meadows commemorate the significance of this area as a place inspiring conservation activism on a national scale.
- Historic landscape features and structures along the river below Tuolumne Meadows represent the development of a distinctive kind of high-country touring that remains unique within the National Park System. In addition, this segment of the corridor contains some of the finest examples of historic trail stonework in the nation.
- Historic landscape features and structures below Hetch Hetchy Reservoir provide evidence of early Euro-American settlement.

Scenic Values

A glacially carved, snow-capped landscape, through which the Tuolumne River alternately meanders across wide meadows and cascades down steep canyons, creates magnificent scenery with a unique character that people equate with Tuolumne River corridor.

- The largest glacier on the western flank of the Sierra Nevada is part of the spectacular high-country views from the Lyell Fork.
- Unparalleled views along the Lyell Fork, Dana Fork, and Tuolumne Meadows encompass the meandering river, adjacent meadows, glacially carved domes, and rugged mountain peaks. The low-relief topography at Tuolumne Meadows and Dana Meadows allows for magnificent skyward views, including some of the darkest night skies in the Sierra Nevada.
- Views within the Grand Canyon of the Tuolumne include steep canyon walls, hanging valleys, and cascades of falling water. Visitors who travel the Grand Canyon of the Tuolumne are rewarded with awe-inspiring views of rare water features.
- The stretch of river below Hetch Hetchy Reservoir offers stunning views of verdant meadows, a glacially carved bedrock valley, large river pools, dramatic canyon walls, and a constricted slot canyon.

Recreational Values

The untrammled character of the river corridor, most of which is in designated Wilderness, provides outstanding opportunities for a diversity of experiences characterized by primitive, unconfined recreation in a landscape dominated by natural scenery and soundscapes:

- The Pacific Crest Trail, which follows the Lyell Fork and the Tuolumne River through Tuolumne Meadows, offers opportunities to travel one of the country's eight National Scenic Trails.
- The rustic high-country lodging available along the Dana Fork, in Tuolumne Meadows, and above the Grand Canyon of the Tuolumne offers a distinctive type of recreation that is unique in the National Park System.
- A wide range of recreational opportunities attract people of all ages and abilities to Tuolumne Meadows, where many individuals, families, and groups establish traditional ties with the area. The National Park Service and other organizations depend on the river and adjacent meadows as a centerpiece of nature interpretation and education in the Sierra Nevada.

- The Grand Canyon of the Tuolumne offers exceptional opportunities for backcountry excursions through a deep, rugged, and seldom-traveled gorge.
- The recreational opportunities below Hetch Hetchy Reservoir are unique due to the relative rarity of low-elevation designated Wilderness elsewhere in the Sierra Nevada.

Corridorwide Scientific Values

The largely undisturbed river corridor provides invaluable opportunities to examine ecologic and sociocultural resources with high research value. The entire river corridor is either in or surrounded by designated Wilderness, which is critical to protecting the integrity and maintaining the scientific value of these resources.

- Relatively intact Sierra river ecosystems provide crucial baseline data and basic information on how components of such natural ecosystems interact and respond to perturbation (e.g., climate change, decline of special-status species).
- Some of the best evidence of glacial processes in the Sierra Nevada occurs along the river corridor.
- Well-preserved prehistoric and historic archeological resources within the river corridor provide outstanding opportunities to research trade, travel, subsistence, and technological change that occurred over thousands of years.

Outstandingly Remarkable Values by River Segment

The outstandingly remarkable values of the various segments of the Tuolumne Wild and Scenic River are presented in table 3.

