APPENDIX D

DRAFT FLOODPLAIN STATEMENT OF FINDINGS

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FLOODPLAIN STATEMENT OF FINDINGS FOR THE MERCED WILD AND SCENIC RIVER COMPREHENSIVE MANAGEMENT PLAN/DEIS

This Floodplain Statement of Findings is included in this document for public review to meet the obligations of Executive Order 11988 (*Floodplain Management*), Director's Order #77-2: Floodplain Management (2003), and the NPS Procedural Manual 77-2: Floodplain Management (update 2004).

INTRODUCTION

The National Park Service (NPS) has prepared the *Merced Wild and Scenic River Comprehensive Management Plan Draft Environmental Impact Statement (Merced River Plan /DEIS)* to provide direction and propose specific actions to protect and enhance ecological and natural resource values of the Merced Wild and Scenic River, support opportunities for visitors to experience and develop direct connections to the Merced River, institute a visitor-use management program, and provide clear direction on land uses and associated developments in the river corridor. It is based on the broad goals of the 1980 *General Management Plan* for Yosemite National Park.

The purpose of this Floodplain Statement of Findings is to review the *Merced River Plan/DEIS* in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the proposed action (without mitigation)
- Provide an analysis of the comparative flood risk among alternatives
- Describe the effects on floodplain values associated with the proposed action
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 *(Floodplain Management),* Director's Order 77-2, and Procedural Manual 77-2: Floodplain Management

Floodplains and Floodplain Extent

Flood hazard areas regulated by the NPS include the 100-year floodplain (1% annual chance of inundation), the 500-year floodplain (0.2% chance of annual inundation, and the Extreme Floodplain (largest magnitude flood possible at a site). According to the NPS Director's Order 77-2 ("Floodplain Management"), for any proposed action that is found to be in the applicable regulatory floodplain, the NPS must prepare a floodplain assessment, known as a Statement of Findings, in accordance with NPS Procedural Manual 77-2: Floodplain Management.

The best available data were used to determine the extent of existing floodplain boundaries and water surface characteristics of the Merced River, as documented in the DEIS. Floodplains have not been defined within the Merced River above Nevada Fall (including Little Yosemite Valley), nor within the Merced Gorge.

GENERAL CHARACTERISTICS OF FLOODING IN THE AREA

Flooding along the Merced River can be generally categorized as one of two general types: (1) *spring floods* include flooding that occurs as a result of spring and summer snowmelt and associated runoff; (2) W*inter floods* or *rain on snow events* include those that occur during the late fall and winter (September through April), primarily as a result of intense rainfall or rainfall on snow. From 1916 through 1989, 124 of 140 recorded high flows on the Merced River in Yosemite Valley were spring floods that occurred in response to spring or early summer snowmelt conditions (NPS 1991). Only about 10% of total floods in the park are winter floods or rain on snow events. However, these events are responsible for the highest floods recorded, especially where warm heavy rains fall on snow in higher elevations. Frazil ice, while less common, is another cause of flooding within the park. Frazil ice occurs within waterfalls, and is generated by ice crystals at the base of a waterfall when air temperature drops to below freezing. Frazil ice can be many feet thick, which can cause localized impoundments and other flooding.

At the beginning of the wet season, the ground is extremely dry, and about 3 to 5 inches of precipitation is required to satisfy the retention storage capacity of the soil before any significant runoff occurs. Later in the season, when the ground may be very wet and there may be a moderate snow cover at the higher elevations, heavy rainfall over the basin can cause large flood runoff. An intense storm with a high freezing level may also result in flood runoff from almost the entire basin, with as much as 2 inches of snowmelt augmenting the rainfall, based on historic measurements. Most of the runoff from the Merced River basin occurs from November through July (Madej et al. 1994).

Well-functioning floodplains can potentially provide an array of natural resource values within the Park, including habitat for vegetation and wildlife, periodic disturbance to habitats within floodplains (which can support ecological value and spatial diversity in habitat), dissipation of flood energy by allowing flood waters to spread across a floodplain area, benefits to waterway hydrologic processes including fluvial transport mechanisms and river geomorphic processes, and groundwater recharge in areas where soils are sufficiently pervious. Key floodplains in the study area include the broad floodplains of Yosemite Valley, Little Yosemite Valley, El Portal, and Wawona.

The discussion of flooding along the Merced River is divided among the following segments:

Merced River above Nevada Fall

The Merced River's floodplains in remote areas above Nevada Fall have not been defined. Steep topography limits the floodplain in the upper canyon areas. High-elevation tributaries (e.g., Merced Peak Fork and Triple Peak Fork) are sparsely vegetated with scattered patches of alpine riparian scrub and alpine willow thickets. Within Little Yosemite Valley, the floodplain likely encompasses most of

the valley floor; however, the 100-year floodplain has not been mapped. Here, the river meanders across its floodplain, creating oxbow lakes and meander cutoffs. As the river descends and the gradient becomes gentler, lodgepole pines, aspens (Populus tremuloides), willows (Salix spp.), and alders (Alnus spp.) become more prevalent. Willows often colonize where point bars form (at the margins of, or within, the river channel). Riparian species often intergrade with coniferous forest at or near the river's upper banks (NPS 1997a; Sawyer et al. 2009).

Although 100-year floodplains have not been mapped in this area, it is assumed that the Merced Lake High Sierra Camp is located within the existing floodplain.

Yosemite Valley

Yosemite Valley has a well-developed, relatively wide floodplain that is confined by steep valley walls. The Merced River in Yosemite Valley has a relatively mild slope, with an average of 0.1%. In the middle reach of the river in Yosemite Valley, downstream of Clark's Bridge to the El Capitan moraine, the river flows through a shallow channel approximately 100 to 300 feet wide.

Riparian zones in Yosemite Valley are characterized by broadleaf deciduous trees, such as white alder (*Alnus rhombifolia)*, black cottonwood (*Populus trichocarpa*), big-leaf maple *(Acer macrophyllum)*, white fir, and willow species. Riparian areas within the valley are rich in species diversity and structure. Riparian vegetation is regularly disturbed by the deposition and removal of soil and the force of floodwaters. Plants in this zone colonize newly formed river-edge deposits readily. The distribution of riparian communities varies with soil saturation and frequency of disturbance. For example, big-leaf maple riparian forests grow on moist gravelly soils in protected spots on alluvial soils bordering streams, whereas sandbar willow woodlands occur on point and mid-channel bars that are washed over annually by spring floods (NPS 1994). In Yosemite Valley, the character of the floodplain varies in different locations due to local hydraulic controls. From Clark's Bridge to Housekeeping Camp in the east Valley, the river floods areas outside the main channel with shallow swift flows that cut across meander bends. Near Yosemite Lodge and downstream to the El Capitan moraine, flood waters back up against the dense vegetation and tend to be deep, low velocity, and low energy. From the El Capitan moraine downstream, the river channel is steeper and confined in the narrow river canyon, the floodplain is narrow, and flow velocities are high.

