



Manzanita Lake Development Concept Plan Environmental Assessment

May 2024



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Purpose and Need

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CHAPTER 1: PURPOSE AND NEED

BACKGROUND

Manzanita Lake Developed Area

Lassen Volcanic National Park (the park) is known for its volcanic geologic history and stunning landscape views. With numerous opportunities for recreation and interpretation, visitors to the park can experience a variety of unique activities. This development concept plan focuses on the Manzanita Lake Developed Area, which is the first developed area encountered by visitors entering the park via the northwest entrance. As one of the park's most heavily visited areas, the Manzanita Lake Developed Area encompasses the largest campground, concessions, and frontcountry visitor facilities in the park. The area includes a large concessions operation (a store, cafe, rental cabins, and kayak/stand up paddleboard rentals), a museum, visitor contact station, amphitheater, campground, camping cabins, parking, roadways, and trails. Between 2021 and 2022, the visitor count at the Manzanita Lake District jumped from 187,203 to 243,855, a 29% increase, and 49% of park annual visitors enter the park at this location, making it the primary park entrance (NPS 2023a). Visitors entering the park experience long lines of cars between the entrance station and the California State Highway 44 and 89 intersection, a distance of about 0.25 mile.



FIGURE 1. LASSEN PEAK OVER MANZANITA LAKE

The facilities at Manzanita Lake are inadequate to meet the current and anticipated number of visitors to this area of the park. Facilities are outdated and need improvements to meet new standards. Circulation issues cause potentially unsafe congestion in front of the camper store, and the existing trail network is inadequate to provide visitors diverse recreational opportunities while protecting both natural and cultural values. Elaborate social trail networks are evolving, and the park is seeing a widespread decline in woody plant species within the area. Facility repairs and maintenance have been addressed in a piecemeal manner for years, and there are several pending proposals to address individual issues rather than holistically improving the site.

Park managers completed a preliminary planning process in 2020 to review the existing direction and knowledge for the proposed undertaking at the Manzanita Lake Developed Area. This process involved reviewing guidance from past plans and discussions with park staff to identify issues within the project area, which included degraded facilities, cultural and natural resource concerns, and the quality of the visitor experience. The process also included work sessions to draft preliminary desired conditions and potential design solutions to address the issues identified. As a result of this process, the planning team recommended that park managers move forward with a development concept plan and environmental assessment to address the issues at Manzanita Lake.

The Manzanita Lake Dam and dike are located on the western shoreline of Manzanita Lake (see Figure 2 below). The dam and dike are two low earthen embankments with a concrete spillway. The larger embankment is the Manzanita Lake Dam, and the smaller embankment is the dike. The dam was constructed in 1911 across the natural outlet of Manzanita Creek to develop hydroelectric power prior to the park's establishment. Manzanita Lake is a naturally occurring lake, and the dam resulted in a small increase in the lake's water elevation and a substantial increase in the lake's surface area. Following the 1915 eruption of Lassen Peak, the dam and other structures related to the development of hydropower were abandoned and later transferred to the National Park Service when the park was established in 1916 (NPS 2021a; Emmons and Caywood 2004; Emmons and Catton 2006). The dam and dike form a reservoir of approximately 50 acres, and the contributing drainage basin is 12 square miles. The existing impoundment structures do not meet current dam safety criteria. The dam and dike are at risk from several factors, including erosion, hydrologic threats such as overtopping, seismic threats, and volcanic threats (NPS 2012b). The Manzanita Lake Dam is currently rated as a significant hazard due to its condition and the value of the lake as a scenic and recreational feature of the park (NPS 2021a). An engineered design approach to address existing deficiencies and bring the structure up to current standards is ongoing. This plan conceptually addresses the Manzanita Lake Dam and dike with regards to resource impacts on the park. The National Park Service will address specific engineering improvements to the dam and dike and necessary access construction routes in a separate future planning and compliance effort as funding is available.

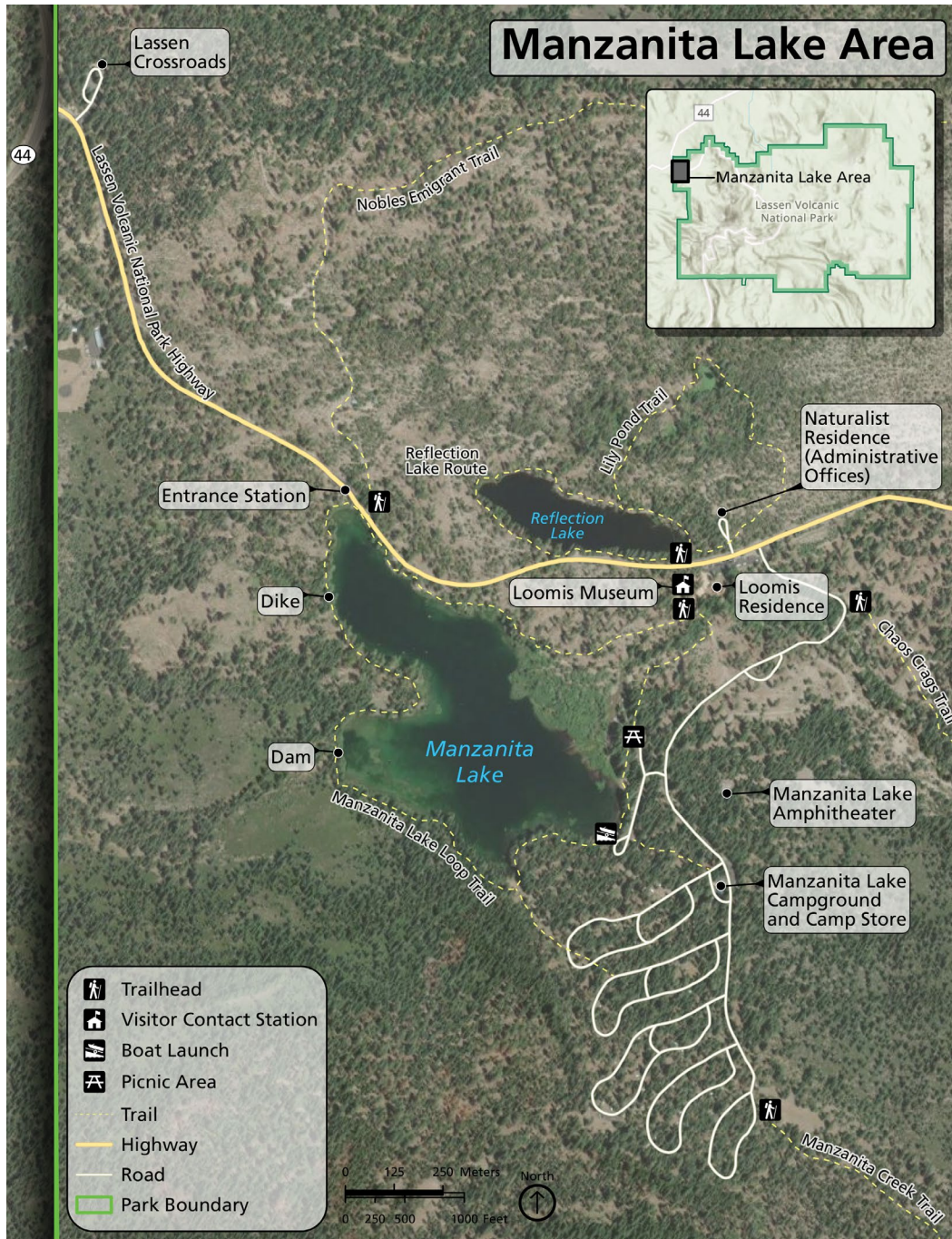


FIGURE 2. MANZANITA LAKE DEVELOPED AREA

PURPOSE OF THE ACTION

The purpose of this plan is to improve the park’s Manzanita Lake Developed Area visitor facilities and respectfully rehabilitate historic structures to accommodate growing visitation and enhance visitors’ experiences through an adaptive lens that accounts for future needs. The plan would provide direction for restoring and preserving natural and cultural resources, improving

safety at Manzanita Lake Dam and dike, increasing opportunities for accessibility, and enhancing existing outstanding visitor opportunities.

NEED FOR ACTION

The plan is needed to:

- Improve inadequate facilities in the Manzanita Lake Developed Area, including, but not limited to, the campground and associated infrastructure, utility systems, and the day use area (i.e., boat launch, picnic area, and primary Manzanita Lake Trailhead).
- Restore and rehabilitate historic structures threatened by overuse and degradation, and consider adaptive reuse where appropriate.
- Enhance connectivity between parking, Loomis Plaza, the day use area, and the campground within the Manzanita Lake Developed Area.
- Provide adaptive opportunities for modernization (i.e., technological advancements).
- Implement accessibility requirements identified in the accessibility self-evaluation and transition plan, and explore opportunities to incorporate additional nonrequired improvements.
- Ease roadway and parking congestion and safety concerns, and improve visitor circulation and flow.
- Improve recreation and visitor areas while protecting Manzanita Lake's natural resources and habitats from increased visitor use impacts and a changing climate.
- Conceptually address resource impacts associated with the upcoming Manzanita Lake Dam and dike improvements.

RELATED PLANNING EFFORTS

Northwest Gateway Forest Restoration

The Northwest Gateway Forest Restoration Project (NPS 2022a) is a multiyear forest restoration project in the Manzanita Lake and Lost Creek areas of the park. The goal of this treatment strategy is to reestablish a fire-adapted forest landscape by restoring a more resilient, diverse forest structure. Mechanical treatment in 2014 successfully restored natural fuel loads to areas closest to the Manzanita Lake Area. In October 2018, firefighters completed a low-intensity prescribed burn to restore fire to unit 4. The park plans to complete prescribed burns in units 5 through 7 and then 1 and 2 as conditions permit. The reintroduction of fire to treated areas has been delayed largely due to dry conditions and resulting longer fire seasons, which limit the window for prescribed burn application. This restoration work is within the project area of this plan.

Manzanita Lake Dam Formal Examination

The Manzanita Lake Dam Formal Examination (NPS 2021a) documents the formal examination of the Manzanita Lake Dam and dike conducted by HDR Engineering for the National Park Service as part of 2021 Dam Safety Program Support. A review of previous inspection records provided by the National Park Service was performed ahead of an on-site field examination. The report details preliminary findings on the existing condition of the dam and dike and provides recommendations for improvements.

Accessibility Self-Evaluation and Transition Plan

The accessibility self-evaluation and transition plan (SETP) (NPS 2021b) documents existing park barriers to accessibility for people with disabilities; recommends an effective approach for upgrading facilities, services, activities, and programs; and instills a culture around creating universal access. The SETP recommendations that are specific to the Manzanita Lake Developed Area are incorporated in this plan where appropriate.

Lassen Volcanic National Park Resource Stewardship Strategy

The resource stewardship strategy (NPS 2018) outlines how the park can achieve its desired natural and cultural resource conditions. The strategy evaluates resource issues, stressors, and threats and identifies priority resources. It also develops stewardship goals to improve or maintain resource information and conditions over time and develops activities for achieving those goals. Manzanita Lake Developed Area resource recommendations outlined in the resource stewardship strategy are still relevant and incorporated in this plan.

Manzanita Lake Dam Screening Level Risk Assessment

The Manzanita Lake Dam Screening Level Risk Assessment (NPS 2012b) assesses the Manzanita Lake Dam under the screening level risk assessment, in compliance with NPS Director's Order 40: *Dam Safety and Security Program*. The report identifies recommendations needed to reduce the risk associated with potential failure modes, reduce uncertainty associated with the estimated risk rating and to improve the existing operations and management program.

Repave and Rehabilitate a Portion of the Lassen Volcanic National Park Highway Environmental Assessment

The repave environmental assessment (NPS 2006a) is the completion of the rehabilitation of the Lassen Volcanic National Park Highway (remainder of the main park road). Proposed project work is partially completed and includes the repair and rehabilitation of the campground loop roads at Manzanita Lake, Craggs Campground, Lost Creek Campground, and North and South Summit Lake Campgrounds. Road rehabilitation began at the end of the previous rehabilitation project, just north of the Bumpass Hell Parking Area, and extended northward to where the phase I project concluded at the Manzanita Lake Campground Entrance Road. Like the first phase of this project, it included repaving and rehabilitating numerous areas along the route, including spur roads, providing access to campgrounds and picnic areas, and pullouts. The preferred alternative occurs along the rehabilitated highway.

General Management Plan

The park's general management plan/environmental impact statement (NPS 2003) provides long-term direction for park resource preservation and visitor use. Management zones and their desired conditions provide guidance on ensuring that resources are passed on unimpaired to future generations and visitor experiences remain high quality. The project area primarily occurs within the scenic drive zone of the park.

CLIMATE CHANGE

A number of reports inform the park's future climate conditions including its Climate Friendly Park Action Plan (NPS 2010), Natural Resource Condition Assessment (NPS 2013), Cultural Resources Climate Change Strategy (NPS 2016a), and Climate Change in Lassen Volcanic National Park report (NPS 2017). The two most probable future climate scenarios for the park include one that is warmer and wetter than current conditions and another that is hotter and dryer than current conditions. The climate scenarios were used to inform the desired conditions for this plan to ensure that future desired conditions are resilient to the changing climate. Future vulnerabilities to the physical environment include potential wildfire increase, air pollution increase, increased storm events, reduced snowpack, and drought. Future vulnerabilities to wildlife include possible increased risk of plague in rodents, bat mortality, spotted owl decline, trout decrease, and bird range shifts. Future vulnerabilities to vegetation include potential tree dieback from drought and beetle infestations, biome shifts, mountain fern drying, rare plant decrease, invasive plant increase, earlier bud break, and the mortality of red fir. These vulnerabilities are considered and analyzed throughout this plan where appropriate (e.g., trends in the affected environment).

IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

Impact topics represent resources that could be affected, either beneficially or adversely, by implementing either of the alternatives. The National Park Service used an interdisciplinary review process, existing studies and data, and public comments to determine which resources would likely be affected by this project. The following topics are carried forward for further analysis in this design concept plan/environmental assessment:

- Vegetation and soils
- At-risk species
- Wetlands
- Visitor use and experience
- Historic structures
- Cultural landscapes

- Archeological resources
- Ethnographic resources

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following impact topics were not carried forward for analysis because they do not exist in the project area; they would not be affected by the proposal; the likelihood of impacts are not reasonably expected; or, through the application of mitigations measures, there would be no potential for significant impacts. Additionally, these impact topics were not a subject of contention among the public and other agencies.