Table 3	
Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River, by River Segment	
Category	Outstandingly Remarkable Values
CORRIDORWIDE	
Ecologic	<p>From the alpine headwaters of the Tuolumne River, through the river’s steep descent into the Sierra Nevada foothills, interactions among geologic, hydrologic, and biologic processes sustain a rare diversity of robust, interrelated, and largely intact ecosystems. The entire river corridor is either within or surrounded by designated Wilderness, which protects the ecological integrity of these systems.</p> <p>The unusual extent and influence of glaciation in the Tuolumne River corridor has resulted in extensive low-relief areas, primarily meadows, separated by steep sections of river flowing over bedrock. This <i>stairstep morphology</i>, in combination with exceptional water quality, a seasonal flood regime, and a largely undisturbed river corridor, sustains systems that are remarkable in their size and diversity:</p> <ul style="list-style-type: none"> ▪ Tuolumne Meadows, Dana Meadows, and the meadows along the Lyell Fork comprise one of the largest and most extensive subalpine meadow/wetland complexes in the Sierra Nevada. In addition, the lower elevation meadow/wetland complex at Poopenaut Valley is unique in its relative lack of human impact and development compared to other low-elevation riparian areas in the Sierra Nevada. These meadow systems sustain an exceptional diversity of river-related habitat types. ▪ Dramatic stairstep river morphology creates highly diverse river canyon communities below Tuolumne Meadows and below Hetch Hetchy Reservoir. Spectacular systems of falls, cascades, basins, riffles, and pools bounded by towering cliffs contribute to a remarkable diversity of largely intact habitat types.
Sociocultural	<p>The Tuolumne River’s unique combination of prehistoric, historic, scenic, and recreational values distinguishes it from other rivers in the Sierra Nevada and throughout the nation. The sociocultural values of the Tuolumne River corridor extend back at least 6,000 years and span generations of diverse groups of</p>

Table 3 Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River, by River Segment	
Category	Outstandingly Remarkable Values
	<p>people. Visible evidence testifies to the evolving importance of the river corridor as a seasonal hunting and gathering ground, a trans-Sierra trade and travel route, a destination for recreation and leisure, and a place to connect with nature in a wilderness setting.</p> <p>From prehistoric through modern times, people have developed powerful and enduring relationships with the Tuolumne River corridor. The corridor plays a significant role in maintaining cultural traditions among groups of American Indian people. In a contemporary context, the corridor engenders deep personal connections to the area and figures prominently in the lives, stories, and traditions of generations of visitors.</p>
Scientific	<p>The largely undisturbed river corridor provides invaluable opportunities to examine ecologic and sociocultural resources with high research value. The entire river corridor is either in or surrounded by designated Wilderness, which is critical to protecting the integrity and maintaining the scientific value of these resources.</p> <ul style="list-style-type: none"> ▪ Relatively intact Sierra river ecosystems provide crucial baseline data and basic information on how components of such natural ecosystems interact and respond to perturbation (e.g., climate change, decline of special-status species). ▪ Some of the best evidence of glacial processes in the Sierra Nevada occurs along the river corridor. ▪ Well-preserved prehistoric and historic archeological resources within the river corridor provide outstanding opportunities to research trade, travel, subsistence, and technological change that occurred over thousands of years.
SEGMENT 1: LYELL FORK	
1a. Hydrologic	The Lyell Fork descends from Lyell Glacier, the largest remaining glacier on the western flank of the Sierra Nevada, and flows through an unusually long low-gradient reach. Resulting hydrologic elements, such as exceptional water quality, perennially high groundwater conditions sustained in part by glacial melt, seasonal flooding, and active channel migration, maintain one of the largest subalpine meadow/wetland complexes in the Sierra Nevada.
1b. Geologic	The geomorphology of Lyell Canyon provides a textbook example of a meandering river through a glaciated U-shaped valley.
1c. Biologic	Largely intact alpine and subalpine habitat in this segment, characterized by high plant diversity, is important for special-status species (e.g., Yosemite toad, Mount Lyell shrew, Mount Lyell salamander, and several bat species) and migratory bird populations. Notably, at least three seasonal mineral springs in Lyell Canyon support localized populations of special-status plant species (e.g., marsh arrowroot, seaside arrow-grass, Sucksdorf's dodder, and Buxbaum's sedge).
1d. Prehistoric and American Indian Cultural	The Lyell Fork contains evidence of high-elevation settlement by groups of American Indian people dating back thousands of years. Archeological sites, trade and travel routes, and areas important for maintaining traditional cultural practices are located in this segment.
1e. Historic	Historic sites attest to the status of the Lyell Fork as a regionally important trade and travel route between the eastern and western Sierra. Specific sites that are either eligible or potentially eligible for listing on the National Register of Historic Places include camps and other material culture indicative of early sheepherding, U.S. Cavalry patrol routes, early scientific studies, and high-elevation recreation.
1f. Scenic	Spectacular views of a U-shaped river valley include mountain peaks, ridgelines, and the largest glacier on the western flank of the Sierra Nevada. Specific views from the bed and banks of the Lyell Fork include Mount Lyell, Lyell Glacier, Lyell Canyon, Kuna Crest, the cascades at Kuna Creek, Cathedral Range, and the meandering Lyell Fork through extensive alpine and subalpine meadows. Ephemeral wildflower displays enhance these impressive views.
1g. Recreational	The Lyell Fork provides outstanding recreational opportunities characterized by a primitive and unconfined experience, enhanced by natural scenery and soundscapes within designated Wilderness. The Pacific Crest Trail, one of eight National Scenic Trails, follows the river corridor in this segment.
SEGMENT 2: DANA FORK	
2a. Hydrologic	From its origin at the watershed divide near 13,000 feet in elevation through a glacially carved landscape containing unique kettle ponds, the headwaters along the upper Dana Fork provides exceptional water quality for the Tuolumne River. Exceptional water quality helps maintain the largely intact meadow/wetland