In 1879, large boulders were blasted to deepen and widen the river gap through the El Capitan moraine, which lowered the base level of the Merced River by 4 to 5 feet (Milestone 1978). As a result, the extent and frequency of flooding in the upstream meadows was reduced, possibly leading to drier conditions and the loss of historic wetlands.

Regular flooding and subsequent deposition of alluvial sediments have been instrumental in the formation of Yosemite Valley. Flooding continues to support a variety of natural processes in the valley, such as deposition of flood-borne sediment; channel avulsion (i.e., abandonment of an old river channel and the creation of a new one); and the development of complex channel patterns and valuable riparian and wetland habitat. The largest document events occurred in 1937, 1950, 1955, and 1997, with peak discharges measured in the range of 22,000 to 25,000 cubic feet per second at Pohono

Bridge. These floods were the result of rain-on-snow events. Several large undocumented events also occurred during the 1860s and 1870s.

The January 1997 flood was the largest recorded flood within the park with a peak discharge of 10,000 cubic feet per second at Happy Isles and 25,000 cubic feet per second at Pohono Bridge (Eagan 1998). The flood inundated roads, picnic areas, park offices, and lodging units. It caused extensive damage to NPS facilities, including roads, bridges, buildings, and Yosemite Valley's electric, water, and sewer systems. The flood also altered natural features and caused downed trees, movement of landslide talus into streams, channel erosion, and substantial changes in channel morphology (NPS 1997b). This flood was estimated to have a recurrence interval of 90 years (NPS 1997b), or about a 1.1% chance of occurring in any given year.

The deposition and removal of soil and the force of flood waters in Segment 2 regularly disturb riparian vegetation. The park has historically cleared large wood from the Merced River to improve flow (to reduce flooding hazard), prevent bank erosion that might compromise park infrastructure, for visitor safety, to remove hazards to commercial rafting, and for aesthetic reasons. Since 1993, it has been park policy to allow large wood in the Merced River to remain, sometimes with some manipulation in its placement, unless it causes a serious safety concern or threatens infrastructure.

Facilities located within the 100-year floodplain within this segment include (generally moving from east to west) portions of the Upper Pines Campground area including a recreational vehicle dump station, a portion of Lower Pines Campground including four restrooms, most of North Pines campground including four restrooms and a lift station, a portion of Backpackers Campground, and most of the Concessioner Stable and the 18 associated housing units and community kitchen. Additionally, most of the Housekeeping Camp area including lodging units, showerhouses and restrooms, and other structures, the Lower River Amphitheatre, and the Yosemite Village Day-use Parking Area are located in the 100-year floodplain. The Lower Tecoya Dormitories A, B, C, D, E, F and the Laundry Building, in addition to two Concessioner apartment buildings and associated garages and sheds, eight single-family residences, the Concessioner General Office, the Concessioner Garage, the Concessioner Valley Fire House, Lost and Found, security buildings are all in the 100-year floodplain. In the vicinity of the Yosemite Lodge area, structures within the 100-year floodplain include Superintendent's House (Residence 1) and garage, theYosemite Creek sewage lift station, groundwater wells near Yosemite Creek, and four lodging buildings at the Yosemite Lodge in addition to three housing buildings near Yosemite Lodge (Thousands Cabins), In the West Valley, the Swinging Bridge Picnic Area, the Sentinel Beach Picnic Area, the Yellow Pine Administrative Campground, the Cathedral Beach Picnic Area, and the gauging station near Pohono Bridge are in the 100-year floodplain.

Over the past two decades, the National Park Service has implemented numerous efforts to restore the underlying natural processes that sustain Yosemite Valley riparian habitats. These efforts include, invasive plant eradication, fencing off sensitive areas, and increasing inundation levels through restoration of natural drainage patterns. A more detailed description of past and present restoration projects is included in the *Merced River and Riparian Vegetation Assessment* (Cardno ENTRIX 2011) and the *Assessment of Meadows in the Merced River Corrido*r (Ballenger et al. 2011). These efforts have been successful in improving the overall condition of riparian areas throughout Yosemite Valley.

However, these reports also identify a number of persisting stressors on the Valley's riparian ecosystems, such as roads, parking areas, structures, campgrounds, and informal trails.

Merced River Gorge and El Portal Watershed

From the location of the former Cascades Diversion Dam downstream to the El Portal Administrative Site, the river channel is steep and confined to a narrow river gorge. In this area, the floodplain is narrow and flow velocities are very high. The Merced River Gorge is a unique display of lower elevation habitat. It is lined with a narrow band of riparian vegetation along the river, bordered by a dense mosaic of chaparral and foothill woodland communities (chaparral/oak woodland zone) on the steep canyon walls.

The Merced River channel in El Portal can shift during large floods, including movement of large boulders that define the channel. One hundred-year discharge of the Merced River in El Portal is estimated to be 32,800 cubic feet per second (PBS&J 2011). Flooding has been an important aspect of the development of riparian communities along the Merced River and its tributaries that intersect drier adjacent vegetation types of El Portal. Within this area, El Portal Road and small levees alter the floodplain by restricting flow during flood events and forming a barrier to channel migration. Facilities located within the 100-year floodplain within this segment include temporary El Portal Special Park Uses Trailers, the embankment/levee between El Portal Market and gas station and the river, Odger's Fuel Storage Facility, the AT&T building, a water valve station, NatureBridge office and employee housing building, the old Wastewater Treatment Plant, portions of Abbieville/Trailer Village employee housing area, and the administrative parking area between Foresta Road and the Merced River at the National Park Service's Warehouse and Administrative Complex. As with certain points within Yosemite Valley, this infrastructure has impacted floodplain habitats.

In the El Portal area, riparian communities occur along tributaries of the Merced River, on flat topographical shaded terraces above the river, in backwater channels, and in areas where runoff from upland sites collects in natural depressions. Native Oregon ash (*Fraximus latifolia*) trees occur in the wetter areas, as well as orchard components in some locations. Foothill pines and valley oaks tend to dominate the drier terraces adjacent to riparian sites.

South Fork Merced River

The floodplain in Wawona along the South Fork is an elongated alluvial valley. In this area, the river meanders through a large floodplain meadow, and the channel can shift laterally during large floods. Upstream of the Big Creek confluence, the average annual flow was 174 cubic feet per second between 1958 and 1968, as measured at the Wawona gauging station, with an estimated maximum flow of 15,000 cubic feet per second in December 1955. The 100-year discharge of the South Fork Merced River is estimated to be 19,700 cubic feet per second (PBS&J 2011).