Air Quality

The Clean Air Act of 1963 was established to promote the public health and welfare by protecting and enhancing the nation's air quality. National Park Service *Management Policies 2006* directs parks to seek the best air quality possible to “preserve natural resources and systems; preserve cultural resources; and sustain visitor enjoyment, human health, and scenic vistas.” (NPS 2006b) The preferred alternative would not impact air quality in a measurable way. The potential to support electric vehicles may positively impact air quality. Smoke from campsites would continue to impact air quality, but the number of sites would not change, resulting in no change to air quality. Therefore, air quality was dismissed from further analysis.

Lightscapes

In accordance with NPS *Management Policies 2006*, the National Park Service strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light. Park managers are also committed to following the more rigorous NPS Sustainable Outdoor Lighting Principles. Park staff strive to limit the use of artificial outdoor lighting to what is necessary for building security and human safety. Park staff also strive to ensure that all outdoor lighting is shielded to the maximum extent possible to keep light on the intended subject and out of the night sky. The proposed development under this plan would include light fixtures. All new lights and fixtures would direct light at intended targets, would not overlight the area, and would be shielded to prevent light from scattering beyond horizontal lines of sight. The overall impact of these local, short-term night illuminations would have a minor adverse effect on the night sky. As a result, lightscape was dismissed from further analysis.

Federally Listed Species

A variety of sources were referenced to determine the presence of threatened and endangered species within the project area, including US Fish and Wildlife (USFWS) Services Information for Planning and Consultation (USFWS 2023) and the Lassen Volcanic NPS species list (NPS 2022b). The species considered in this environmental assessment are provided in Table 1 below. Two state-listed species, the Sierra Nevada red fox and the bald eagle, have been carried forward for analysis in this plan. All federally threatened and endangered species were dismissed for analysis because there is no potential for the species or their habitat to occur in the planning area.

Table 1. Federally Endangered, Threatened, and Candidate Species That May Occur in Lassen Volcanic National Park (as of December 2023)

Common Name	Scientific Name	Federal Status	Potential for Species or Habitat in Planning Area	Proposed or Designated Critical Habitat Present in Planning Area
Monarch butterfly	<i>Danaus plexippus</i>	C	No	No
Shasta crayfish	<i>Pacifastacus fortis</i>	E	No	No
Whitebark pine	<i>Pinus albicaulis</i>	T	No	No
California spotted owl	<i>Strix occidentalis occidentalis</i>	PT	No	No
Northwestern pond turtle	<i>Actinemys marmorata</i>	PT	No	No
Gray Wolf	<i>Canis lupus</i>	E	No	No

T = Threatened, E = Endangered, C = Candidate, PT = Proposed Threatened

At the time of this writing, the Monarch butterfly is periodically observed within the park but its host plant milkweed is not within the project area; the species is therefore dismissed. Shasta crayfish has not been found within the park, as confirmed by park staff. Whitebark pine is located within the park but does not occur within the project area. California spotted owl is proposed threatened as of 50 CFR 17 (Code of Federal Regulations) on February 23, 2023. Habitat modeling shows very little nesting habitat and some foraging habitat within the project area for the California spotted owl, but the project area does not contain large trees with the multistoried, 70% or more canopy cover required by this species. Further, no detections of the California spotted owl have occurred within the project area and is therefore dismissed. Future surveying would occur before construction, and construction would not occur during species-specific sensitive times. Within the project area, no suitable nesting habitat has been identified for the northwestern pond turtle, which is known to prefer elevations below 5,000 feet and was last observed in the project area over 15 years ago. Visual encounter surveys for the turtle would be conducted before work occurring within or near lacustrine habitat (refer to appendix C); however, the proposed action is anticipated to have no impact on this species. Within the project area, there have been no observations of gray wolves or denning activity. While the gray wolf could potentially pass through the project area, the proposed action is anticipated to have no impact on the species. As a result, all federally listed species were dismissed from further analysis.

Wildlife Species and their Habitat

According to NPS *Management Policies 2006*, the National Park Service strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of animals. In addition to the Sierra Nevada red fox and bald eagle, which were carried forward for analysis, songbirds were identified as having the potential for impact as a result of the actions in this plan. Songbirds are plentiful within the

project area, including, but not limited to, Steller's jay (*Cyanocitta stelleri*), mountain chickadee (*Poecile gambeli*), and Clark's nutcracker (*Nucifraga columbiana*). The proposed development in this plan has the potential to impact songbirds' habitat. Nonetheless, there is an abundance of similar habitat adjacent to the project area, so adverse impacts from habitat loss are not expected to affect songbird population viability. Construction noise and activity may alter wildlife use of the area in the short term if animals avoid the disturbed area. As stated in the mitigation measures, vegetation clearing would be done outside the bird nesting season, so there would be minimal direct impacts on nesting birds. As a result, the topic of wildlife species and their habitat was dismissed from further analysis.

Floodplains

In compliance with Executive Order 11988, "Floodplain Management," it is NPS policy to preserve floodplain values and minimize potentially hazardous conditions associated with flooding. The project area falls within Zone D, according to Federal Emergency Management Agency (FEMA) panel T31N R04E S18 (FEMA 2020). Zone D is not considered a special flood hazard area and is defined as an "Area of Flood Risk due to Levee" (FEMA 2020). The Manzanita Lake Dam, which sits along the southwestern edge of the lake, is the levee in question. Flood risk associated with the dam lies below the structure to the southwest. An engineered design approach to address existing deficiencies and bring the structure up to current standards is ongoing. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation. This plan proposes construction and improvements to facilities that are located to the southeast of the lake, in an area up gradient from the identified "levee." Outside of the dam repairs, which are addressed conceptually, there is no proposed new construction below the existing dam that would impact floodplains. Ongoing use of the existing area/facilities within the Manzanita Lake Developed Area, including developed campgrounds, is excepted under Director's Order 77-2: *Floodplain Management*. Flood risk for this site was evaluated and based on FEMA designation; the assessed hazard is not high and will be adequately mitigated by seasonal and emergency closures. No perceived risk to capital investment or natural and beneficial floodplain values exists. As a result, the topic of floodplains was dismissed from further analysis.

Water Quality

The Clean Water Act of 1972 was established to regulate discharges of pollutants into US waters and regulate quality standards for surface waters. National Park Service *Management Policies 2006* requires protection of water quality consistent with the Clean Water Act. The development of the actions included in this design concept plan would not contribute to long-term impacts on water quality at the park. New or rerouted trails would not compete with or dominate hydrologic activity. Erosion control methods would be used during ground-disturbing construction, which would minimize the amount of sediment that reaches Manzanita Lake and its tributaries. The boat launch improvements would be short in duration, minor in scale in relation to the 26 acre lake, and are not anticipated to impact the overall quality of the lake. Some areas of wetlands within the project areas may be affected by the preferred alternative, which are assessed separately under the "Wetlands" impact topic in chapter 3. Similarly, social trailing could impact water quality, which is assessed separately under the "Soils" impact topic. Water quality could be affected by stormwater runoff because of parking lot expansion, where

contaminants such as grease, oil, and antifreeze could be flushed into waterways by rainfall events. Mitigation measures outlined in appendix C would reduce overall impacts on water quality from stormwater during construction. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation. Therefore, water quality was dismissed from further analysis.

Alternatives

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CHAPTER 2: ALTERNATIVES

INTRODUCTION

This environmental assessment analyzes a no-action alternative and one action alternative (NPS preferred alternative). The elements of these alternatives are described in detail in this chapter. The no-action alternative would continue current management and provides a basis for comparing the effects of the other alternatives. The action alternative addresses the plan's purpose and need as described in chapter 1. The action alternative presented in this section was created based on the recommendations of an interdisciplinary planning team, an environmental impact analysis, and public feedback. This chapter also includes visitor use management actions, alternatives considered but dismissed from further consideration, and a comparison of the no-action and action alternatives.

NO-ACTION ALTERNATIVE

The no-action alternative describes the current management of the Manzanita Lake Developed Area carried into the future and is also a baseline for comparison of the action alternative. Under the no-action alternative, the management direction established in the 2003 general management plan would continue. At Manzanita Lake Developed Area, park staff would continue to involve enforcing regulations during peak use to minimize impacts on resources and visitor experience, as well as the continued maintenance of facilities. The following section describes current conditions and management by location/feature.

Lassen Crossroads

Under the no-action alternative, Lassen Crossroads would continue to provide some outdoor, year-round information displays for visitors. The Crossroads is currently a summer and shoulder season use area with flush toilets but must be closed in the winter to avoid pipes freezing. The trailhead for the Nobles Emigrant Trail would continue to be located along the park highway, with no parking lot associated with the trail.

Entrance Station

Under the no-action alternative, the Manzanita Lake entrance station would continue to be configured with one inbound lane and one outbound lane. Just past the entrance station, the pulloff with striking views of Manzanita Lake would continue to provide informal access to the shoreline of Manzanita Lake.

Administrative Use

Under the no-action alternative, the park would continue to lack designated administrative areas for activities such as camping for researchers or private Tribal gathering areas.



FIGURE 3. LASSEN CROSSROADS



FIGURE 4. ENTRANCE STATION

Parking and Circulation

The parking lot by Loomis Plaza would continue to be the only large parking lot servicing the Manzanita Lake area under the no-action alternative. Limited amenities at the parking lot would continue. Without additional parking in this area, there is limited parking for larger RVs, buses, and towed vehicles and limited overflow parking for all vehicles during special events, such as during the Dark Sky Festival. The trailhead for the Chaos Crags Trail would continue to be located along the campground road with its small native surface parking area. A previously disturbed location near the Chaos Crags Trailhead would remain a restored area that supports native vegetation.

The current circulation around the Manzanita Lake Developed Area would remain. The trail system would continue to connect visitors from Loomis Plaza to the day use area, the camper store, amphitheater, campground, and night sky program area. Visitors would continue to use the campground road or social trails that have been created throughout the area to informally connect to facilities.

Loomis Plaza

Under the no-action alternative, visitors would continue to stop for park information and enjoy interpretation opportunities at the Loomis Museum. When the museum is closed, there would be no opportunities for visitors to obtain park information on-site. The plaza would continue to be used for interpretation and education programs with limited facilities. The seismograph building would continue to be closed to visitors and no accessible entrance to the Loomis Residence would be provided.



FIGURE 5. LOOMIS PLAZA



FIGURE 6. LOOMIS PLAZA RESTROOMS BUILDING

Day Use and Manzanita Lake

Under the no-action alternative, picnicking opportunities would remain along the shoreline at the day use area. One boat launch would be available for use by both the public and concessioner, with no improvements to make it accessible or to better meet NPS character and aesthetics. Additionally, the Manzanita Lake Trail would continue to cut through the boat launch area near the shoreline. No boat cleaning station would be provided.

The Manzanita Lake Trail would remain a natural surface path with no improvements. Limited wayfinding and interpretive signage along the trail would continue, along with many social trails.



FIGURE 7. MANZANITA LAKE BOAT LAUNCH



FIGURE 8. MANZANITA LAKE TRAIL

Manzanita Lake Dam

The dam and dike would continue to consist of two low, earthen embankments and a concrete spillway, and potential flood hazards downstream would continue to be present, as described in the 2012 Manzanita Lake Dam Screening Level Risk Assessment (NPS 2012b).

Reflection Lake

The Reflection Lake Trail would remain a natural surface path with no improvements.

Amphitheater and Living History Program Area

Under the no-action alternative, the route to the amphitheater would continue to be a paved surface, with some accessibility barriers. The amphitheater would remain the same, with outdated audiovisual equipment, limited accessibility throughout, and lighting that detracts from night sky viewing. The living history program area and trail to it would remain as an unimproved surface with accessibility barriers.

Campground and Night Sky Program Area

The existing vehicular and pedestrian circulation at the camper store would continue. The campground road would continue to bisect the main parking lot for the camper store, with parking on either side and vehicles backing up into traffic and pedestrian crossings. Limited seating would continue to be provided near the camper store for visitors. In the campground, concessioners would continue to provide glamping sites (a form of camping that provides accommodations more luxurious than those associated with traditional camping). Proper turning radii or parking for larger (45 foot) RVs would continue to be unavailable at the

campground. Loop D would remain a tent-only loop. In the southern section of the campground, the night sky program area would continue to be an informal open area on the natural surface. No parking would continue to be provided by the night sky viewing area; visitors would continue to access it by walking along the campground road.



FIGURE 9. MANZANITA LAKE AMPHITHEATER



FIGURE 10. MANZANITA LAKE CAMPGROUND

ACTION ALTERNATIVE – NPS PREFERRED ALTERNATIVE

The preferred alternative would provide additional visitor opportunities and experiences throughout the Manzanita Lake Developed Area. Improvements to vehicular circulation and a multiuse path connecting all facilities would be provided for a pedestrian-focused experience in the area. Visitor information would be enhanced throughout the developed area, including at Loomis Plaza, Lassen Crossroads, and along the Manzanita Lake Trail, to improve visitor orientation and reduce impacts on cultural and natural resources. Additional recreational opportunities would be provided for visitors, including at the campground, lake, and day use area.

Administrative use areas for camping and Tribal use would be designated, with an increase in Tribal demonstration opportunities as well.

The preferred alternative includes multiple projects in the Manzanita Lake Area. Park managers would use a phased approach to incrementally implement projects individually or in logical combinations as funding becomes available. Projects requiring construction would need additional design and would be planned accordingly (with seasonal considerations) to reduce impacts on resources and visitors. As many of these actions are conceptual in nature, and some elements could require additional compliance as design and site-specific details evolve. The following section describes proposed improvements and management by location/feature.