Table 3
Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River, by River Segment

Category	Outstandingly Remarkable Values
	complex at Dana Meadows.
2b. Geologic	This segment contains geologic features that provide dramatic evidence of glaciation, such as glacial erratics, glacial polish, moraines (e.g., Little Blue Slide), and examples of roches moutonnées (e.g., Puppy and Kitty Domes).
2c. Biologic	Alpine and subalpine habitat in this segment, characterized by high plant diversity, is important for migratory bird populations and special-status species (e.g., mountain yellow-legged frog, Yosemite toad, Mount Lyell salamander, several bat species, snow willow, and slender lupine). Highly diverse meadow and riparian willow communities (e.g., Dana Meadows) are especially important foraging areas for special-status bat species.
2d. Prehistoric and American Indian Cultural	Concentrations of pre-contact archeological sites along the Dana Fork date back at least 6,000 years and provide evidence of continuous human use and possible environmental change in the region. Materials and culturally important landscape features found along this stretch of river include structural remains, sites associated with food and medicine procurement and processing, intact volcanic ash deposits, traditional campsites, ceremonial sites, and trade and travel routes. American Indian traditions are maintained by an annual ceremonial walk and sharing of oral history along this segment of the river.
2e. Historic	Historic landscape features and structures attest to the status of the Dana Fork as a regionally important trade and travel route between the eastern and western Sierra. Specific sites that are either eligible or potentially eligible for listing on the National Register of Historic Places include camps and other material culture indicative of early sheepherding, U.S. Cavalry patrol routes, early scientific studies, and high-elevation recreation (such as the Tuolumne Meadows High Sierra Camp).
2f. Scenic	Dramatic views from the Dana Fork encompass glacially carved mountains and ridgelines, alpine and subalpine meadows, and expansive skies. Specific views from the bed and banks of the Dana Fork include the Kuna Crest, the Cathedral Range, Mount Dana, Mount Gibbs, and the meandering Dana Fork through Dana Meadows. The low-relief topography of the meadows allows for magnificent skyward views, including some of the darkest night skies in the Sierra Nevada. Ephemeral wildflower displays and weather phenomena enhance these impressive views.
2g. Recreational	The Dana Fork is exceptionally attractive to a broad spectrum of visitors who find outstanding opportunities for high-elevation experiences, ranging from backcountry recreation to rustic lodging and high-country touring.
SEGMENT 3: TUOLUMNE MEADOWS	
3a. Hydrologic	Basins of alluvial fill, perennially high groundwater conditions, seasonal flooding, and active channel migration combine to sustain one of the largest subalpine meadow/wetland complexes in the Sierra Nevada at Tuolumne Meadows. This segment also contains a classic and well-known example of an alkaline spring at Soda Springs.
3b. Geologic	This segment contains exceptionally well-preserved geologic features, such as glacial striations and erratics, that provide dramatic evidence of glaciation and the convergence of several large glaciers during the last major glacial period. This convergence resulted in the basin that is now Tuolumne Meadows. Notably, this area contains some of the best examples of glacial polish in the United States.
3c. Biologic	Tuolumne Meadows represents some of the most extensive subalpine meadow and riparian habitat in the Sierra Nevada. This meadow/wetland complex provides habitat for a diversity of plant and animal species, including special-status species (e.g., slender lupine, Yosemite bulrush, Yosemite toad, and several species of bats) and migratory bird populations. In addition, Soda Springs supports localized populations of special-status plant species (e.g., Buxbaum's sedge and marsh arrow-grass).
3d. Prehistoric and American Indian Cultural	This river segment is flanked by concentrations of pre-contact archeological sites containing materials that are uncommon in the region, as well as prehistoric resources that are important for maintaining cultural traditions among groups of American Indian people affiliated with the Tuolumne River. Materials and culturally important landscape features in the Tuolumne Meadows Archeological District include hearth features, structural remains, bedrock mortars, intact volcanic ash deposits, traditional campsites, ceremonial sites, and a sacred water source. American Indian traditions of trans-Sierra trade and travel are maintained by an annual ceremonial walk and sharing of oral history along this segment of the river.