In the portions where the gradient is gentlest, riparian vegetation (willows and alders) becomes more prevalent. Willows often colonize sandbars that are deposited at the margins of or within the river channel. In this area, the riparian corridor resembles the riparian corridor seen along the Merced

River as it flows through Yosemite Valley. Also found in this area is Sierra sweet bay (*Myrica hartwegii*), a shrub endemic to the Sierra Nevada. In Yosemite National Park, Sierra sweet bay is found at the average high water line of the South Fork Merced River downstream from Wawona and along Big Creek (NPS 2012). The NPS (2002) considers Sierra sweet bay a sensitive species, and the California Native Plant Society (CNPS Rank 4.3) identifies the plant as being of limited distribution.

Facilities located within the 100-year floodplain within this segment include portions of the Pioneer Yosemite History Center, the Wawona Covered Bridge, South Fork Wawona Picnic Area, a portion of the Wawona Campground, the Yosemite Transportation Company office, utility buildings, the Ranger Station, and a bakery building. As with certain points within Yosemite Valley, this infrastructure has impacted floodplain habitats. In addition, trampling of riparian vegetation and associated erosion also occurs in this area, resulting from use in the vicinity of the Wawona Store and Gas Station area and the Wawona Campground.

PREFERRED ALTERNATIVE

The *Merced River Plan/DEIS* includes an evaluation of six alternatives including five action alternatives, each of which would implement a series of management actions within the Merced Wild and Scenic River corridor. Each action alternative addresses issues relevant to protection and enhancement of river values, user capacity management, and land use and facilities. Alternative 5: *Enhanced Visitor Experience and Essential Riverbank Restoration* has been identified as the Preferred Alternative. This alternative is characterized by restoring riparian areas within 100 feet of the ordinary high water mark. To address free-flowing conditions, Alternative 5 includes the removal of Sugar Pine Bridge and reestablishing channel complexity in East Yosemite Valley. Alternative 5 includes restoration of 203 acres within the river corridor, including removing existing campsites within 100-feet of the ordinary highwater mark, Housekeeping Camp lodging units within the ordinary high water mark, informal trails in meadows and wetland areas, and roadside parking adjacent to meadows. In terms of recreation, limited private boating would be allowed by permit on river stretches within all segments. Under Alternative 5, peak daily visitation within Yosemite Valley would be slightly reduced (19,900) as compared to peak visitation at present (20,900). Additional temporary and overflow parking areas would be located in West Yosemite Valley and at Abbieville/Trailer Village in El Portal to alleviate traffic congestion on busy peak summer days. The shuttle system would be expanded to serve these new locations.

Existing Structures in the Floodplain

The NPS Director's Order 77-2 and Procedural Manual 77-2 consider the evaluation of actions that may be grouped into the following three categories:

- Class I Actions – include administrative, residential, warehouse and maintenance buildings, and nonexempted (overnight) parking lots

- Class II Actions – those that would create “an added disastrous dimension to the flood event.” Class II actions include schools, clinics, emergency services, fuel storage facilities, large sewage treatment plants, and structures such as museums that store irreplaceable records and artifacts.

- Class III Actions – Class I or Class II Actions that are located in high hazard areas such as those subject to flash flooding.

The regulatory floodplain for Class I actions is the 100-year floodplain. The following existing structures in the study area's regulatory floodplain constitute Class I Actions:

- Housekeeping Camp; Backpackers, Lower Pines, and North Pines campgrounds; portions of Ahwahnee Row and Tecoya housing area, the Concessioner General Office and Garage, select Yosemite Lodge buildings, and associated infrastructure.

The following existing structures located in the study area's regulatory floodplain constitute Class II Actions:

- Odger's Fuel Storage Facility (main tanks are outside of the 500-year floodplain, other facilities with less than 40,000 gallon per day capacity are located within the 500-year floodplain), El Portal Gas Station, and the El Portal Wastewater Treatment Plant (500-year floodplain).

There are no Class III actions in the study area.

Proposed Actions

Under the Preferred Alternative, the following actions would be located within floodplains and would either have a net beneficial impact on floodplains, or would not affect floodplain function. Therefore, the following actions are not discussed further within this document:

- Removal of conifer seedlings and saplings from meadows
- Reinstitution of low intensity/high frequency fire as an ecological process
- Installation of logjams and large wood management
- Placement of large wood (including large trees with root wads) between Ahwahnee and Stoneman bridges which would increase roughness in the river as well as channel complexity
- Establishing a riparian buffer that includes a restriction on new development or redevelopment of existing facilities within 150 feet of the ordinary high water mark
- Meadow restoration at Ahwahnee, El Capitan, Leidig, Cooks, Slaughterhouse, Bridalveil, and Stoneman meadows

Under the Preferred Alternative, the following facilities would be removed from the floodplain. Removal of these existing structures from the floodplain represents a net beneficial impact. Therefore, removal of these facilities is not discussed further within this document:

- Concessioner General Office and Concessioner Garage
- 34 units from within the observed ordinary high water mark at Housekeeping Camp

- Abandoned infrastructure such as remnant pavement associated with the former Upper and Lower River Campgrounds
- Campsites within 100' of the ordinary high water mark at Backpacker's Camp, Lower Pines, and North Pines Campgrounds
- Sugar Pine Bridge and the associated road berm
- Imported rock/concrete/asphalt/soil at Greenemeyer sandpit
- Housing units at the Yosemite Lodge
- Odger's Fuel Storage Facility. This facility is presently in use and provides important storage and distribution capacity for fuel within the area. The existing tanks are located outside of the floodplain, while remaining facilities are located within the 500-year floodplain. The facility would be removed from the floodplain.
- Old Wastewater Treatment Plant in El Portal

Under the Preferred Alternative, the following facilities would remain or could be placed in the floodplain. Rational for leaving these facilities within the floodplain, associated risk, and proposed mitigation or management strategies for these facilities are discussed subsequently:

- Merced River above Nevada Fall:
  - Merced Lake High Sierra Camp
- Yosemite Valley:
  - Ahwahnee Row Houses
  - Tecoya Dorms and other Concessioner Housing in the vicinity of Indian Creek (apartments and single-family residences)
  - Yosemite Lodge area facilities including overnight units and associated parking, laundry building, lost and found, the security building, and the Concessioner Valley Fire House, the Superintendent's House, Yosemite Creek Sewage Lift Station, groundwater wells near Yosemite Creek, four lodging buildings at Yosemite Lodge, in addition to three housing buildings near Yosemite Lodge (Thousand Cabins)
  - Housekeeping Camp, with232 units, shower houses, restrooms, and laundry facilities Yosemite Valley Campgrounds including North Pines, Backpackers, portions of Lower Pines, Upper Pines, and Yellow Pines Administrative Campgrounds, plus new camping facilities (30 walk-in camp sites) at Upper River Campgrounds and near Upper Pines Campground
  - Concessioner Stable
  - Yosemite Village Day-Use Parking Area and Rerouting of Northside Drive to south of the Yosemite Village Day-Use Parking Area
  - Lower River Amphitheater
  - West Valley picnic areas