Lassen Crossroads

The preferred alternative would provide outdoor, year-round information displays to help orient visitors to the area. Park staff would also improve the facilities at Lassen Crossroads by providing an electric vehicle charging station for visitor use and a vault toilet with year-round access (see figure 11). The trailhead for the Nobles Emigrant Trail would be formalized at the Lassen Crossroads parking lot, and a new unpaved trail would be constructed to connect the trailhead to the existing trail. The proposed trail would be 4 feet wide and approximately 600 feet long.

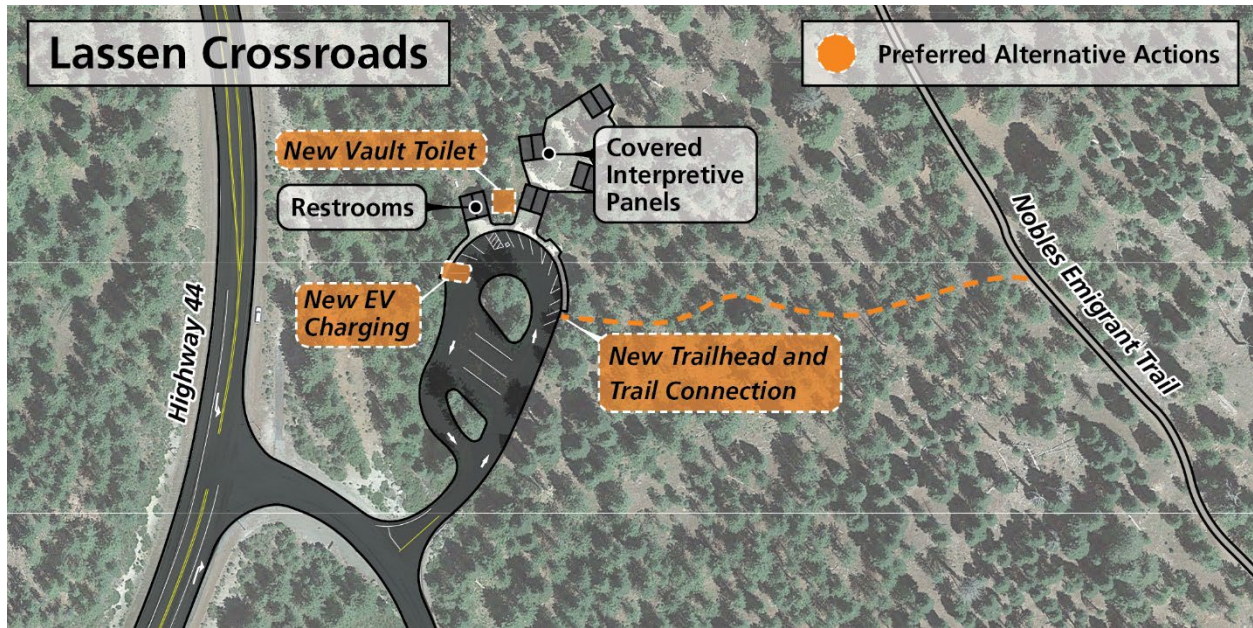


FIGURE 11. LASSEN CROSSROADS NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Entrance Station

The preferred alternative would reconfigure the entrance station to allow for two inbound lanes, with one being a passholder lane to alleviate waiting times, and one outbound lane (see figure 12). The additional lane would be constructed within the existing road shoulder and would be approximately 12 feet wide and 100 feet long. The existing entrance station would remain in its current location with no proposed changes. Approximately 1,600 square feet of new pavement would be added to provide the second inbound lane.

Just past the entrance station, the pulloff, with stunning views of Manzanita Lake, would be formalized as short-term parking with signage for visitors to safely stop and enjoy the view. No long-term parking would be allowed at this pulloff.

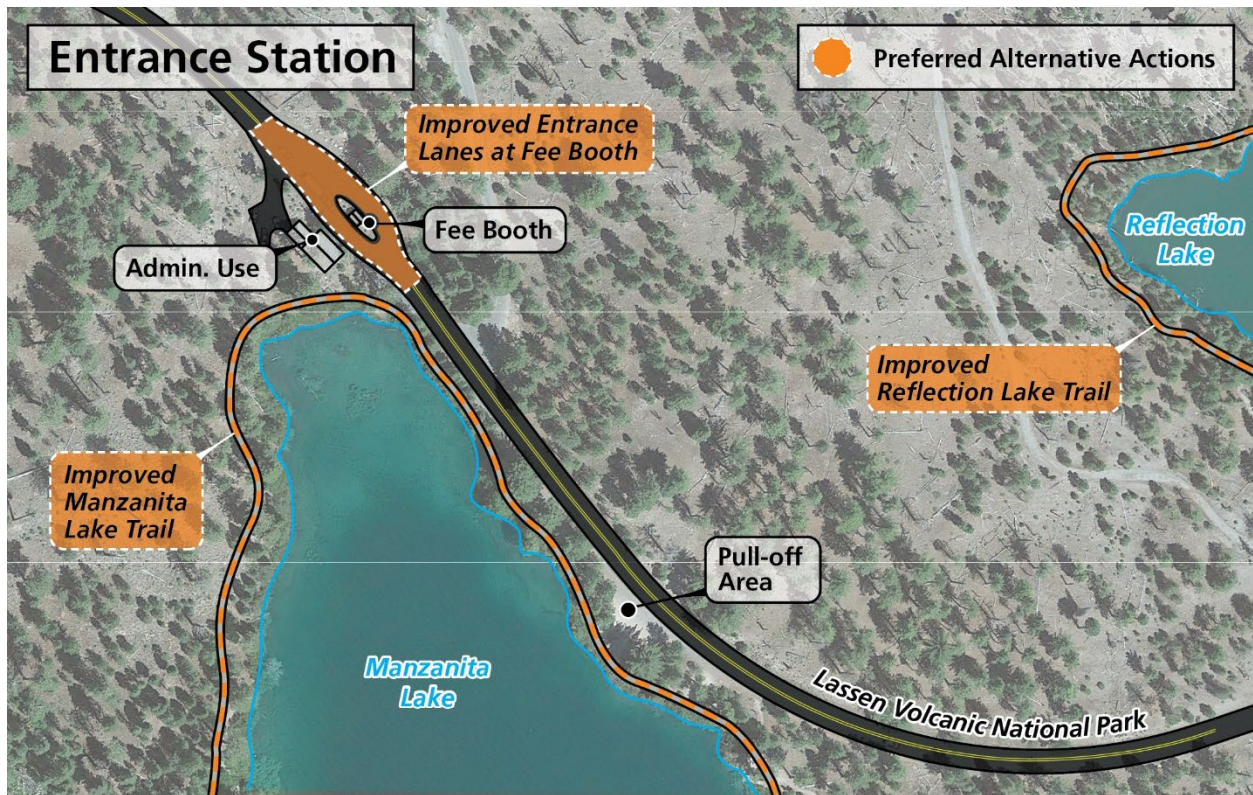


FIGURE 12. ENTRANCE STATION NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Administrative Use

As more researchers and volunteers come to work at the park, the park needs additional administrative camping opportunities to house them. The preferred alternative considers multiple locations for administrative camping, including Reflection Lake Road, the road past the Naturalist’s Residence (also formally known as the Discovery Center), and in the current administrative area off the entrance highway. Additionally, park managers envision inviting Tribes to use these spaces as private Tribal areas. Park managers are still uncertain of the level of development needed to provide these administrative camping opportunities; additional compliance would be needed when these opportunities are further considered.

Parking and Circulation

The preferred alternative would reestablish parking east of the main parking area, where cabins and parking areas were previously removed (see figure 13). The parking lot would accommodate approximately 40 vehicles and would be approximately 22,000 square feet and paved. The parking lot would have up to eight electric vehicle charging stations, one double vault toilet, and picnic tables and serve as the trailhead for the Chaos Crags Trail. The parking lot would provide more opportunities for larger RVs, buses, and trailers to park and prevent off-road parking that currently occurs along park roads. This parking would be walking distance to both Loomis Plaza

and Manzanita Lake. Proper signage would be added by the existing parking lot to indicate where the parking is located.

To connect visitors from this parking area to the greater Manzanita Lake Developed Area, an approximately 10-foot wide accessible, multiuse paved path would be provided, meeting architectural barrier act accessibility standards (ABAAS) and international building code (IBC) requirements. This path would be approximately 4,000 feet in length and would connect visitors from the parking area to Loomis Plaza, the day use area and boat launch, camper store, amphitheater, campground, and night sky program area. The path would allow varying uses to best serve all visitors. Night sky-friendly lights and interpretive waysides would be added along the path. Additionally, park staff would explore techniques to reduce the speed along the entrance highway near the crosswalk to Loomis Plaza, including rumble strips and improved signage to increase pedestrian safety.

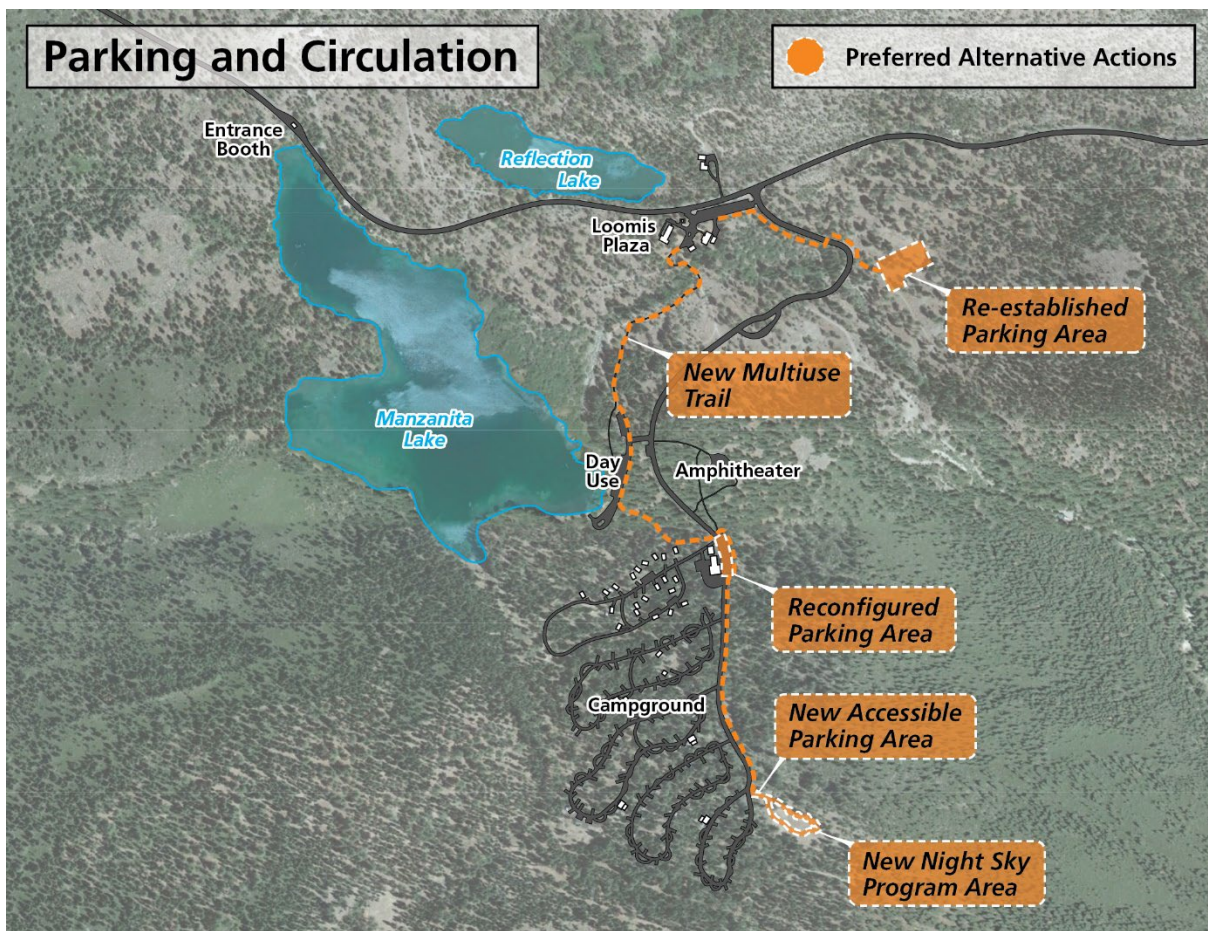


FIGURE 13. PARKING AND CIRCULATION NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Loomis Plaza

Under the NPS preferred alternative, park staff would focus on visitor interpretation and services at Loomis Plaza. A temporary contact station would be provided at the parking lot for quick orientation and information (see figure 14). Improved kiosks and wayfinding in and around the plaza would allow visitors to understand the area and activities provided by self-

orientation when a ranger is not present. A formal interpretation area that could also be used for Tribal interpretation would be established in the plaza, with paving and a temporary shade structure where informal interpretation is already occurring. Other opportunities would be provided for visitors, including picnic tables, water filling stations, an improved accessible route to the Loomis Residence, an outdoor recreation access route (approximately 100 feet long by 5 feet wide) to a clearing by Manzanita Creek behind the Loomis residence, and the interpretation of the seismograph building.