Table 3 Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River, by River Segment	
Category	Outstandingly Remarkable Values
3e. Historic	Historic sites along this segment of the river commemorate the significance of Tuolumne Meadows as a place inspiring conservation activism on a national scale. Specific sites that are either eligible or potentially eligible for listing on the National Register of Historic Places include Parsons Memorial Lodge (a National Historic Landmark) and the Soda Springs Enclosure, where significant gatherings influenced the creation of Yosemite National Park, early conservation activism, and national environmental legislation.
3f. Scenic	Tuolumne Meadows offers breathtaking views of the large, low-lying river valley, adjacent meadows, glacially carved domes, rugged mountain peaks, and expansive skies. Specific views from the bed and banks of the river include the Cathedral Range, Lembert, Pothole, and Fairview Domes, Kuna Crest, Mount Dana, Mount Gibbs, Juniper Ridge, and the river meandering through subalpine meadows. The low-relief topography of the meadows allows for magnificent skyward views, including some of the darkest night skies in the Sierra Nevada. Ephemeral wildflower displays, congregations of wildlife, and weather phenomena enhance these vistas.
3g. Recreational	The natural sights, sounds, and other sensations particular to the river and adjacent open meadows are exceptionally attractive to visitors, who find outstanding opportunities for a wide range of recreational activities. Tuolumne Meadows provides easily accessible recreational opportunities for people of all ages and abilities, and many individuals, families, and groups establish traditional ties with the area. The National Park Service and other organizations depend on the river and adjacent meadows as a centerpiece of nature interpretation and education in the Sierra Nevada. The Pacific Crest Trail, one of eight National Scenic Trails, follows the river corridor in this segment.
SEGMENT 4: TUOLUMNE MEADOWS TO HETCH HETCHY RESERVOIR	
4a. Hydrologic	An unusually long stretch of classic stairstep river morphology exists along this segment of the river, resulting in many spectacular cascades and waterfalls that surpass those of any other canyon in the Sierra Nevada. Specific features include Waterwheel, Tuolumne, California, and LeConte Falls and White Cascades.
4b. Geologic	This segment contains exceptionally well-preserved dramatic evidence of glaciation, such as stairstep river morphology, glacial striations and polish, a deep glaciated canyon, and hanging valleys. Notably, this segment contains some of the best examples of glacial polish in the United States.
4c. Biologic	As the river descends in elevation, it passes through a variety of intact river-dependent habitat types, such as meadows, pools, riffles, and steep cliffs, that support a diverse assemblage of species. In particular, special-status bird and bat species (e.g., black swift, spotted and northern mastiff bats) occur along this segment.
4d. Prehistoric and American Indian Cultural	This river segment contains concentrations of pre-contact archeological sites containing materials that are uncommon in the region, as well as prehistoric resources that are important for maintaining cultural traditions among groups of American Indian people affiliated with the Tuolumne River. Archeological sites contain distinct evidence of trade and travel routes, tool caching, food and medicine procurement and processing, and related settlement.
4e. Historic	Historic landscape features and structures along the river below Tuolumne Meadows represent the development of a distinctive kind of high-country touring that remains unique within the National Park System. In addition, this segment of the corridor contains some of the finest examples of historic trail stonework in the nation.
4f. Scenic	Spectacular views within the Grand Canyon of the Tuolumne include steep canyon walls, hanging valleys, and cascades of falling water. Visitors who travel the canyon are rewarded with dramatic views of rare water features, including Waterwheel, Tuolumne, California, and LeConte Falls and White Cascades.
4g. Recreational	An exceptional variety of recreational opportunities along this stretch of river ranges from rustic lodging and high-country touring to backcountry excursions in a deep, rugged, and seldom-traveled gorge dominated by the dramatic sounds of continuous cascades and rapids. The Pacific Crest Trail, one of eight National Scenic Trails, follows the river at the eastern end of this segment.
SEGMENT 5: BELOW HETCH HETCHY RESERVOIR TO DESIGNATED WILDERNESS BOUNDARY	
5a. Prehistoric and American Indian Cultural	Pre-contact archeological sites represent possible year-round use by groups of American Indian people and are contributing features to the Hetch Hetchy Archeological District. Prehistoric resources important to the oral traditional history of American Indian people affiliated with the Tuolumne River are also contained