  - Guaging Station near Pohono Bridge

- Merced River Gorge and El Portal:
  - Facilities near Old El Portal including the AT&T Building, NatureBridge office and employee housing, and a water valve station
  - El Portal Market building
  - El Portal gas station
  - Administrative parking area between Foresta Road and the Merced River at the National Park Service's Warehouse and Administrative Complex
  - Temporary El Portal Special Park Uses Trailers
  - Embankment/levee between El Portal Market and gas station and the river
  - Portions of Abbieville/Trailer Village employee housing area
- South Fork Merced River:
  - Yosemite transportation Company office
  - Historic facilities including the Wawona Covered Bridge and portions of the Pioneer Yosemite History Center
  - Utility buildings
  - Ranger Station
  - Bakery building
  - Portions of the Wawona Campground and the South Fork Wawona Picnic Area

RATIONALE FOR CONTINUED USE OF THE FLOODPLAIN

To the extent practicable and appropriate, the Preferred Alternative includes the removal of existing facilities to outside of the 100-year floodplain, and does not propose to place new facilities in the floodplain that would interfere with floodplain function or that would cause or exacerbate flood related hazards. However, NPS was not able to develop a feasible alternative that involved removal of all existing facilities from the 100-year floodplain. Key constraints that prevent the removal of additional facilities from the 100-year floodplain center on a lack of available land area that is not located in a floodplain or rockfall hazard zone. The following provides additional information and details regarding existing development that would remain in the floodplain with implementation of the Preferred Alternative.

Existing and Proposed Development that would Remain or be Located in the Floodplain in the Preferred Alternative

Merced River above Nevada Fall

High Sierra Camp Reduction to 11 Units. Removal of existing facilities would result in a net benefit to floodplains, and beneficial effects are not discussed further. Remaining facilities (11 units) are presumed to be located within the 100-year floodplain based on their proximity to the river, although floodplains have not been delineated. The remaining facilities would not be removed because they provide a unique experience to visitors within the area.

Yosemite Valley

Ahwahnee Row Houses. These houses would not be removed because they are important contributing elements to the Yosemite Valley cultural landscape, are contributors to the Yosemite Village Historic District, and their removal or demolition would result in an adverse effect on this historic resource. Therefore, these facilities would not be removed.

Tecoya Dorms and Other Concessioner Housing in the Vicinity of Indian Creek (apartments and single-family residences). The Tecoya dorms are a part of the National Register listed Yosemite Valley Historic District, and their removal or demolition, as well as that of concessioner housing, would result in an adverse effect to this historic resource. Therefore, these facilities would not be removed.

Yosemite Lodge Area Facilities (overnight units, parking, laundry building, lost and found, security building, Concessioner Valley Fire House, Superintendent's House, Yosemite Creek Sewage Lift Station, groundwater wells near Yosemite Creek, four lodging buildings at Yosemite Lodge, three housing buildings near Yosemite Lodge (Thousand Cabins)). These buildings facilities within the Yosemite Lodge complex and the day use parking lot are located within the 100-year floodplain. These would not be removed under the Preferred Alternative. Existing facilities that are located within the floodplain are adjacent to areas that are above or outside of the floodplain, including most of the Yosemite Lodge complex. These facilities are important contributing elements to the Yosemite Valley cultural landscape, provide unique experience and access for visitors, provide lodging and/or critical facilities services to the area, and therefore would not be removed.

Housekeeping Camp (232 units, shower houses, restrooms, laundry facilities). These units and facilities are available seasonally, and the area is closed for overnight use in the winter, when most high-flow winter flooding events have occurred. In the Preferred Alternative all but 34 units at Housekeeping Camp would remain in the floodplain along with other existing structures located on site, for a total of 232 units remaining. These facilities have a unique function within Yosemite Valley and provide a unique experience to visitors – opportunity for a rustic camping experience with "developed camping shelters" that eliminate the need to purchase a large amount of camping equipment. Also, these facilities would be closed during periods of high flood risk, and there would be sufficient time to evacuate visitors in the unlikely event that evacuation would be necessary. Therefore, these facilities would not be removed.

Yosemite Valley Campgrounds (North Pines, Backpackers, portions of Lower Pines, Upper Pines, and Yellow Pines Administrative Campground, plus new camping facilities (30 walk-in camp sites) at Upper River Campgrounds and near Upper Pines Campground). To preserve the floodplain values in areas close to the river while still preserving the unique visitor experiences afforded by these campgrounds, existing units within these campgrounds that are located within 100 feet of the high water mark would be removed. However, other existing campsites that are located within the larger floodplain area would not be removed, and new walk-in camping opportunities would be provided at Upper River Campground and near Upper Pines Campground. These campgrounds are/would be closed during the winter, when most high flow winter or rain-on-snow flooding events have historically occurred. There would be sufficient time to evacuate visitors in the unlikely event that evacuation would be necessary. These facilities provide or would provide unique visitor experiences and would be closed during periods of high risk. Therefore, they would not be removed.

Concessioner Stable. The concessioner stable supports commercial day rides along pack stock trails in the area, and also offer High Sierra Camp rides. Thus the Concessioner stable supports unique visitor experience including horseback access to the High Sierra Camp, as well as other portions of the park. During a potential flood event, the facility could be closed or readily evacuated in order to avoid potential hazards.

Yosemite Village Day-use Parking Area and Rerouting of Northside Drive. These facilities would continue to serve as the primary day-use parking area for Yosemite Valley and serves to access Yosemite Village, and Northside Drive would be rerouted to provide improved service to the area. Design measures for these facilities would be implemented to minimize potential effects on floodplains. Maintaining the parking lot and rerouting Northside Drive would preserve unique visitor experiences afforded by parking access and enhanced vehicle access to the area. Therefore, these facilities would not be removed.

Lower River Amphitheater. The Lower River Amphitheater supports unique visitor experience within the Yosemite Valley, ranging from children's theater opportunities to weekly religious services. The amphitheater includes bench seating and a limited stage area. Maintaining the facility would preserve these and other unique visitor experiences associated with the facility, and the facility could be evacuated quickly in the event of a potential flood event. Therefore, the amphitheater would not be removed.

West Valley Picnic Areas. Picnic areas in Yosemite Valley, including the western valley, including the Swinging Beach Picnic Area the Sentinel Beach Picnic Area, and the Cathedral Beach Picnic Area support visitor access to these areas, affording scenic views and encounter with these unique natural areas. These picnic areas present minimal obstruction to flood flows, and would either be closed during seasonal flooding periods, or could be easily evacuated in the event of a flood event. Therefore, these facilities would not be removed.