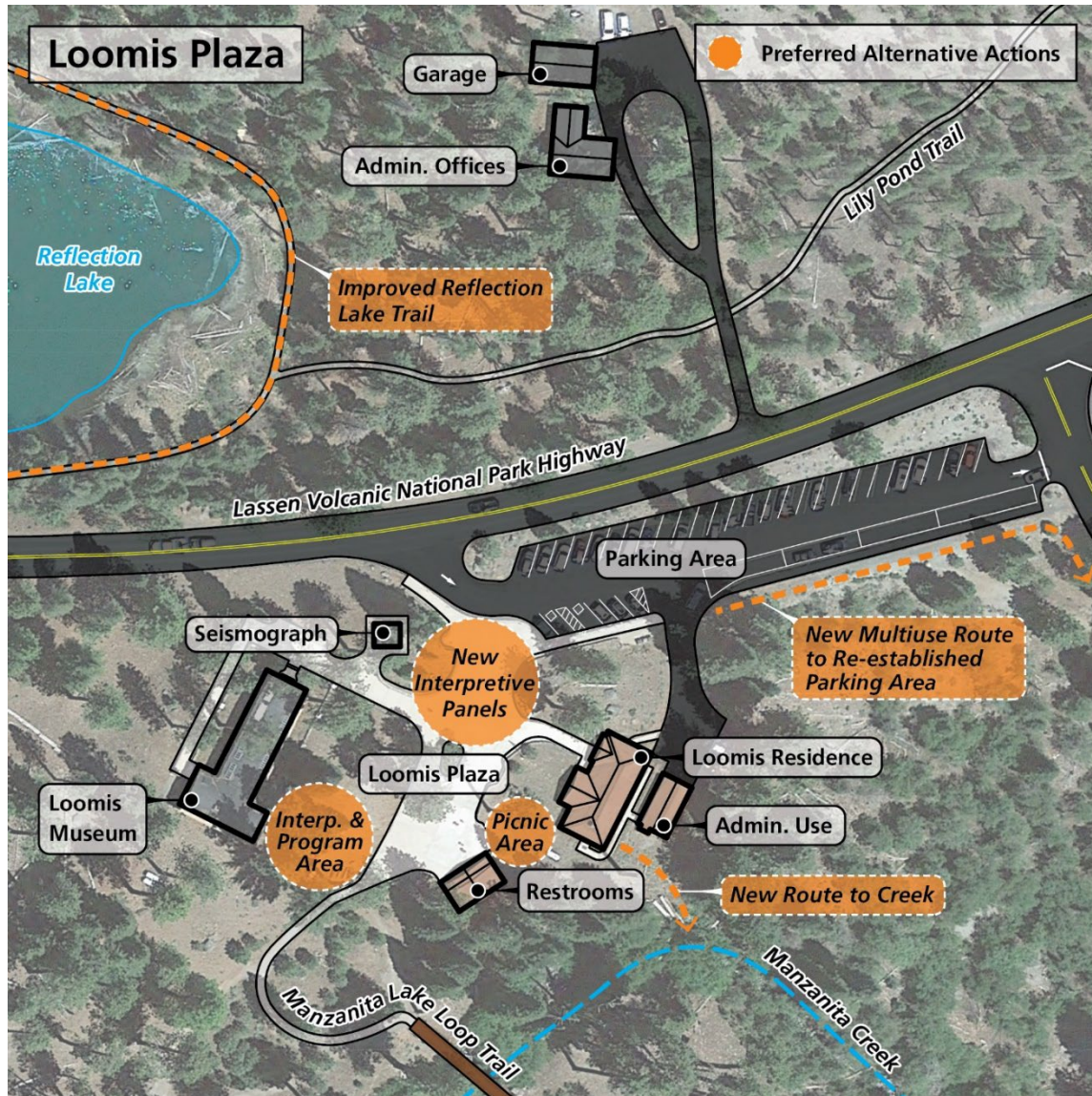


FIGURE 14. LOOMIS PLAZA NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Day Use and Manzanita Lake

Under the NPS preferred alternative, the multiuse paved path would connect visitors from Loomis Plaza to the day use area (see figure 15). The preferred alternative would retain some picnic tables in the day use area; however, park staff would encourage visitors to use other

picnicking opportunities throughout the Manzanita Lake Developed Area to help reduce trash and resource damage to the lake.

The existing boat launch would be removed and replaced with a prefabricated accessible boat launch to better meet NPS character and aesthetics. A bulkhead platform would be installed along the lakeshore to connect one end of the boat launch with two metal posts driven into the sand on the other end of the launch. The dock and boat launch would be disconnected in winter to be stored on land. An accessible fishing pier that is approximately 650 square feet would be installed to the northwest of the boat launch. The pier would be T-shaped, with wood planks that connect to the shoreline by a concrete pad. Six metal pilings would be driven into the lakebed to ensure the stability of the fishing pier. A metal railing would go along the edge of the entire fishing pier, with a lowered accessible section. The Manzanita Lake Trail would be rerouted along the shoreline near the day use area to help reduce user conflicts. Approximately 400 linear feet of the trail would be reconstructed. To help prevent the spread of aquatic invasive species, a boat cleaning station with educational signage would be provided at the existing RV dump station.

The preferred alternative improves the visitor experience along the entire Manzanita Lake Trail, while also protecting important resources of the park. The existing 1.9-mile trail would remain a natural surface but would be made accessible by removing large openings and thresholds barriers and providing a small bridge over the creek crossing to meet ABAAS/IBC requirements. Improved wayfinding and interpretive signage along the trail would help visitor orientation and educate visitors about resource protection. An interpretive water trail on the lake would also be established, and additional compliance would be needed when final design and location were decided.

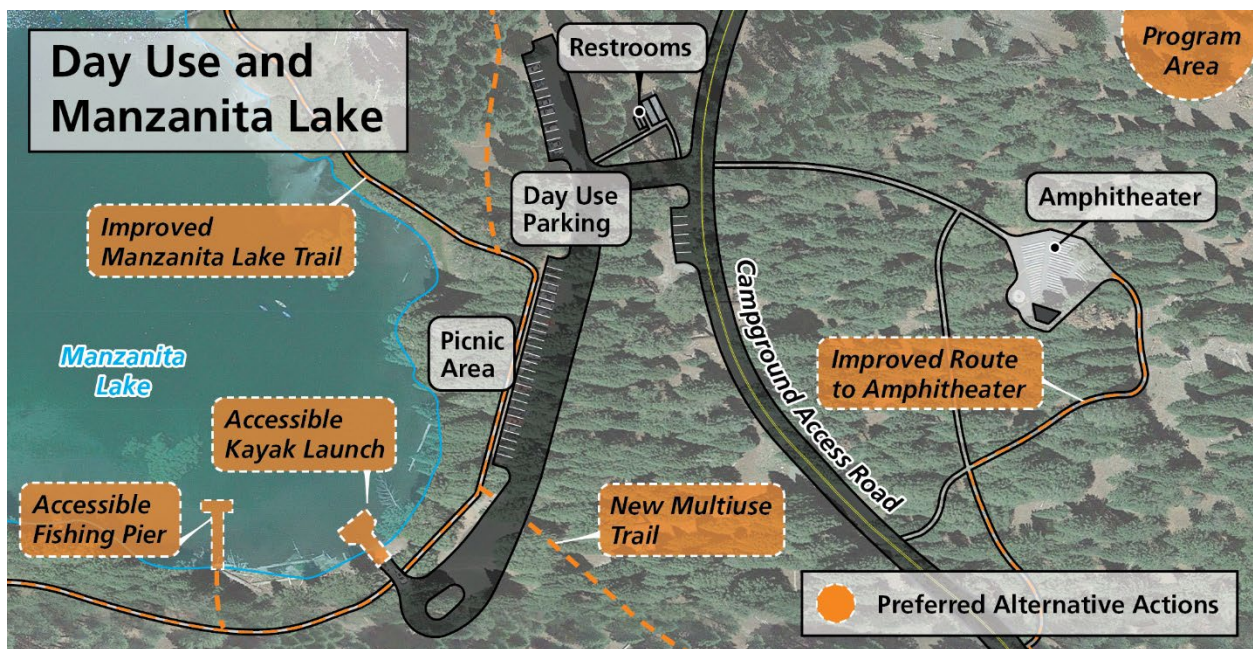


FIGURE 15. DAY USE AND MANZANITA LAKE NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Manzanita Lake Dam

The existing dam and associated dike do not meet current dam safety standards. The existing structure is deficient in several categories, including hydraulic and seismic criteria. In a separate environmental assessment, the structures would be modified to bring them into compliance with current standards. Park managers anticipate that the construction site would be accessed from the western boundary of the park to minimize impacts on the historic Manzanita Lake Trail. The construction area would be surveyed for both natural and cultural resources before the start of any work. Numerous trees would likely be removed within the footprint of the engineered features, with efforts to maintain as many trees as possible to preserve vistas from the lake. Temporary structures would be used within Manzanita Lake to allow for any necessary in-water work during construction. The new engineered structures would incorporate a pedestrian bridge over the dam spillway to maintain connectivity along the Manzanita Lake Trail. The lake level, outstanding fishery, attraction of diverse animal and plant life, and recreation opportunities would all be retained. Additional engineering and design are ongoing, and separate compliance for the dam and dike reconstruction would be completed before implementation.

Reflection Lake

The 0.6-mile Reflection Lake Trail would be widened to 4 feet and would maintain a natural firm surface, with minor rerouting to make it universally accessible. Additionally, tree roots and other barriers would be removed to improve accessibility.

Amphitheater and Living History Program Area

Connectivity between the amphitheater and campground would be improved by linking these sites to the areawide multiuse trail. The paved, 400-foot by 5-foot accessible route would be provided at the front of the amphitheater and the existing “arrival” experience of walking through the woods would be maintained. Additional upgrades within the amphitheater include night sky-friendly lighting, audiovisual equipment, seating, and accessibility. The amphitheater could also be used as a Tribal interpretive area. Beyond the amphitheater is the living history program area. Minimal improvements to the area are being proposed; however, the 900-foot by 4-foot trail surface would be hardened to make it accessible while using a material that blends into the surroundings to maintain the character of the program.

Campground and Night Sky Program Area

The preferred alternative would improve the sequence of facilities at the camper store to minimize conflicts between vehicles and pedestrians (see figure 16). The road would be relocated to the far east side so vehicular traffic could move freely through the area without vehicles backing up into it. The parking lot would be relocated to the west of the new road alignment and connect directly to an improved picnic plaza and the camper store. To accommodate the new sequence of facilities, 12,000 square feet (400 feet by 30 feet) of new pavement would be constructed. The areawide multiuse path would pass the camper store and connect to the day use area to the west and the campground and night sky viewing area to the south. The concept would provide a wide range of camping experiences in the campground. Concessioners would provide glamping sites in addition to the existing camping cabins. Loop A

would be retrofitted to lengthen campsite parking spurs and expand vehicle turning radii to accommodate larger (45-foot) RVs. Up to 12,000 square feet of new pavement would be needed to modify the Loop A road and parking spurs. Additionally, Loop D would remain a tent-only loop to help disperse and separate camping uses throughout the campground.

Additional design for these campground elements would be necessary before development. Design elements would be in keeping with NPS Campground Design Guidelines. Additional compliance and/or consultation would be conducted following design if warranted.

In the southern section of the campground, the night sky program area would be formalized, made accessible, and improve the visitor experience. A 10-foot by approximately 900-foot multiuse paved accessible route would connect visitors from accessible parking stalls to interpretive panels, four 100 square foot hardened telescope platforms, and a native plant garden that could provide visitors with information about the traditional (or Tribal) uses of native plants.

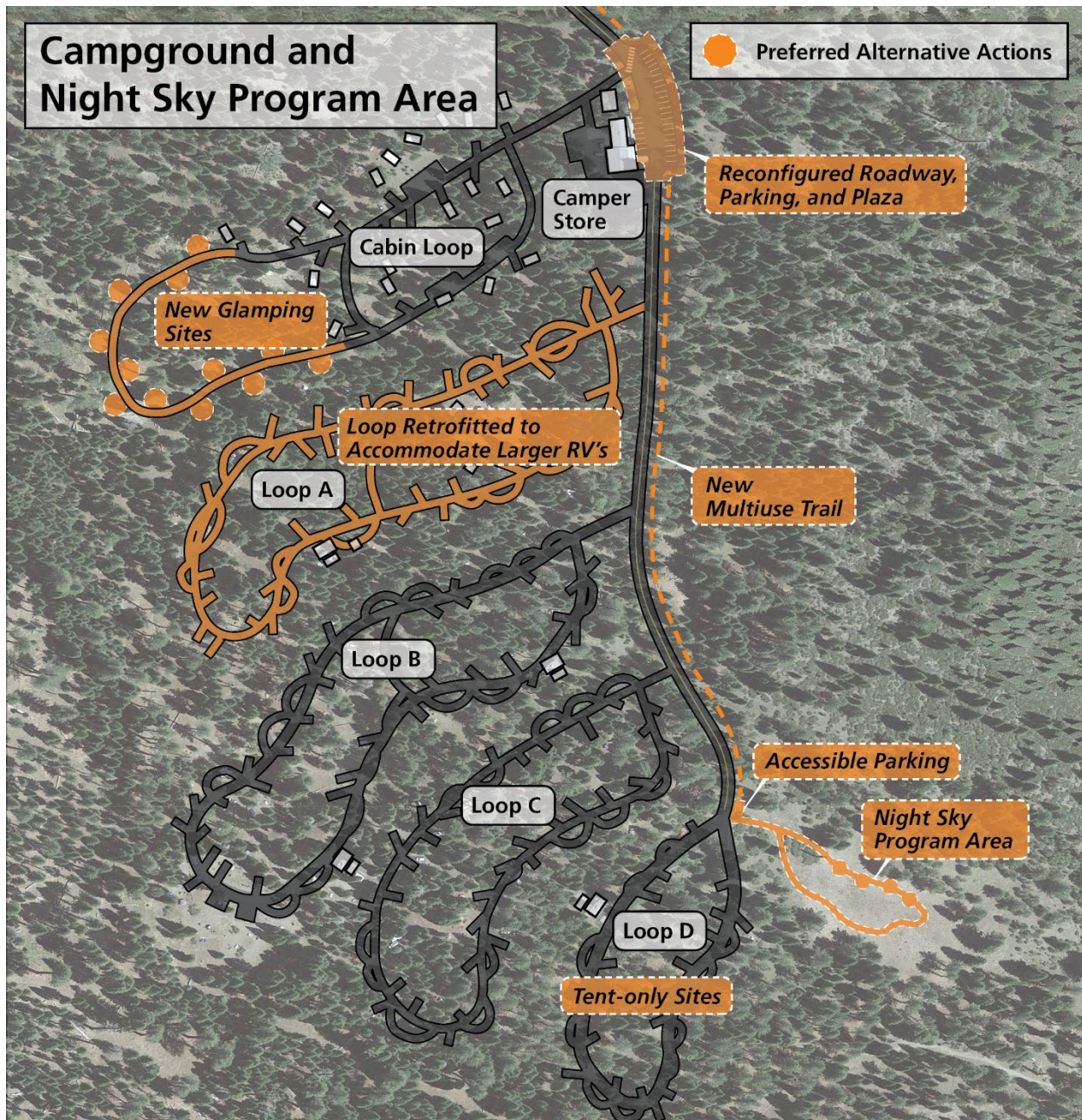


FIGURE 16. CAMPGROUND AND NIGHT SKY PROGRAM AREA NPS PREFERRED ALTERNATIVE CONCEPTUAL DRAWING

Visitor Use Management

This plan incorporates the process described by the Interagency Visitor Use Management Council's (IVUMC) Visitor Use Management Framework (IVUMC 2016) to develop long-term strategies for managing and monitoring visitor use within the park. Key aspects of visitor use management incorporated into this plan include the identification of desired conditions, indicators and thresholds, and visitor capacity.