Table 3**Outstandingly Remarkable Values of the Tuolumne Wild and Scenic River, by River Segment**

Category	Outstandingly Remarkable Values
	within this segment.
5b. Historic	Historic landscape features and structures provide evidence of early Euro-American settlement. Specific sites that are either eligible or potentially eligible for listing on the National Register of Historic Places include the Screech Trail and cabin ruins.
SEGMENT 6: DESIGNATED WILDERNESS BOUNDARY TO WESTERN PARK BOUNDARY	
6a. Hydrologic	A transition zone from a glacially carved U-shaped valley to a river-incised V-shaped canyon contributes to seasonal flooding and the maintenance of an unusual diversity of riparian habitats at Poopenaut Valley, one of the few undeveloped low-elevation meadow/wetland complexes in the region.
6b. Geologic	This segment of the river represents the lowest-elevation evidence of glaciation found anywhere in the western Sierra.
6c. Biologic	This segment contains remarkably undeveloped low-elevation riparian and meadow communities, which provide habitat for a diversity of species. Low-elevation meadow/wetland complexes that have not been heavily impacted by settlement are uncommon in the Sierra Nevada. The riparian communities at Poopenaut Valley, including stands of tule bulrush, willow and woodland habitats, unusual hanging ponds, and seasonal pools, support an exceptionally diverse assemblage of bird species and several special-status bat species.
6d. Prehistoric and American Indian Cultural	Pre-contact archeological sites occur along this segment of the river in the larger, low-elevation flats, particularly Poopenaut Valley. These sites represent possible year-round use by groups of American Indian people. Prehistoric resources important to the oral traditional history of American Indian people affiliated with the Tuolumne River are contained within this segment.
6e. Historic	Historic landscape features and structures provide evidence of early Euro-American settlement. Specific sites that are either eligible or potentially eligible for listing on the National Register of Historic Places include cabin ruins.
6f. Scenic	This segment offers stunning views of verdant meadows, a glacially carved bedrock valley, large river pools, dramatic canyon walls, and a constricted slot canyon below Poopenaut Valley.
6g. Recreational	This segment provides outstanding recreational opportunities in a largely undisturbed, low-elevation riparian environment dominated by natural scenery and soundscapes. The recreational opportunities along this segment of river are unique due to the relative rarity of low-elevation designated Wilderness elsewhere in the Sierra Nevada.