Guaging Station near Pohono Bridge. The existing gauging station supports measurement and monitoring of river levels in this area. Due to the nature of the facility, which collects data on river

stage, the facility must be located within the floodplain in order to collect the needed data. Therefore, this facility would not be removed.

Merced River Gorge and El Portal Watershed

Facilities near Old El Portal (AT&T Building, NatureBridge office and employee housing, water valve station). These facilities are presently in use. NatureBridge is an official park partner, and helps the NPS to achieve its mission, while AT&T provides communications support services. Additionally, the NatureBridge facility is on the list of classified structures and is an important cultural resource. The existing water valve station is critical to the function of existing infrastructure within the area. As an unmanned station, the facility does not represent a substantial risk to humans. The indicated buildings would continue to be utilized by employees, but could be easily and rapidly evacuated in the event of a potential flood. Therefore, these facilities would not be removed from the floodplain.

El Portal Market Building. This facility is presently in use and provide key services within the El Portal area. The facility would continue to be used by employees and visitors. However, because it is located in close proximity to the edge of the 100-year floodplain, it could be evacuated easily in the event of a potential flood. This facility would not be removed from the floodplain.

El Portal Gas Station. This facility is presently in use and provides important refueling capacity within the area, and support visitor use within the park and area. The facility would not be removed from the floodplain.

Administrative Parking Area (between Foresta Road and the Merced River at the National Park Service's Warehouse and Administrative Complex). This existing parking structure provides parking facilities in support of adjacent buildings and services, and is currently in use by the National Park Service. In the event of a potential flood, this area could be evacuated easily and rapidly. The facility would not be removed from the floodplain.

Temporary El Portal Special Park Uses Trailers. These facilities are considered temporary until uses can be redesignated to other areas or facilities. In the interim, the trailers remain in use and in support of Park services. In the event of a potential flood, the facilities could be easily evacuated. These facilities would not be removed from the floodplain.

Embankment/Levee between El Portal Market and Gas Station and the Merced River. This existing embankment provides partial control of high water flows in this area. While the facility does not effectively protect against 100-year flooding, it does provide some degree of protection during lesser potential flood events. The facility is unmanned. This facility provides critical support to adjacent infrastructure, and would not be removed.

Portions of the Abbieville/Trailer Village Employee Housing Area. The Abbieville/Trailer Village housing area is currently in use in support of staff. As noted, only portions of the area are located within the floodplain, and the margin of the floodplain is located in close proximity to these areas. Therefore, affected areas could be easily evacuated in the event of a potential flood. These facilities would not be removed.

South Fork Merced River

Yosemite Transportation Company Office. This facility is currently in use and supports operations and management of transportation services and transportation infrastructure within the Park. The facility is located in close proximity to the margin of the floodplain, and could be easily evacuated in the event of a potential flood. Therefore, the facility would not be removed from the floodplain.

Historic Facilities (Wawona Covered Bridge, portions of the Pioneer Yosemite History Center). These facilities would not be removed because they are important contributing elements to the Yosemite Valley cultural landscape. Their removal or demolition would result in an adverse effect on historic resources. Therefore, these facilities would not be removed.

Utility Buildings. The existing utility buildings are critical to the function of existing infrastructure within the area. Unmanned, potential flooding of the facilities does not represent a substantial risk to humans. Therefore, the facility would not be removed from the floodplain.

Ranger Station and Bakery Building. These facilities are currently in use and provide useful or required services within the area. They are located in relatively close proximity to the margin of the floodplain, and could be easily evacuated in the event of a potential flood. Therefore, these facilities would not be removed from the floodplain.

Wawona Campground and the South Fork Wawona Picnic Area. Portions of these areas are located within the floodplain. These facilities result in only minor to minimal interference with potential flood flows, are currently in use, could be easily evacuated or closed in the event of a potential flood, and afford unique camping and picnicking experiences in the Wawona area. These facilities would not be removed from the floodplain.

DESCRIPTION OF SITE-SPECIFIC FLOOD RISK

Merced River above Nevada Fall

Floods of consequence along the Merced River above Nevada Fall, including Little Yosemite Valley and the upper canyon, always occur with some warning, although flood conditions may occur more immediately than in the Yosemite Valley downstream. Risks to humans can typically be mitigated by warning and evacuation.

High Sierra Camp Reduction to 11 Units. Remaining units would presumably be subject to periodic inundation during 100-year flood events. During a major flood event, these units could become inundated with floodwaters. This could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans related to potential risk of inundation. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the camp facilities during intermittent flood events. Flooding of

sufficient depth could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Yosemite Valley

In Yosemite Valley, the character of flooding varies in different locations because of local hydraulic controls. From Clark's Bridge to Housekeeping Camp in the east Valley, the Merced River floods areas outside the main river channel with shallow, swift flows that cut across meander bends. Near Yosemite Lodge and downstream to the El Capitan moraine, flood waters back up against the moraine and dense vegetation. Flood waters in this area are of low velocity and significant depths. At Housekeeping Camp, velocities are relatively higher with lower depths.

The historic discharge in the river, measured at the Pohono Bridge gauging station, has ranged from a high of about 25,000 cubic feet per second to a low of less than 10 cubic feet per second. The mean daily discharge rate is about 600 cubic feet per second. The following discussion provides information about potential risks of continued floodplain use for each of the facilities that would remain within the floodplain.