Desired Conditions

Desired conditions are statements of aspiration that describe resource conditions, visitor experiences and opportunities, and facilities and services that an agency strives to achieve and maintain in a particular area. They help park managers answer the question, “What are we trying to achieve?”

According to *NPS Management Policies 2006*, “Through its planning processes, the Park Service will determine the desired future conditions for natural and cultural resources for each park unit and identify a strategy to achieve them” (4.1) (NPS 2006b). This plan establishes desired conditions for visitor experience and resource conditions at Manzanita Lake. The following desired conditions are based on guidance from previous planning efforts—including the 2003 general management plan, interdisciplinary discussions, and the park’s 2016 foundation document and are an update to those desired conditions listed in the general management plan. These desired conditions are based on the park’s fundamental resources and values, associated visitor experience opportunities, and the types and levels of management, development, and access that are appropriate in different locations. Desired conditions updated during this planning process guided the development of the management actions and visitor use management strategies included in this plan.

Visitor Experiences

- Manzanita Lake Developed Area is a main entry point to Lassen Volcanic National Park, welcoming visitors and providing orientation to the activities and opportunities available in the park. The area is a launching point for visitors starting their park visit, as well as those heading into the park’s backcountry and wilderness, providing access and information that support visitor orientation.
- Manzanita Lake Developed Area showcases the significance of Lassen Volcanic National Park and the fundamental resources and values for which the area was set aside as a national park.
- While the visitor experience is highly social and encounters with other visitors and park staff are expected, Manzanita Lake Developed Area is not overcrowded, and visitors are able to access and move through the area freely.
- Circulation around different parts of the Manzanita Lake Developed Area is clearly marked and easy to navigate. Trails, facilities, services, and programs are convenient and accessible to all visitors to the greatest extent possible. Pedestrian and bicycle routes are separated from vehicle traffic to provide a safer and more enjoyable visitor experience. The area provides connectivity between activity areas via paths or trails.
- The area can accommodate large events and myriad opportunities for visitors to learn about and enjoy the diverse resources Lassen Volcanic National Park has to offer. A wide variety of interpretive programs, products, and narratives, including Tribal perspectives, are showcased in the area.

- The area is managed to enhance visitor experience with nature, including the ability to engage and connect with the natural environment and feel separated from their day-to-day lives.
- Access to a variety of recreational uses is available, including hiking, bird watching, the world-class catch-and-release fishery, boating, swimming, and overnight use. Visitors only need minimal outdoor skills to engage in these activities.
- The iconic views from Manzanita Lake of Lassen Peak and Chaos Crags are preserved and showcased as key elements of a visit to the area. Visitors can also view the spectacular wildflowers that bloom at Manzanita Lake.
- Nighttime visitors experience the dark night skies anywhere they find open sky. Views from Manzanita Lake offer spectacular, mirror-like reflections of the starry sky.
- Within the area north of Highway 89, visitors can access and enjoy interpretive trails around the ranger office. These trails offer a less-crowded experience and connectivity to other areas within Manzanita Lake. Visitors are able to safely move around the area and cross the highway.
- Campground
 - The Manzanita Lake Campground is a highly social area, alive with the sights, sounds, and smells of the natural area and visitors of all ages and backgrounds. More restrained noise and light levels prevail during nightly quiet and dark hours.
 - While the campground is a highly social and developed area, sustainable and environmentally conscious camping practices that maximize and protect the surrounding natural qualities are implemented whenever possible.
 - Visitors have a spectrum of overnight opportunities that reflect a variety of camping styles, ranging from traditional tent sites to more developed and facilitated opportunities.
 - The campground supports access and use for a diversity of visitors.

Cultural Resources

- Visitors enjoy a sense of the 20th-century history of the area as they engage with the architecture and landscape of the Manzanita Lake Historic District, which is in the National Register of Historic Places for its 1925–1936 period of significance.
- Loomis Plaza
 - The historic buildings at Loomis Plaza interpret park history and provide current visitor information. The historic buildings, including the Mae Loomis Memorial Museum, the seismograph building, and the Loomis Residence are preserved and evoke a sense of the past.

- Visitors have opportunities to view and engage with the Loomis family photo archive, current and previous artists-in-residence, and other art, which includes photos of the drastic 1915 eruption of Lassen Peak. The photo archives are also highlighted for interpretation.
- Archeological and ethnographic histories and resources of the Native peoples connected to the park, including the Yana/Yahi, Atsugewi, and Maidu, are preserved and highlighted for interpretation. Cultural demonstrations and interpretive programs are offered within the Manzanita Lake Developed Area. The National Park Service works together with Tribes to preserve and document park collections and resources and to create exhibits, publications, and programs to tell their stories.
- All cultural resources are identified, evaluated, and documented to integrate cultural resource concerns into broader park planning processes, to avoid or minimize harm to cultural resources, to identify the most appropriate uses for cultural resources, and to determine the ultimate treatment (preservation, rehabilitation, restoration) for cultural resources.

Natural Resources

- Natural resources and associated values are protected, restored, and maintained in good condition and managed within the broader ecosystem. Specifically, the lakes and surrounding forests and canopy experience natural species evolution with minimal human intervention. Although the area has substantial development and concentrated human use, natural processes and sensitive habitat are not significantly affected.
- The habitats in and around the Manzanita Lake Developed Area, including the forest, shrubs, lakes, creeks, and wetlands, are intact and protected as refuges that attract and sustain diverse wildlife.
- Wildlife moves through the area and can often be viewed by visitors. Conflict between visitors and wildlife is minimal.
- Bears do not encounter or engage with visitors, their property, or the area's facilities (e.g., buildings, cars, trashcans).
- Evidence of fire management is all around the Manzanita Lake Developed Area, per the Northwest Gateway Forest Restoration Project and the Lassen Volcanic National Park Wildland Fire Management Plan. This evidence includes the use of fire management tools, activities, and partnerships that support a more fire-resilient landscape.
- Manzanita Lake is designated as wild trout waters by the California Fish and Game Commission and is highly valued as a blue-ribbon fishery.
- Lassen Volcanic National Park is managed as an International Dark Sky Park.

Management and Operations

- Management incorporates best practices and administrative efficiencies to support the implementation of management actions in the Manzanita Lake Developed Area.

- Management operations emphasize visitor protection and safety. Limited conflict exists between park operations and visitors.
- Administrative facilities are designed to be rustic and nonintrusive and conform to parkwide architectural standards. Landscaping supports the overall cultural landscape, resisting exotic and invasive species proliferation, and emphasizing native plants.
- A wide variety of services are provided in the Manzanita Lake Developed Area. The area has a mixture of concession-run and park-run services, including the wilderness office, where visitors can obtain wilderness permits.
- The dam's purpose at Manzanita Lake functions as it was intended when built. The dam is preserved to maintain the lake's integrity and protect visitor safety now and into the future.
- The National Park Service supports and benefits from close partnerships with a spectrum of national and local programs and organizations that uphold the NPS mission. Partners provide important support for education, sustainability initiatives, management solutions, and park research.
- The National Park Service fosters a culture of collaboration and shared stewardship with associated Tribes in and around the Manzanita Lake Developed Area.
- The facilities in the area north of Highway 89 are for administrative uses, research, and partnership groups.

Indicators and Thresholds

Monitoring in this plan is accomplished through establishment of “indicators” and “thresholds.” Indicators are specific resource or experiential attributes that can be measured to track changes in conditions so that progress toward achieving and maintaining desired conditions can be assessed. Thresholds are the minimum acceptable conditions associated with each indicator. Indicators and thresholds provide park managers with monitoring protocols to ensure desired conditions for resources and visitor experiences are achieved and maintained over time.

The planning team identified four indicators that are most important to monitor the effectiveness of the plan's management strategies. The four indicator topics are crowding in and on Manzanita Lake, parking and safety, impacts on vegetation from social trailing, and human/wildlife interaction. Appendix A includes the full descriptions and rationales for each of these indicators.

To keep conditions within the identified thresholds, the planning team identified management strategies associated with each indicator. Several of these management strategies are currently in use and may be increased in response to changing conditions. Other management strategies would be implemented upon completion of the plan to ensure conditions do not approach thresholds. These management strategies would be implemented if and when monitoring indicates that conditions are changing and triggers or thresholds are being approached or exceeded. The impacts of these management strategies are analyzed in chapter 3. See

appendix A for detailed descriptions of the indicators and thresholds along with rationales for why the indicator was selected, monitoring protocols, and management strategies that may be used.

Visitor Capacity

Visitor capacity is a component of visitor use management defined as the maximum amount and types of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences consistent with the purpose for which the area was established (IVUMC 2019). Visitor capacity would be used to inform and implement the management strategies included as part of this design concept plan. By establishing and implementing visitor capacities, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. This plan contributes to meeting the legal requirements (National Parks and Recreation Act of 1978, 54 USC 100502 [United States Code]) to identify and implement visitor capacities by including detailed direction and analysis for the park's action area. See appendix B for visitor capacity identifications and potential adaptive strategies.

ACTIONS AND ALTERNATIVES CONSIDERED BUT DISMISSED

The National Park Service considered various elements or actions that could be part of a future proposed action alternative during the planning process and dismissed these elements from this planning process for various reasons, including the following.

Reroute Highway 89

Rerouting the highway was considered to reduce pedestrian and vehicular conflicts. The National Park Service determined there would be too significant of an impact on historic properties listed or eligible for listing in the National Register of Historic Places, so this action was dismissed.

Move the Entrance Station Kiosk

Park managers considered moving the entrance station kiosk slightly from its current footprint to accommodate two lanes of incoming traffic more easily. Nonetheless, moving the entrance station kiosk would detract from its historic character, so this action was dismissed.

Reuse of Pulloff Area Near the Entrance Kiosk

Park managers considered removing the pulloff area past the entrance station but determined that the views of Manzanita Lake were an important visitor experience and taking away the pulloff would be undesirable. Additionally, park managers considered formalizing the pulloff area to add long-term parking. The National Park Service determined that this would also impact the visitor experience since cars would take up spots for people wanting to quickly stop and briefly take in the view. So, the action of providing long-term parking was also dismissed.

Remove the Boat Launch

The National Park Service considered removing the boat launch to protect the viewshed and lake; however, park managers determined that allowing visitors out on Manzanita Lake was a key visitor experience that is important to protect.

Remove Vehicle Parking by the Boat Launch

There were concerns that having vehicles near the boat launch impacted the viewshed of Manzanita Lake; however, the action to remove vehicle parking by the boat launch was ultimately dismissed because it is integral to provide access for visitors going on the lake with equipment.

Move the Amphitheater

To create a better flow for pedestrian circulation, relocating the amphitheater was considered. The amphitheater is a Mission 66 structure and the only Mission 66 structure in the campground that has retained its integrity. The National Park Service determined that relocating the amphitheater would have an adverse impact on the historic structure, so this action was dismissed.

Relocate the Camper Store and Gas Station

To reduce vehicle congestion, relocating the camper store and gas station outside of the campground was considered. Park managers determined that the camper store and gas station provide check-in services and other amenities commonly used by visitors staying in the campground and moving it further away from the campground would detract from positive visitor experiences.

Provide Walk-in Campsites at the Campground

Park managers considered adding a walk-in camping loop to the east of the existing campground. Since the park already offers this camping experience in other parts of the park and there is limited demand for walk-in camping in this area, adding walk-in campsites at Manzanita Lake Campground was dismissed.

Provide Large RV Campsites throughout the Campground

Expanding turning radii and parking stalls throughout all the loops of the campground was considered to provide parking for larger RVs. To keep similar camping experiences together and reduce the amount of pavement that would be added, the National Park Service determined to designate one loop for large RVs and dismiss the action of expanding parking stalls and turning radii throughout the campground.

COMPARISON OF THE ALTERNATIVES

The following table provides a comparison of the two alternatives by location.