Other Important Values Captured for Further Consideration

Some values identified during internal scoping were determined not to meet the ORV criteria. Although they are not identified as outstandingly remarkable values of the river, these values will be carried forward for consideration during subsequent steps of the river management planning process. These values include, but are not limited to, the following:

Air quality: Air quality was considered not to be a river-related value. Therefore, it does not fulfill the criteria for Wild and Scenic River ORVs. Although it is not an outstandingly remarkable value of the Tuolumne River, air quality will be considered during the development of the Tuolumne River Plan and future planning efforts in the river corridor.

Fire processes: Fire processes were determined not to be a river-related value. The role of fire in the park is addressed in other management efforts, such as the Fire Management Plan and Wilderness Management Plan.

Hydrologic features: Based on guidance from the Interagency Council, hydrologic ORVs do not include features that are common to other rivers in the Sierra Nevada and therefore not unique, rare, or exemplary. Examples include bedrock spurs and cutoff channels. Although not considered to be outstandingly remarkable hydrologic features, they may be contributing elements to scenic, recreational, or biologic values.

Geologic features: Based on guidance from the Interagency Council, determinations of geologic ORVs exclude those features that are wholly outside the river corridor boundary and therefore not river related. Although they are not river-related geologic values, such features may be river-related scenic values, if they are visible from the bed and banks of the river.

Historic and prehistoric resources: Evidence of some historic uses in the river corridor, such as mining-related activities, was considered not to be river related or not to be regionally unique, rare, or exemplary. Likewise, prehistoric resources located in the river corridor were identified as outstandingly remarkable only if they were river related and significant on a regional or national scale. Regardless of their ORV status, all prehistoric and historic resources in the corridor remain protected under the National Historic Preservation Act and the Archeological Resources Protection Act.

Specific recreational activities: Specific recreational activities (sightseeing, wildlife observation, camping, photography, hiking, fishing, etc.) were generally not included in the descriptions of the recreational ORVs. Rather, the outstandingly remarkable values describe the overall character of the recreational opportunities available within the corridor (e.g., “primitive, unconfined recreation in a landscape dominated by natural scenery and soundscapes” or “an exceptional variety of opportunities ranging from rustic lodging to backcountry excursions”).

Specific scientific values and research potential: The entire river corridor is a highly significant scientific resource for important research across multiple disciplines. This value is captured in the description of the corridorwide scientific ORV. Specific research opportunities were not tied to particular areas because that was considered to be too restrictive given the vast research potential within the corridor.

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Appendix: Outstandingly Remarkable Values Identified in the 1979 Tuolumne Final Study

The 1979 Tuolumne Final Study evaluated the segments of the river administered by Yosemite National Park and Stanislaus National Forest and identified nine ORVs for the river. Four study segments of the river fall within Yosemite National Park. The ORVs and the study segments within Yosemite National Park are shown in table A-1.

Table A- 1
Tuolumne River Outstandingly Remarkable Values from the 1979 Tuolumne Final Study (USDA and USDI, 1979)

Outstandingly Remarkable Values	Segment 1: Dana Fork, source to Tuolumne Meadows	Segment 2: Lyell Fork, source to Tuolumne Meadows	Segment 3: Tuolumne Meadows to Hetch Hetchy (max. pool)	Segment 5: O'Shaughnessy Dam to Early Intake
Scenic	Yes	Yes	Yes	Yes
Recreation	Yes	Yes	Yes	Yes
Geologic	Yes	Yes	Yes	Yes
Fishery	No	No	Yes	No
Wildlife	Yes	Yes	Yes	Yes
Historic/Cultural	Yes	Yes	Yes	Yes
Whitewater Boating	No	No	No	No
Scientific/Educational	Yes	Yes	Yes	Yes
Wilderness Characteristics	No	Yes	Yes	No

Segment 4 was Hetch Hetchy Reservoir, which was not included in the Wild and Scenic River legislation.



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