Ahwahnee Row Houses. Flooding within Yosemite Valley including in the area of the Ahwahnee Row Houses requires a prolonged period of intense rain for at least 24 hours to create flood conditions. During a major flood event, the Ahwahnee Row Houses could become inundated with floodwaters. This could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans related to potential risk of inundation. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the row houses during intermittent flood events. Flooding of sufficient depth could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Tecoya Dorms and Other/Concessioner Housing in the Vicinity of Indian Creek (apartments and single-family residences). As discussed previously, flooding within Yosemite Valley including in this area requires a prolonged period of intense rain for at least 24 hours to create flood conditions. During a major flood event, these facilities could become inundated with floodwaters. This could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans related to potential risk of inundation. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the housing during intermittent flood events. Flooding of sufficient depth could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Yosemite Lodge Area Facilities (overnight units, parking, laundry building, lost and found, security building, Concessioner Valley Fire House, Superintendent's House, Yosemite Creek Sewage Lift Station, groundwater wells near Yosemite Creek, four lodging buildings at Yosemite Lodge, three housing buildings near Yosemite Lodge (Thousand Cabins)). As discussed previously, flooding within Yosemite Valley including in the area of Yosemite Lodge requires a prolonged period of intense rain for at least 24 hours to create flood conditions. Also, these existing facilities that are located within the floodplain are located close to the edge of the 100-year floodplain. Therefore, water depth during a 100-year flood event is expected to be relatively shallow. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans related to potential risk of inundation. However, given the nature of flooding in the Yosemite Valley, which has a relatively slow onset with sufficient time for warning and evacuation, it is anticipated that evacuation of these facilities could be completed easily. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Housekeeping Camp (232 units, shower houses, restrooms, laundry facilities). Facilities at housekeeping camp are available seasonally, and are closed for overnight use during the winter, the period when most major precipitation based flooding events occur. When flooding within Yosemite Valley does occur, it requires a prolonged period of intense rain for at least 24 hours to create flood conditions, which provides sufficient time for evacuation. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans related to potential risk of inundation. However, risk of interference with human activities is limited due to winter period closure of Housekeeping Camp. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the grounds during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Yosemite Valley Campgrounds (North Pines, Backpackers, portions of Lower Pines, Upper Pines, and Yellow Pine Administrative Campground, plus new camping facilities (30 walk-in camp sites) at Upper River Campground and near Upper Pines Campground). Facilities at other campgrounds that are or would be located within the floodplain are closed for overnight use during the winter, the period when most major precipitation based flooding events occur. When flooding within Yosemite Valley does occur, it requires a prolonged period of intense rain for at least 24 hours to create flood conditions, which provides sufficient time for evacuation. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, risk of interference with human activities is limited due to winter period closure of the campgrounds. With respect to natural resource values, continued

presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the campgrounds during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities and result in minor and intermittent additional maintenance requirements to repair flood damage.

Concessioner Stable. Flooding events are most likely to occur within this area during the winter, wherein flooding requires a prolonged period of intense rain for at least 24 hours to create flood conditions. This provides sufficient time for evacuation of the area. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. Additionally, potential flood events would require evacuation of any animals located at the facilities, if present. It is anticipated that sufficient time would be available in order to enable evacuation of humans and animals in the event of a potential flood. With respect to natural resource values, the existing stables would interfere somewhat with flood flows, but would not be anticipated to result in a substantial backup of water or constriction of the floodway, such that major deleterious effects would be generated during a flood event. During a flood event, the facilities could sustain damage, depending upon the depth of flooding, thereby requiring additional maintenance and upkeep following a flood event.

Yosemite Village Day-use Parking Area and Rerouting of Northside Drive. Flooding events are most likely to occur within this area during the winter, wherein flooding requires a prolonged period of intense rain for at least 24 hours to create flood conditions. This provides sufficient time for evacuation of the area. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. With respect to natural resource values, the parking lot and roadway would be reconstructed so as to minimize interference with floodplains, and would not include the construction of any major buildings or other facilities that would interfere with flood flows. Additionally, the parking area would be designed to handle periodic inundation, thereby minimizing erosion and other potential damage to parking facilities that could otherwise occur as a result of flooding.

Lower River Amphitheater. Flooding events are most likely to occur within this area during the winter, wherein flooding requires a prolonged period of intense rain for at least 24 hours to create flood conditions. While visitors and staff would utilize this facility, use would be transitory, due to the nature of the facility. This, combined with a relatively extended period of warning for flooding in the area provides sufficient time for evacuation of the area. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, such risks would be avoided by evacuation. With respect to natural resource values, the existing facilities would interfere only minimally with flood flows, and would not result in a major construction or interference. During a flood event, the facilities could sustain minimal damage, depending upon the depth of flooding, thereby requiring additional maintenance and upkeep following a flood event.

West Valley Picnic Areas. Similar to other areas of the Yosemite Valley, flooding events are most likely to occur within this area during the winter, wherein flooding requires a prolonged period of intense rain for at least 24 hours to create flood conditions. Picnic areas are used for short periods by Park visitors. Therefore, along with a relatively extended period of warning for flooding in the area, it is anticipated that sufficient time for evacuation of the area would be available in the event of a potential flood. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, risks to humans would be avoided by evacuation. With respect to natural resource values, the existing facilities would interfere somewhat with flood flows, but would not be anticipated to result in a substantial backup of water or constriction of the floodway, such that major deleterious effects would be generated during a flood event. During a flood event, the facilities could sustain minimal to minor damage, depending upon the depth of flooding, thereby requiring additional maintenance and upkeep following a flood event.

Guaging Station near Pohono Bridge. Flooding in this area would occur in a manner that is similar to the other facilities noted above – primarily during winter flood events. The gauging station is small in extent and does not present a major interference with natural flood flows. Additionally, the facility is unmanned and would not require evacuation. During a flood event, it is anticipated that the facility would sustain only minimal potential damage as a result of flooding.

Merced River Gorge and El Portal

The El Portal area is located in an extremely high energy, bedrock-controlled reach with little high floodplain suitable for development. Due to high flood velocities, infrastructure and developments must be located above flood levels or be massively armored. Evacuation of flood-prone areas should be mandatory during flood events of any appreciable size.

Facilities near Old El Portal (AT&T Building, NatureBridge office and employee housing, water valve station), as well as the El Portal Market Building and the El Portal Gas Station. These facilities are subject to year-round use, and are located near the margin of the floodplain. Therefore, flood water depths within these areas are expected to be minor to moderate, with areas suitable for evacuation located within a few hundred feet or less. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, it is anticipated that sufficient warning would be available to enable evacuation. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities, while floating debris could result in damage to structures and facilities. Flood flows in this area are generally anticipated to be faster-moving than within the Yosemite Valley, which could exacerbate potential for damage to

buildings and facilities, while floating debris could result in damage to structures and facilities. Damage would require maintenance and repair once flood flows recede.

Administrative Parking Area (between Foresta Road and the Merced River at the National Park Service's Warehouse and Administrative Complex). The parking area is subject to year-round use, and is located near the margin of the floodplain. Similar to other facilities in this area, suitable evacuation areas are located within a few hundred feet of the facility. During a major flood event, the parking lot could become inundated with floodwaters. Inundation could interfere with human access and use of the area, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, it is anticipated that sufficient warning would be available to enable evacuation. With respect to natural resource values, continued presence of the facilities within the floodplain would minimally interfere with flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain could result in periodic inundation of the lot during intermittent flood events. However, only minimal damage is anticipated to result from such events.

Temporary El Portal Special Park Uses Trailers. These facilities are subject to year-round use, and are located near the margin of the floodplain. Similar to other facilities in this area, suitable evacuation areas are located within a few hundred feet of the facilities, and it is anticipated that the facilities would be evacuated in advance of an anticipated flood. During a major flood event, the trailers could become inundated with floodwaters. Inundation could interfere with human access and use of the area, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, it is anticipated that sufficient warning would be available to enable evacuation. Additionally, if flood waters are sufficiently high and fast moving, trailers could potentially sustain minor to considerable flood damage. With respect to natural resource values, continued presence of the facilities within the floodplain would minimally interfere with flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain could result in periodic inundation and damage to the trailers during flood events, This could result in need for minor to extensive repairs following each flood event.