Table 2. Comparison of Alternatives by Location

Location	No-Action Alternative	Action Alternative
Lassen Crossroads	<ul style="list-style-type: none"> • Some outdoor, year-round information displays • Parking for standard vehicles • Seasonal flush toilet 	<ul style="list-style-type: none"> • Additional outdoor, year-round information displays • Parking for standard vehicles and electric vehicle charging stations • Additional year-round vault toilet • Formalized trailhead for the Nobles Emigrant Trail
Entrance station	<ul style="list-style-type: none"> • One entrance lane, one exit lane • Unimproved pulloff to view Manzanita Lake, frequently used by visitors as long-term parking 	<ul style="list-style-type: none"> • Two entrance lanes, one exit lane • Formalized pulloff to view Manzanita Lake, with no long-term parking
Administrative uses	<ul style="list-style-type: none"> • No additional uses 	<ul style="list-style-type: none"> • Administrative sites used for camping by researchers or as private Tribal areas
Parking and circulation	<ul style="list-style-type: none"> • One large parking lot, located near Loomis Plaza • Limited visitor facilities provided • Existing natural surface trail connecting Loomis Plaza and the day use area, with no accessibility improvements • No improvements to the pedestrian crosswalk on the park highway • Small native surface parking for Chaos Crag Trail, with poor site distance 	<ul style="list-style-type: none"> • Parking near Loomis Plaza retained and 40-vehicle parking lot in previously disturbed area reestablished • Additional visitor facilities, such as electric vehicle charging stations, vault toilets, bus and large vehicle parking, and picnic tables • Expanded multiuse trail to connect all facilities and areas, with accessibility improvements and night sky-friendly lighting • Improved safety features for pedestrian crossing at the park highway • Trailhead for Chaos Crag Trail, located in the new paved parking area
Loomis Plaza	<ul style="list-style-type: none"> • Loomis Museum continues as main hub for visitor information and orientation, with no outdoor informational exhibits • Interpretation and education programs continue at the plaza, with limited visitor facilities • Seismograph building remains closed • No accessible access to the Loomis Residence 	<ul style="list-style-type: none"> • Loomis Museum and Loomis Residence open for visitor orientation and information, with additional outdoor exhibits provided when the museum is closed • Formalized interpretation and education program area at the plaza, with a shade structure, picnic tables, benches, and water filling stations • Seismograph building interpretation

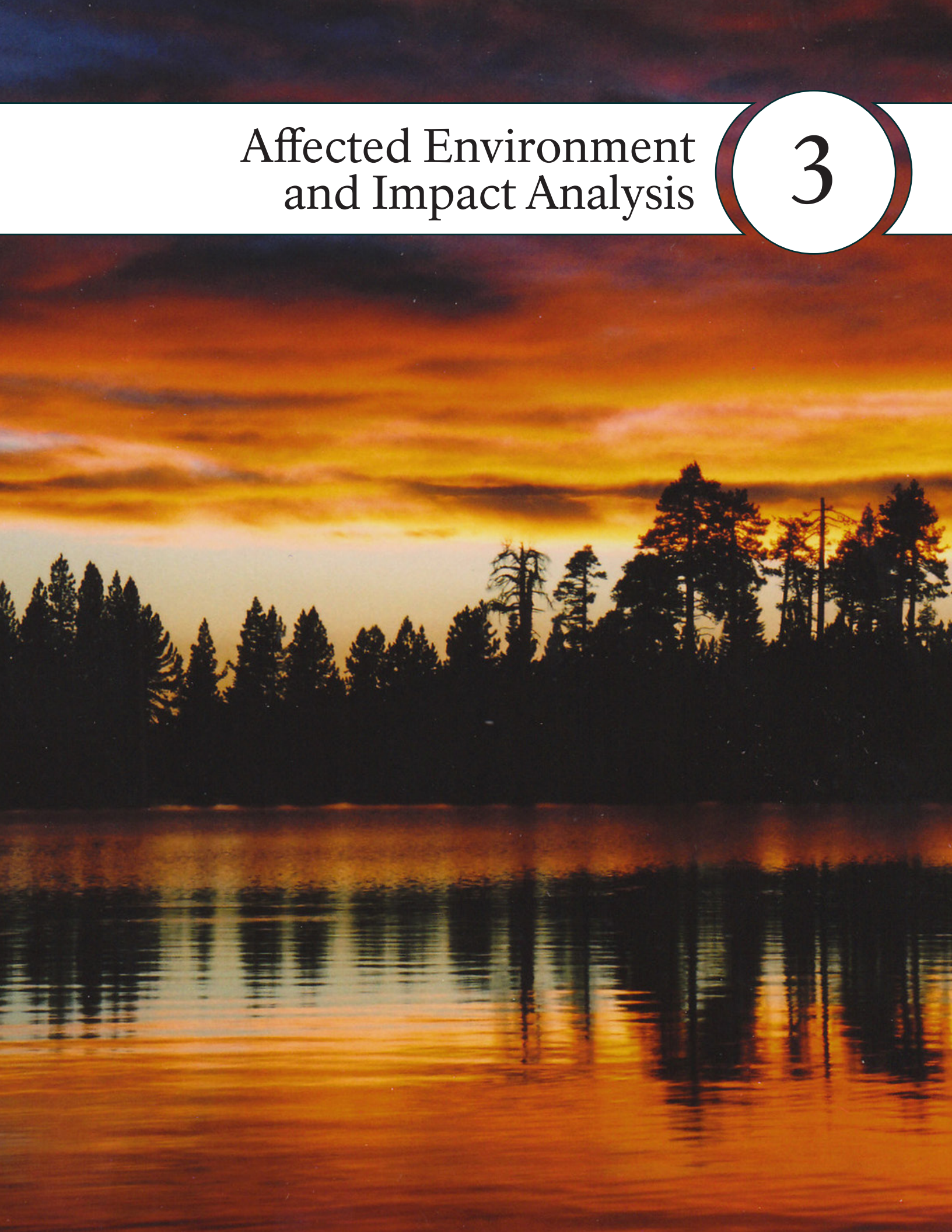
Location	No-Action Alternative	Action Alternative
		<ul style="list-style-type: none"> • Accessible entrance to the Loomis Residence • Accessible trail from Loomis Residence to a clearing by Manzanita Creek
Day use area and Manzanita Lake	<ul style="list-style-type: none"> • Picnicking along the shoreline of Manzanita Lake • One unimproved boat launch for both public and concessioner use that is not accessible • No boat cleaning station • Manzanita Lake Trail continues to have a natural surface with accessibility barriers • Limited visitor orientation along the trail, with social trails present • No improvements to the dam, dike, and water outlet • No improvements to the Reflection Lake Trail 	<ul style="list-style-type: none"> • Less crowding at the shoreline due to picnicking at the new parking area • An accessible boat launch that meets NPS aesthetic characteristics • Manzanita Lake Trail rerouted • Accessible fishing pier • Boat-cleaning station at the RV dump station • Natural surface with accessibility improvements for Manzanita Lake Trail • Additional visitor orientation along the trail, with social trails restored • Conceptual resource impacts addressed regarding Manzanita Lake Dam improvements • Reflection Lake Trail's natural surface hardened and widened to meet ABBAS/IBC requirements
Amphitheater and Living History Program area	<ul style="list-style-type: none"> • Route to amphitheater remains paved with some accessibility barriers • No improvements to the amphitheater, limited accessibility, poor equipment, and impacts on night sky viewing • Route to Living History Program remains a natural surface with some accessibility barriers 	<ul style="list-style-type: none"> • Paved route to amphitheater, with improvements to the surface for accessibility • Accessible routes and seating areas at the amphitheater, with improved audio-visual equipment and lighting that enhance night sky viewing • Hardened surface and accessibility improvements for route to Living History Program
Campground and Night Sky Program area	<ul style="list-style-type: none"> • Campground road bisects the parking lot for the camper store • Limited seating provided at the camper store • Camping cabins and glamping opportunities provided by concessioner • Large RVs not accommodated in the campground • Loop D a tent-only campsite loop • Unimproved night sky viewing program area, with limited accessibility and no associated parking 	<ul style="list-style-type: none"> • Campground road rerouted on the east side of the parking lot • Additional seating provided by the camper store • Camping cabins and glamping opportunities provided by concessioner • Loop A retrofitted to accommodate large RVs in the campground • Loop D a tent-only campsite loop • Improved night sky viewing program area, with an accessible path around it and accessible viewing platforms;

Location	No-Action Alternative	Action Alternative
		parking at the south end of the campground
Visitor use management	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> Implementation of the Visitor Use Management Framework, including desired conditions, indicators and thresholds, and visitor capacities

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Affected Environment and Impact Analysis

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CHAPTER 3: AFFECTED ENVIRONMENT AND IMPACT ANALYSIS

INTRODUCTION

This chapter describes the resources that could be affected, as well as the potential environmental consequences of implementing one of the alternatives being considered.

The issue topics presented are those related to the key issues of this planning process. The descriptions of the resources provided in this chapter serve as baseline conditions against which the potential effects of the preferred alternative can be compared. Included in this analysis are the following issue topics: vegetation and soils, at-risk species, wetlands, visitor use and experience, historic structures, cultural landscapes, archeological resources, and ethnographic resources.

VEGETATION AND SOILS

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Vegetation in the Manzanita Lake Developed Area is diverse, in part because the park occupies a geographic zone where three major ecological systems meet: the southern Cascades, the Sierra Nevada, and the Great Basin. Elevation in the Manzanita Lake Developed Area ranges from approximately 5,800 feet to 6,200 feet. Of the four major plant communities occurring within the park (red fir forest, yellow pine forest, subalpine forest, and alpine fellfields), the Manzanita Lake area is primarily composed of yellow pine forest. Yellow pine forest contains mature stands of Jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), white fir, ponderosa pine, lodgepole pine, western white pine, incense cedar (*Calocedrus decurrens*), and red fir. Common understory species include western needlegrass (*Achnatherum occidentale*), bottlebrush squirreltail (*Elymus elymoides*), and greenleaf manzanita (*Arctostaphylos patula*). Disturbances such as fire contribute to the longstanding diversity of vegetation in the park. The proposed area also includes minor plant communities such as montane chaparral, herbaceous wet meadows, and riparian areas.

Soils in the Manzanita Lake Developed Area are generally loamy, ashy, and gravelly sloped sands. Soils in the park are almost exclusively volcanic in origin. Soil depths in the proposed area are typically several feet deep. In the action area, there are organic-rich soils in the wet meadows. These soils are predominately peat and mucky loams. The park's dynamic history of glaciation and recent volcanic activity provides a suite of diverse substrates, ranging from excessively dry volcanic cinders to hydrothermally altered clays. The range of geologic formations and chemically and texturally varied soil types also contributes to species diversity, as well as the many anomalies within each community type. Because of their rocky, porous nature, most soils are rather resistant to erosion.

Threats to vegetation and soils in the proposed area include compacted soil, erosion, vegetation succession, fire management, pests and pathogens, invasive plants, and climate change (NPS 2013). Disturbance from recreational use in and around the lake and campground and along

trails have increased impacts of vegetation trampling and soil compaction. Park management efforts are actively working to improve forest diversity and cover to ensure healthy vegetation succession and a community resilient to fire impacts. Vegetation restoration can be challenging in this area due to compacted soils and erosion. Pathogens, such as blister rust, continue to impact pine and conifer communities within the park, and beetles continue to take advantage of trees stressed by drought and warmer temperatures (NPS 2021c). Manzanita Lake trends of invasive vegetation species is somewhat concerning, and the trends in the plant species diversity and rare species is intermediate (NPS 2013). The negative impacts of pathogens, pests, and invasive species are all further exacerbated by increased drought and warmer temperatures due to climate change. Past actions, such as road construction and maintenance activities, have resulted in vegetation clearing, the introduction of invasive plants, and soil erosion. Planned future hazard tree removal would result in the removal of individual trees. These past, present, and reasonably foreseeable future projects contribute to overall adverse trends in vegetation and soils in the park.

Impacts on Vegetation and Soils

No-Action Alternative. Under the no-action alternative, the condition of vegetation and soils would remain the same as described in the affected environment. The current resource threats and impacts on vegetation and soils would continue to occur.

Action Alternative. Under the NPS preferred alternative, the newly constructed trails, improvements to existing trails, and paving associated with infrastructure would require vegetation clearing and ground disturbance in various locations. Initial trail construction would cause soil compaction and loss through grading. The placement of pavement would result in soil compaction and permanent reduction of soil productivity. Estimated areas of impact are presented below; these numbers are approximate because the trail alignments are conceptual at this stage and could change slightly during final design and implementation. Estimates account for the trail widths, potential soil disturbance outside of the trail surface, and the distance of vegetation thinning and trimming beyond the trail. Because of rounding, numbers presented may not add up precisely to the totals provided.

- Collectively, natural surface trail improvements and development would result in a footprint of up to approximately 2.4 acres. This change would include the extension of the Nobles Emigrant Trail (0.1 acres), Manzanita Lake Trail ABAAS and IBC improvements (1.8 acres), and the widening of the Reflection Lake Trail (0.4 acres).
- Collectively, paved surface trail improvements and development would result in a footprint of up to approximately 1.2 acres. This change would include paving a new ABAAS and IBC path to the parking lot (0.9 acres), improving cracked sections of the Manzanita Lake Trail (0.07 acres), two hardened paths at the amphitheater (0.1 acres), and a new ABAAS- and IBC-compliant night sky path (0.1 acres).
- Paved surface development for infrastructure would result in a footprint of up to approximately 0.8 acre. These changes would include improvements at the entrance station (0.04 acres), parking lot expansion of 40 stalls (0.5 acres), campground paving (0.3

acres), improvements to spurs in loop A (0.02 acres), and a hardened telescope platform (0.01 acres).

In total, up to 4.5 acres of predominantly native vegetation would be permanently removed for the development of natural and paved trails and for infrastructure development. Vegetation types impacted by removal would include white fir, Jeffrey pine, and willow shrub. Construction activities and fill associated with curves would temporarily impact soils within a 5-foot-wide perimeter around the final parking lot footprint. Recreational use of the trails would cause continued adverse soil impacts, including the loss of organic litter and soil compaction, rutting, and erosion. In addition, trail widening or braiding could result in soil compaction and erosion on either side of new trails. Reducing social trailing and restoring these social trails to natural conditions would have a positive impact on soils. Of these 4.5 acres of impact, 2 acres of impact would involve increases of pavement, reduction of impervious surface, and the loss of soil productivity. This increase in pavement could impact natural drainage flow patterns in the local project area. However, the increased impervious surface area would not be concentrated in one single area and with mitigation measures impacts would be considered negligible across the 106,240-acre park.

The dam and dike improvements would result in temporary impacts of soil compaction and vegetation trampling during construction at the job site, an access route to the job site, and construction of the pedestrian bridge. Numerous trees would be removed within the footprint of the engineered features, a long-term negative impact on vegetation and soils. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation.

Trail design and route placement would minimize vegetation removal, and in forests and woodlands, best management practices and mitigation measures, as described in appendix C, would be implemented. Examples of applicable best management practices include designing trail alignments to avoid and minimize the removal of mature healthy trees, staging in previously developed areas or in the immediate project area, and limiting the amount of time soil is left exposed and applying other erosion control measures to reduce adverse impacts from trail construction, maintenance, and use.

Cumulative Impacts. As previously described, no new impacts would occur under the no-action alternative, and thus, no cumulative impacts on vegetation would occur.

Implementing the preferred alternative would result in ground disturbance and vegetation clearing of up to approximately 4.5 acres of vegetation, and soil compaction, and/or or loss of productivity in up to 2 acres. The successional process of reforestation currently taking place after the eruptions of Lassen Peak in 1914 and 1915 involve herbs, shrubs, and trees taking root in the coarse soils of recent lava flows. Human activities, particularly fire suppression, have also altered the structure and composition of forest vegetation. In addition to broad-scale changes in vegetation characteristics, relatively small patches and corridors of habitat have been lost in the park in areas that have been developed for facilities, trails, and roads. Adverse impacts on soils as a result of other past and ongoing actions include compaction, soil mixing, and soil loss from removal and erosion, development and concentrated visitor use in the park, and areas where soils have been disturbed and revegetation has not occurred naturally or been undertaken by

park staff. Other impacts include an overall decrease in soil infiltration, where hardening of surfaces (roads, walkways, buildings) has occurred. Some restoration and development projects (e.g., the addition of new visitor service facilities, restoration of old roads or building sites) could occur within the park and project vicinity. These projects could contribute additional beneficial and adverse impacts on soils. Because most of the park continues to be undisturbed by human impacts (approximately 75% is designated wilderness), the amount of area affected by past and possible future projects is not substantial, and, therefore, soil impacts are relatively minor. Impacts under the preferred alternative, when combined with past, present, and reasonably foreseeable future actions and trends, would be adverse and long term (for the life of the trails and associated trail facilities). The impacts of the preferred alternative would contribute slightly to, but would not substantially change, the impacts that are already occurring on vegetation and soils because the total area of impact is small relative to the size of the park. Impacts from the above actions, in combination with the impacts of the preferred alternative would result in ongoing long-term negligible adverse cumulative effects on vegetation and soils.

Conclusion. The no-action alternative would be the continuation of current management. No new actions would occur, and thus, there would be no new impacts on vegetation and soils under this alternative.

Under the NPS preferred alternative, collectively, up to 4.5 acres of native and nonnative vegetation would be permanently removed for development of trails and infrastructure. To minimize impacts on vegetation, mitigation measures and best management practices would be implemented, as described in appendix C, such as locating staging areas in previously developed areas or in the immediate project area. A net increase of 2 acres of impervious surfaces in the park would occur from the addition of paved surfaces. The permanent removal of up to 4.5 acres of native and nonnative vegetation would not affect native vegetation at a population level, and no rare vegetation communities would be affected.

AT-RISK SPECIES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Two state-listed species have the potential to occur within the Manzanita Lake Developed Area: the state-endangered bald eagle and the state-threatened Sierra Nevada red fox. At the time of this writing, no other state-listed species under the California Endangered Species Act has the potential to occur within the Manzanita Lake Developed Area and, therefore, were not carried forward for analysis in this plan.

The bald eagle (*Haliaeetus leucocephalus*) is listed as state endangered under the California Endangered Species Act. Due to recovery efforts, the bald eagle was removed from the federal endangered species list in 2007; however, bald eagles are federally protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, both of which prohibit killing, selling or harming eagles, their nests, or eggs (CDFW 2022). There are two known bald eagle nesting areas within Lassen Volcanic National Park. One known bald eagle nesting pair nests outside of the project area at Snag Lake (NPS 2009). This pair has been monitored sporadically since its discovery in 1980, and their hunting territory comprised the eastern half of the park

(NPS 2013). A new nest was located at Manzanita Lake in 2018, approximately 0.25 miles west of the dike, near the park boundary. This nest was active until 2023 when the nest tree fell. No new nest was observed during surveys conducted in 2023, although adult bald eagles were observed at Manzanita Lake. Management actions are adjusted as necessary to prevent disturbance of nesting and hunting eagles. Bald eagles build their nests in trees greater than 30 inches in diameter, within a quarter-to-half-mile from a fish-providing water source (NPS 2009). Bald eagles mate monogamously year-round and lay 1–3 eggs at a time (Audubon 2022). Young depend on their parents until first flight at about 10–12 weeks (Audubon 2022). Nest sites are usually a mound of sticks lined with finer materials in very tall trees (Audubon 2022). Because of scarce food supply and relatively harsh nesting season climatic conditions, the park has extremely marginal bald eagle nesting habitat (NPS 2009).

Threats to bald eagles include human use of chemicals, habitat modification, and human disturbance (CDFW 2022). The development of roads, housing, agriculture, and timber harvest have all contributed to habitat modification of bald eagles (CDFW 2022). Historically, bald eagles were hunted and shot before the establishment of laws protecting them, which contributed to their lower populations (CDFW 2022). Recovery efforts are proving successful, resulting in growing numbers of breeding pairs in California and an expanding breeding range (CDFW 2022). Overall, bald eagles have a positive population trend (CDFW 2022).

The Sierra Nevada red fox (*Vulpes vulpes necator*) is listed as state threatened under the California Endangered Species Act. Lassen Volcanic National Park contains one of the two known California populations of the rare Sierra Nevada red fox, with one den site and four individuals documented (NPS 2021c). High densities of red fox are known to occur outside of the project area(s) near Lassen Peak (Schempf and White 1977). Most red fox sightings have been in developed areas along the main park road within the park, and the species is known to beg at parking areas and campgrounds throughout the park (NPS 2009). Sierra Nevada red foxes generally weigh 4.5 to 9 pounds, have a narrow-pointed muzzle, large pointy ears, and a slender body and legs (NPS 2020). Red foxes are typically yellowish to reddish brown but can also be black or silver with dark-brown markings on the top of their ears and shins, white covering their chest and stomach, and a white tipped bushy tail (NPS 2020). Red foxes generally occur above 5,000 feet in forest and fell fields, among red fir, lodgepole pines, and alpine fell fields (NPS 2020). Red foxes prefer high-elevation areas even in the winter but may visit lower-elevation areas in the summer (NPS 2020, 2009). Sierra Nevada red foxes are forest dwellers that use forests with large trees and more than 40% canopy closure in winter and range in areas up to 5,683 acres in summer (NPS 2013). Red foxes mate in late winter and birth litters of about five red fox pups in early spring (Johnson and Harris 2000). Den sites include rock outcrops, hollow logs and stumps, and burrows in deep, loose soil (Johnson and Harris 2000). Pups are dependent on parents for about six months and become sexually mature at 10 months (Johnson and Harris 2000).

Threats to red foxes include competition with other species, reduced prey populations, disease and reduced genetic adaptation, and climate change (NPS 2020, 2013). Red foxes compete with coyotes and American martens in hunting declining populations of small rodents such as hares and gophers (NPS 2020). There is concern that potential interbreeding with nonnative red foxes expanding into Sierra Nevada red fox territory may result in increased mortality from disease

and reduced genetic adaptation to local conditions (NPS 2013). Within the state of California, the red fox population is trending downward (Schempf and White 1977). Within the park, instances of vehicle collisions with the Sierra Nevada red fox have occurred, which contribute to its overall downward trend. Red foxes' regular begging at campsites and parking areas, below-average body size, large home ranges, and low-palatability foods in their stomachs are evidence of the species being under stress within the park (Perrine 2006). Park managers are reducing visitor impacts on the red fox by securing all food and waste from wildlife access via animal-proof food storage boxes at campsites and animal-proof trash cans throughout the Manzanita Lake day use area. The negative impacts of competition with other species and reduced prey are further exacerbated by reduced snowfall and increased drought due to climate change (NPS 2020).

Impacts on At-Risk Species

No-Action Alternative. Under the no-action alternative, the condition of the state-listed bald eagle and Sierra Nevada red fox would remain the same, as described in the affected environment. The current resource threats and impacts on the state-listed bald eagle and Sierra Nevada red fox would continue to occur.

Action Alternative. Under the NPS preferred alternative, there is a potential to impact the state-listed bald eagle and Sierra Nevada red fox due to development and construction in the project area. Following are I related unique impacts on each species.

There are no known bald eagle nests within the park currently. If a new nest were discovered, the nest would be monitored. If any activity were observed, a 0.5-mile limited operation period would be placed around the nest from January 1st to August 31st. A park biologist would determine whether a limited operation period would be initiated based on the type of disturbance anticipated. The limited operation period would be used to mitigate any sound impacts from heavy equipment and sounds, such as chainsaws, which can disturb nesting activity. Ongoing public use of the area would continue to cause periodic to consistent noise and human presence that would have short-term negligible impacts on the bald eagle. Noise and human presence would diminish in winter and during shoulder seasons, as well as at night and/or when work was completed. Above-ambient noise and activity during project implementation would coincide with the peak visitor use season during the heaviest use of the area. The noise and activity associated with the construction would generally be similar to and periodically louder than the visitor activity. The construction noise would contribute minorly to this area, which is already impacted by sounds from the highway, campground, and visitor use. These impacts are anticipated to be short term and directly from construction noise. No known bald eagle nesting trees would be removed. As a result, the impact on bald eagles would be minor and short in duration because no habitat would be removed and no project work would take place near known nesting areas during the nesting season.

Sierra Nevada red foxes are known to inhabit the project area, predominately in the winter. A maximum of 4.5 acres of permanent vegetation removal would occur in stands predominately consisting of white fir, Jeffrey pine, and willow shrub. Of those 4.5 acres, the majority of the vegetation removal would occur in already developed areas and would not detract from large tracts of high-quality habitat found elsewhere in the project area and park. While small

mammals such as the red fox could be disturbed by routine and ongoing maintenance actions, short-term impacts from construction are unlikely to impact the red fox since the species mainly uses the area in the winter, and all construction work would occur in nonwinter months when the ground is void of snow. Since trail and infrastructure impacts would be localized alongside an already highly modified corridor and a great deal of suitable habitat for the red fox would continue to be present in the vicinity, these impacts would be short term and minor.

The dam and dike improvements may result in temporary, short-term disturbances to state-listed species during construction at the job site, access to the job site route, and the construction of the pedestrian bridge. Numerous trees would be removed within the footprint of the engineered features, a potential long-term negative impact on both species if these trees contain suitable habitat for the state-listed species. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation.

Impacts on the bald eagle and the red fox would be mitigated by implementing the following measures (further described in appendix C), including implementing a limited operation period on construction activities if active nesting of bald eagles is identified and ensuring that above-ambient noises from trail repair would coincide with the busy summer season.

Cumulative Effects. As previously described, no new impacts would occur under the no-action alternative, and thus, no cumulative impacts on the bald eagle nor the Sierra Nevada red fox would occur.

Implementing the preferred alternative would result in no changes to bald eagle habitat, up to 4.5 acres of potential Sierra Nevada red fox habitat, and minor increase of short-term noise due to construction. The combined effects of development in the park and in the surrounding area over time, coupled with the purposeful eradication of many predator species during the 1800s and early 1900s, have contributed to low-level or extirpated wildlife populations in the park. While there are no major development projects planned for the park that would result in additional cumulative effects on either bald eagles or Sierra Nevada red foxes, the cumulative effects of existing development continue to take a toll on both species. The existence and maintenance of the road and park developed areas would continue to contribute to a long-term negligible-to-minor adverse effect on both species. Impacts under the preferred alternative, when combined with past, present, and reasonably foreseeable future actions and trends, would be adverse and long term. The impacts of the alternatives would contribute slightly to, but would not substantially change, the impacts that are already occurring to both species because of the distance to an active nest for the bald eagle and the seasonality of use for the red fox. Impacts from the above actions, in combination with the impacts of the preferred alternative, would result in negligible impacts on the bald eagle and Sierra Nevada red fox.

Conclusion. The no-action alternative would be the continuation of current management. No new actions would occur, and thus, there would be no new impacts on bald eagles and Sierra Nevada red foxes under this alternative.

Implementing the preferred alternative would result in no changes to bald eagle habitat, up to 4.5 acres of potential Sierra Nevada red fox habitat, and minor increase of short-term noise due to construction. To minimize impacts on the species, mitigation measures and best management practices would be implemented, as described in appendix C, such as implementing a limited

operation period on construction activities if active nesting bald eagles are identified, and ensuring that above-ambient noises from trail repair would coincide with the busy summer season. These changes would result in short-term negligible-to-minor impacts on the bald eagle due to noise and long-term minor impacts on the Sierra Nevada red fox due to reduction of up to 4.5 acres of potential habitat.

WETLANDS

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The wetlands in the Manzanita Lake Developed Area are primarily associated with Manzanita Lake and Reflection Lake. Of the four drainage basins within the park, this area sits within the Battle Creek watershed. Manzanita Lake was created from the Chaos Crags rockfall avalanche 300 years ago and was enlarged with a dam in 1911 for a small hydropower operation (NPS 2009). The wetlands in the project area serve as natural water purifiers, maintain flow regimes, provide flood control, and offer important habitat for many fish, wildlife, and plant species.

The National Wetlands Inventory, maintained by the US Fish and Wildlife Service, depicts wetlands throughout the project area (USFWS 2021). According to this dataset, the primary wetland type in the project area is palustrine. The palustrine wetlands around Manzanita and Reflection Lakes are freshwater wetlands associated with persistent groundwater (NPS 2009). Palustrine wetlands are inland wetlands that contain ocean-derived salts in concentrations of less than 0.5 parts per thousand and are nontidal. The most common species found in these wetlands is the Pacific treefrog (*Pseudacris regilla*) and the long-toed salamander (*Ambystoma macrodactylum*), western toad (*Anaxyrus boreas*), and rough-skinned newt (*Taricha granulosa*) (NPS 2013).

Threats to wetlands include the loss of wetland vegetation, fire, invasive species, visitor-associated water contamination, and climate change. The loss of wetland vegetation occurs as lodgepole pine and red fir take over meadows, both of which species are present in the project area. This type of vegetation transition is associated with a lack of fire. When fires occur, the use of fire retardants can also contribute to chemical infiltration in wetlands. Reduced wetland vegetation creates an opportunistic environment for invasive species. The likelihood of invasions of exotic plants and nonnative animals is high at lower-elevation aquatic sites with heavy recreational use and unnatural water level fluctuations, such as the project area (NPS 2013). Recent wetland studies at the park show that the northwest shore of Manzanita Lake is home to nonnative *Agrostis stolonifera* and *Elodea canadensis*, whose nativity is unknown (NPS 2008). Day and overnight use of the lakes contribute to the loss of vegetation, soil compaction, increased sediment loads in water bodies, and, occasionally, bacterial pollution of surface water, which can all reduce wetland ecosystem health (NPS 2013). Anticipated impacts on wetlands from climate change include changes to precipitation, snowpack, ice cover, and wetland water levels, all of which may impact seed germination, wildlife breeding success, and public water supplies (NPS 2013). Trends for wetland health in the park is indeterminate due to limited data. Current information on wetlands at the park is limited to maps produced in the late 1900s, and wetland mapping has not been ground truthed for accuracy (NPS 2013).