Embankment/Levee between El Portal Market and Gas Station and the Merced River. This unoccupied facility is subject to inundation during major flood events. Hazardous conditions for humans are not anticipated as a result of flooding of the embankment. In the event of a major flood event with fast moving waters, the facility could sustain minor to moderate damage due to erosive forces. With respect to natural resource values, the embankment would continue to interfere with natural flood flows along the river, resulting in a continued deleterious effect on floodplain processes. With respect to investment values, the facility could sustain damage during a flood event, which would require maintenance and repair following the event. However, the facility also provides partial protection to nearby buildings, including the gas station and store, and its presence is likely to reduce potential damage to those buildings, especially during flood events that are smaller than 100-year events.

Abbieville/Trailer Village Employee Housing Area. Portions of this area are subject to flooding during a 100-year event, as noted previously. These facilities are located near the margin of the floodplain. Similar to other facilities in this area, suitable evacuation areas are located within a few

hundred feet of the facilities, and it is anticipated that the facilities would be evacuated in advance of an anticipated flood. During a major flood event, housing areas could become inundated with floodwaters. Inundation could interfere with human access and use of the area, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, it is anticipated that sufficient warning would be available to enable evacuation. Additionally, if flood waters are sufficiently high and fast moving, the facilities could potentially sustain flood damage. With respect to natural resource values, continued presence of the facilities within the floodplain would interfere with flood flows and floodplain hydrology during major flood events, but would not cause major disruptions or constrictions of natural flood flows. With respect to investment values, continued presence of the facilities within the floodplain could result in periodic inundation and damage to the housing areas during flood events, This could result in need for minor to extensive repairs following each flood event.

South Fork Merced River

Floods of consequence in Wawona along the South Fork always occur with some warning. It takes a prolonged period of intense rain for at least 24 hours to create flood conditions. Risks to humans can typically be mitigated by warning and evacuation.

Historic Facilities (Wawona Covered Bridge, portions of the Pioneer Yosemite History Center). These facilities are subject to year-round use. Like other facilities at Wawona, these historic facilities are located within several hundred feet of the margin of the floodplain. Areas suitable for evacuation are located in adjacent areas, just outside of the floodplain. During a major flood event, these facilities could become inundated or partially inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, the facilities would be evacuated in the event of a potential or anticipated flood, thereby avoiding effects on humans. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor to moderate disruptions to flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities, while floating debris could result in damage to structures and facilities, requiring additional repair and maintenance.

Yosemite Transportation Company Office. The Transportation Company Office is subject to year-round use. The facility is located within several hundred feet of the margin of the floodplain. Areas suitable for evacuation are located in Wawona, just outside of the floodplain. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. With respect to natural resource values, continued presence of the facilities within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could damage existing

facilities, while floating debris could result in damage to structures and facilities, requiring additional repair and maintenance.

Utility Buildings. These facilities could become inundated during a major flood event. Direct consequences to humans would be minimal, because the facilities are unmanned, and would not require evacuation. With respect to natural resource values, continued presence of the buildings within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the utility buildings within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities, while floating debris could result in damage to structures and facilities, requiring additional repair and maintenance.

Ranger Station and Bakery Building. The ranger station and bakery building are subject to year-round use, and are located within several hundred feet of the margin of the floodplain. Areas suitable for evacuation are located in adjacent parts of Wawona, just outside of the floodplain. During a major flood event, these facilities could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, the facilities would be evacuated in the event of a potential or anticipated flood, thereby avoiding such risks. With respect to natural resource values, continued presence of the buildings within the floodplain would result in continued minor disruptions to flood flows and floodplain hydrology during major flood events. With respect to investment values, continued presence of the facilities within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could damage existing facilities, while floating debris could result in damage to structures and facilities, requiring additional repair and maintenance.

Wawona Campground and the South Fork Wawona Picnic Area. Like other facilities noted for Wawona that would remain in the floodplain, the campground and picnic area are located in close proximity to the floodplain margin. Therefore, suitable evacuation areas are located within several hundred feet of these facilities. During a major flood event, the campground and picnic area could become inundated with floodwaters. Inundation could interfere with human access and use of the facilities, and could cause potentially hazardous conditions for humans due to potential risk of inundation. However, the facilities would be evacuated in the event of a potential or anticipated flood, thereby avoiding such risks. With respect to natural resource values, the existing campgrounds and picnic areas are expected to cause only very minimal interference with flood flows and floodplain hydrology, and would not substantially interfere with or redirect flood flows. With respect to investment values, continued presence of the campground and picnic area within the floodplain would result in periodic inundation of the facilities during intermittent flood events. Flooding of sufficient depth or velocity could cause minor damage existing facilities, requiring additional repair and maintenance.

DESIGN OR MODIFICATIONS TO MINIMIZE HARM TO FLOODPLAIN VALUES OR RISKS TO LIFE AND PROPERTY

General Mitigation

The design of all new structures or substantial improvements to existing structures would incorporate requirements and methods for minimizing flood damage, as contained in the National Flood Insurance Program "Floodplain Management Criteria for Flood-Prone Areas" (CFR 44, 60.3) and in accordance with any local, county, or state requirements for flood-prone areas. Furthermore, park staff would maintain an active flood evacuation plan. The plan details responsibilities of individual park employees for advanced preparedness measures; removing or securing park property; records and utility systems; monitoring communication; and conducting rescue and salvage operations. New roadways and traffic circles would be designed so as to minimize interference with floodplains by avoiding areas within floodplains, to the extent practicable, and by adhering to NPS, local, county, and state requirements for the construction of roadways within floodplains. Thus, impacts on the site's resources would be minimized and avoided. The proposed floodplain related facilities upgrades that would occur under the Preferred Alternative (discussed above) would also support reduced flood risk and reduced potential for inundation of facilities during flood events, as compared to the No Action Alternative.

Site-Specific Mitigation – No Subsequent Statement of Findings Necessary

Merced River above Nevada Fall: High Sierra Camp Reduction to 11 Units.

- Plans would be made for timely and safe evacuation of people the remaining units in times of rising water. These areas would be evacuated prior to major storm events that could potentially produce flooding, based on ongoing monitoring within the Park. Therefore, risks to humans would be mitigated by monitoring of storm or potential storm conditions, warning, and evacuation as warranted.

- In order to minimize potential damage to facilities located within the floodplain, prior to an anticipated flood event, removable facilities that could be damaged by flooding would be removed and stored outside of the floodplain.

- No mitigation is available to offset the potential minor effects of these facilities on floodplain hydrology during flooding events; however, associated effects would be minor.

Yosemite Valley: Ahwahnee Row Houses, Tecoya Dorms, Yosemite Lodge and parking, Housekeeping Camp Lodging Units, and Other Campgrounds (North Pines, Backpackers, Lower Pines, Yellow Pine Administrative Campground,and Upper River Campground), and theYosemite Village Day-use Parking Area

- Plans would be made for timely and safe evacuation of people from the Ahwahnee Row houses, Tecoya Dorm/Ahwahnee Row Housing, Yosemite Lodge, Housekeeping Camp, affected campgrounds, and other affected facilities in times of rising water. These areas would be evacuated prior to or during the early phases of major storm events that could potentially

produce flooding, based on ongoing monitoring within the Park. Therefore, risks to humans would be mitigated by monitoring of storm or potential storm conditions, warning, and evacuation as warranted. Given that flooding within Yosemite Valley occurs with at least 24 hours of warning, these facilities could be easily evacuated in the event of an anticipated flood.

- In order to minimize potential damage to facilities located within the floodplain, prior to an anticipated flood event, removable facilities that could be damaged by flooding would be removed and stored outside of the floodplain.

- No mitigation is available to offset the potential minor effects of these facilities on floodplain hydrology during flooding events; however, associated effects would be minor.

Merced River Gorge and El Portal Watershed: Water valve station, El Portal Market building, Nature Bridge buildings, El Portal gas station.

- Plans would be made for timely and safe evacuation of people from the El Portal Market building the Nature Bridge buildings, the fuel storage facility, and gas station. The pump station is unmanned, and therefore evacuation of the pump station would not be required. These areas would be evacuated prior to or during the early phases of major storm events that could potentially produce flooding within the area, based on ongoing monitoring within the Park. Therefore, risks to humans would be mitigated by monitoring of storm or potential storm conditions, warning, and evacuation as warranted. Evacuation would be facilitated by the very close proximity of roadways and other facilities that are located outside of the floodplain. Thus, these facilities could be easily evacuated in the event of an anticipated flood.

- In order to minimize potential damage to facilities located within the floodplain, prior to an anticipated flood event, any removable facilities that could be damaged by flooding would be removed and stored outside of the floodplain. Minor and localized armoring may also be installed so as to minimize potential damage from debris and floodwaters. Residual flood damage would require intermittent minor repairs to the affected facilities.

- No mitigation is available to offset the potential minor effects of these facilities on floodplain hydrology during flooding events; however, associated effects would be minor

South Fork Merced River: Yosemite Transportation Company office, two cabins, historic jail, utility buildings, Ranger Station, and a bakery building

- Plans would be made for timely and safe evacuation of people from these facilities in times of rising water. These areas would be evacuated prior to or during the early phases of major storm events that could potentially produce flooding, based on ongoing monitoring within the Park. Therefore, risks to humans would be mitigated by monitoring of storm or potential storm conditions, warning, and evacuation as warranted. Given that flooding within the vicinity of Wawona occurs with at least 24 hours of warning, and that areas suitable for evacuation are located in the adjacent areas of Wawona, these facilities could be easily evacuated in the event of an anticipated flood.

- In order to minimize potential damage to facilities located within the floodplain, prior to an anticipated flood event, any removable facilities that could be damaged by flooding would be removed and stored outside of the floodplain. Minor and localized armoring may be also

installed so as to minimize potential damage from debris and floodwaters. Residual flood damage would require intermittent minor repairs to the affected facilities.

- No mitigation is available to offset the potential minor effects of these facilities on floodplain hydrology during flooding events; however, associated effects would be minor.

Site-Specific Mitigation – Subsequent Statement of Findings Necessary

None Warranted

CONCLUSION

The Preferred Alternative would substantially reduce potentially hazardous conditions associated with flooding by removing existing campground sites within 100-feet of the ordinary high water mark. Facilities that would be removed from highly flood-prone areas include lodging units at Housekeeping Camp, abandoned infrastructure at Upper and Lower River Campgrounds, and removal of campsites at Backpackers Camp, Lower Pines, and North Pines Campground. The Preferred Alternative would also prohibit new development within 150 feet of the ordinary high water mark of the Merced River. The Preferred Alternative would also involve removal of housing units at the Yosemite Lodge which are currently located within the floodplain. Removal of these facilities from the vicinity of the ordinary high water mark and/or the floodplain would reduce existing effects of these facilities on floodplain hydrology, and would support increased safety and reduced flood related hazards for park employees and visitors.

The Preferred Alternative would also include removal and mitigation of existing obstructions along the river, including Sugar Pine Bridge, Odger's Fuel Storage Facility, and the Old Wastewater Treatment Plant in El Portal. Channel complexity would be substantially improved in Yosemite Valley and thereby lessen existing floodplain effects of other existing bridges. These changes would also support minimization of existing floodplain and flooding effects along the Merced River. Installation of logs and logjams along the Merced River could result in minor increases in flooding in select localized areas; however, such effects are anticipated to be minimal and locally beneficial.

The National Park Service has determined that the following structures must remain within the regulatory floodplain (no practicable alternatives to this action): Yosemite Valley: Ahwahnee Row and Tecoya Dorm housing, Yosemite Lodge facilities that are located within the floodplain, Housekeeping Camp, and campgrounds including North Pines, Backpackers, and Lower Pines; Merced River Gorge and El Portal Watershed: water valve station, El Portal Market building, and Nature Bridge buildings; South Fork Merced River: Yosemite Transportation Company office, two cabins, historic jail, utility buildings, Ranger Station, and a bakery building. These facilities are not within areas subject to frequent flooding, and with the early warning system and evacuation plan in use, the risk to human safety would be minimized.

The National Park Service concludes that the Preferred Alternative would reduce the impacts of potentially hazardous conditions associated with flooding in the study area. Implementation of the proposed actions along with compliance with regulations and policies to prevent impacts to floodplain

values and loss of property or human life would be strictly adhered to during and after the construction. Individual permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. No long-term adverse impacts would occur from the proposed actions. Therefore, the National Park Service finds the Preferred Alternative to be acceptable under Executive Order 11988 for the protection of floodplains.

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FLOODPLAIN STATEMENT OF FINDINGS
Merced River Draft Environmental Impact Statement
Yosemite National Park
California

Recommended: _____
Superintendent, Yosemite National Park Date

Concurred: _____
Chief, Water Resources Division Date

Concurred: _____
Regional Safety Officer, Pacific West Region Date

The above signatures certify that this document is technically adequate and consistent with NPS policy.

Approved: _____
Director, Pacific West Region Date