Impacts on Wetlands

No-Action Alternative. Under the no-action alternative, the condition of wetlands would remain the same as described in the affected environment. The current resource threats and impacts on wetlands would continue to occur.

Action Alternative. Under the NPS preferred alternative, construction of new trails and facilities would primarily occur on well-drained soils. The construction of new trails and facilities would involve additional vegetation clearing and ground disturbance in some areas, accounted for in the vegetation and soils analysis. Before any construction occurs, a soil investigation would be conducted to confirm soil-bearing capacity and drainage characteristics. If such an investigation reveals soil conditions indicative of wetlands, alternative locations would be assessed. All attempts would be made to avoid or minimize impacts on wetlands. If no alternative non-wetland sites were located, then additional compliance (e.g., a wetlands statement of findings) would be done to assess impacts on wetlands and ensure no net loss of wetland area. Project construction for the areas analyzed would not occur at the same time, and thus, their impacts would be spread out. Construction would be phased over time in different locations to minimize the impacts on wetlands. Upon final design and if warranted, a formal delineation and any applicable Clean Water Act permitting would occur before groundbreaking. The following estimations derive primarily from the National Wetland Inventory (USFWS 2021). Estimated areas of impact are presented below; these numbers are approximate because the alternative alignment is not yet in the design stage of development and could change. Because of rounding, numbers presented may not add up precisely to the totals provided.

- Boat launch improvements would involve replacing the informal wooden plank launch and replacing it with an accessible EZ Launch®. The new launch would be approximately 0.01 acre in size, placed in the lake, and would not impact any wetlands. As per Director's Order 77-1, this action would be exempt from a wetlands statement of findings as small boat ramps/launches, piers, or docks with total long-term wetland impact for the entire project (both on-site and off-site) of 0.1 acre or less.
- The accessible fishing pier would be located southwest of the boat launch. The new pier would be approximately 0.02 acre in size, placed in the lake, and would not impact any wetlands. As per Director's Order 77-1, this action would be exempt from a wetlands statement of findings as a small boat ramps/launches, piers, or docks with total long-term wetland impact for the entire project (both onsite and offsite) of 0.1 acre or less.
- Rerouting the Manzanita Lake Trail along the shoreline would occur on up to 0.07 acre of palustrine wetland. As per Director's Order 77-1, this action would be exempt from a wetlands statement of findings as maintenance, repair, or of currently serviceable facilities or structures (i.e., trail) for minor deviations of 0.1 acre or less.

In total, impacts on wetlands are anticipated to be less than 0.1 acre, a minor impact on wetlands parkwide. Overall functions of the wetlands are not likely to be noticeably altered because of the small area of ground disturbance (0.1 acre) in relation to the total acres of wetlands present in the project area. Remaining adjacent wetlands would continue to filter and convey precipitation and provide an important complex of habitats. Therefore, the actions proposed under the

preferred alternative would not be expected to impact the long-term viability of wetlands in the park.

The dam and dike improvements would result in an expansion of the existing footprint. Preliminary designs indicate that the dam work would not exceed 0.1 acre, and there are no indicators of wetland around the existing dam, with conifers growing in the toe of the dam, even in low areas. Preliminary designs indicate that the dike work would not exceed 0.02 acre, and there are minimal indicators of wetland around the existing dike. As a result, both elements of this work would be exempt from a wetlands statement of findings as maintenance, repair, or of currently serviceable facilities or structures (i.e., trail) for minor deviations of 0.1 acre or less, as per Director's Order 77-1. The access road to the worksite is conceptual at this stage and would avoid any impacts on wetlands to the extent possible. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation.

Because only a few square feet of wetlands would be affected, much less than 0.1 acre, no wetlands statement of findings would be required. Authorization to implement this work would be obtained under a nationwide permit. Other work in the area includes general trail improvements, which would avoid wetlands to the extent possible. Repair to existing trails would be exempt under Director's Order 77-1. The work described above would occur adjacent to, but not within, a wet herbaceous meadow. Impacts on wetlands would be mitigated during or following construction by implementing the measures outlined in appendix C, including avoiding wetlands where possible by trail routing, using bridges rather than culverts to cross drainages, and avoiding excavation during wet periods.

Cumulative Impacts. As previously described, no new impacts would occur under the no-action alternative, and thus, no cumulative impacts on wetlands would occur.

Implementation of the preferred alternative would result in ground disturbance of up to approximately 0.1 acre of wetlands. Wetlands and riparian areas throughout the park have been lost or disturbed by a number of past and present actions. Heavy sheep and cattle grazing in the late 1800s and early 1900s reduced or eliminated herbaceous cover in some meadows and riparian areas. Natural drainage patterns and water flow were altered by development and diversions, including the water flume located in the project area that diverted Manzanita Lake to near Crags Campground. The Manzanita Lake Dam raised the water level in this natural lake to create a larger water storage area. In addition, numerous road and stream crossings have been constructed throughout the park, which have channeled water and, in some cases, reduced the extent of riparian habitat. Impacts under the preferred alternative, when combined with past, present, and reasonably foreseeable future actions and trends, would be adverse and long term. The impacts of the alternatives would contribute slightly to, but would not substantially change, the impacts that are already occurring to wetlands because the total area of impact is small relative to the size of the park. Overall, in comparison to the total park area originally containing wetlands, the extent of these cumulative impacts has been localized and negligible to minor (ranging to moderate or major where dams have been constructed). The preferred alternative would contribute negligible adverse cumulative effects.

Conclusion. The no-action alternative would be the continuation of current management. No new actions would occur, and thus, there would be no new impacts on wetlands under this alternative.

Under the NPS preferred alternative, up to 0.1 acre of wetlands would be impacted. Impacts on wetlands would be mitigated during or following construction by implementing the measures outlined in appendix C, including avoiding wetlands where possible by trail routing, using bridges rather than culverts to cross drainages, and avoiding excavation during wet periods. Overall, in comparison to the total park area originally containing wetlands, the extent of these impacts would be localized and negligible to minor.

No wetlands statement of findings would be required because much less than one acre of wetlands would be affected.

VISITOR USE AND EXPERIENCE

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Data from the NPS Integrated Resource Management Applications (NPS 2023a) database shows that from 2000 to 2021, annual visitation to Lassen Volcanic National Park increased over 42%, with the Manzanita Lake entrance station experiencing a 25% increase of vehicles entering the area over that same period. In 2021, a total of 83,455 vehicles passed through the Manzanita Lake entrance station, accounting for approximately 250,000 visitors coming into the area. While the exact amount of visitor use within the Manzanita Lake Developed Area is unknown, as many visitors just drive through on their way to other destinations, many visitors spend some or all of their visit to the park in this area.

Visitor use at Manzanita Lake is highest during the summer months, between May and October, and weekends and holidays during the summer typically have higher levels of congestion than weekdays. Although the Manzanita Lake Developed Area sees some winter use, it is relatively low, even on weekends and holidays. The park plows the Loomis Plaza parking lot in the winter, but this lot usually does not reach capacity, indicating relatively low winter visitor use. Popular winter activities include snowshoeing, cross-country skiing, and snowplay. There is limited overnight use in the winter season.

Lassen Crossroads is located at the turn off Highway 44 onto the Lassen Volcanic National Park Highway. The site is meant to be a welcome center for visitors to the park and the Lassen National Forest. Lassen Crossroads has a parking area, some outdated interpretive panels, and open-air pavilions. The site is underused by park visitors and is used as trailhead parking for the Nobles Emigrant Trail or as a highway rest stop for those traveling along Highway 44. As visitors continue into the park, they enter through the Manzanita Lake entrance station, where only one fee booth accommodates all use. This leads to congestion and long lines and waits during the peak season as observed by park staff. Just beyond the fee booth is an unpaved pulloff where visitors often stop to take a photo of the iconic Lassen Peak. However, this can cause additional congestion, as multiple cars stop for a quick photo at the pulloff.

When the area is busy, vehicle circulation, finding parking, and pedestrian movement can be challenging due to high numbers of vehicles and limited connectivity. Finding day use parking can be a challenge for visitors throughout the summer, especially at peak times on weekends and holidays. During these times, visitors compete for limited parking and may have to circle and wait for some time before finding a spot. The Loomis parking lot is located right off the main road and is the primary parking area for visitors to the Loomis Plaza. To access the Manzanita Lake day use parking area, visitors turn off the road onto the Campground Access Road. Visitors also park here to access other areas, including trailheads. There is also a small roadside pulloff near the entrance to the Manzanita Lake lot. Visitors can also park at the camper store. The current parking inventory reported by park staff includes approximately 110 parking spots (which can vary based on if oversized vehicles use spots). Four accessible parking spots are available in the Loomis parking lot, one at the camper store, one adjacent to the boat launch, and one at the lake picnic area.

Visitor circulation for pedestrians or cyclists around the Manzanita Lake Developed Area is limited. Many of the sites have no connective paths and very limited accessibility per the Americans with Disabilities Act. The area is split by the park highway, which can cause challenges for circulation and access. Since all the parking is on the south side of the highway, visitors need to cross the highway to access Reflection Lake and its trail, the Lily Pond Nature Trail, and other areas or to access the Nobles Emigrant Trail from Crossroads parking. Road crossings can be dangerous, as vehicles can be traveling speeds of 35 miles per hour.

Manzanita Lake, the lakeshore, and Loomis Plaza are the most popular areas of the Manzanita Lake Developed Area. Loomis Plaza is a key historic site for visitors that includes interpretive opportunities at the Loomis Museum, Loomis Residence, and the seismograph building. The Loomis Museum holds the area's visitor center and includes exhibits, a park film, the park store, and ranger programming. The museum is listed in the National Register of Historic Places, and the whole area is a historic district. As they are historic, these buildings are small and can often get crowded.

The Manzanita Lake Developed Area has some accessible spaces but does not meet all legal requirements. Visitors with mobility issues are not able to access most trails, and moving throughout the area requires visitors to walk along roadways or through parking areas. The National Park Service does not recommend the use of strollers or wheelchairs on the Manzanita Lake Loop, as the trail is rocky and narrow.

Some of the most popular activities in and around the lake include boating, hiking, fishing, picnicking, bird/wildlife watching, photography, swimming, and night sky activities like star gazing. The Reflection Lake trail is an undefined half-mile route that circles Reflection Lake. It provides desirable views of Chaos Crags and Lassen Peak which are often reflected on the still lake. Due to being undefined, unhardened, and narrow, the route has limited accessibility. Some visitor programming occurs at Loomis Plaza and the amphitheater.

The Manzanita Lake Dam and dike do not meet current dam safety criteria. The dam is currently rated as a significant hazard due to its condition and the value of the lake as a scenic and recreational feature of the park (NPS 2021a). The potential failure of the dam poses a significant threat to the heavily visited park resources. While life loss or injury due to dam failure

is unlikely, potential consequences could include extensive damage to the Manzanita Lake Trail (not the Nobles Emigrant Trail, as incorrectly identified in NPS 2012b) at its crossing with Manzanita Creek and US Forest Service Road A17 (NPS 2012b; Emmons and Caywood 2004). An engineered design approach to address existing deficiencies and bring the structure up to current standards is ongoing.

The Manzanita Lake Campground is located 1 mile east of the Manzanita Lake entrance and is the largest campground in the park. The campground is popular with families and provides space for groups, tents, trailers, and RVs, as well as rustic camping cabins. Five loops include the cabin loop and a tent-only loop. A camp store with a parking area supplies food, camper supplies, showers, and laundry. The campground has a total of 179 sites, 20 cabins, and two glamping sites, and each site can accommodate two passenger vehicles or one oversized vehicle (e.g., a trailer). The campground is open from mid-May to mid-October annually and closed all other months.

Lassen Volcanic National Park offers incredible dark night skies, perfect for stargazing. Park managers have taken steps to minimize light pollution within the Manzanita Lake Developed Area, and both the amphitheater and campground provide opportunities for night sky viewing. When possible, park staff provide night sky viewing programs during the summer at the amphitheater, as well as an annual Dark Sky Festival.

Impacts on Visitor Use and Experience

No-Action Alternative. Under the no-action alternative, the condition of visitor use and experience would remain the same as described in the affected environment. The current threats and impacts on visitor use and experience would continue to occur.

Action Alternative. Under the NPS preferred alternative, facility upgrades and improvements and new amenities would occur throughout the Manzanita Lake Developed Area, better accommodating visitors of all abilities and improving the overall experience.

The preferred alternative would improve visitor orientation and wayfinding throughout the Manzanita Lake Developed Area. At Lassen Crossroads and Loomis Plaza, new information displays and orientation materials would improve the arrival experience for visitors to those areas and provide valuable information about the area. Further, new interpretation and educational areas would be provided where the history and significance of the park would be shared. New emphasis would be placed on sharing the Tribal connections and stories from the perspectives of Tribal members.

Under the preferred alternative, park managers would improve vehicle circulation and parking. Park staff would install electric vehicle charging stations at Lassen Crossroads and the new proposed lot. These charging stations would allow visitors with electric vehicles to confidently travel to and from the park, knowing they can charge their cars. At the entrance station, a second inbound lane would be added to reduce wait times and queuing for those entering the park, especially for those with annual passes, and to improve the efficiency of the fee collection operation. Additionally, the reestablished 22,000-square-foot parking lot at the east of the Manzanita Lake Developed Area would allow up to 40 additional vehicles to park. This improvement would include three electric vehicle charging stations. The reestablished lot can

also accommodate oversized vehicles parking (e.g., buses, RVs, and trailers). This parking area would allow for more visitors to safely park in proximity to desired attractions like Manzanita Lake, Loomis Plaza, and the Chaos Crags Trailhead. This access would provide a beneficial effect on the visitor experience.

Within Loomis Plaza, the new formal interpretation area, picnic areas, water filling stations, and a new shade structure would provide more comfort and opportunities for visitors. An increased ranger presence would engage with visitors, provide answers to questions, and educate visitors about the history of the area. The new boat cleaning station would be available to all visitors to use after boating on the lake, allowing them to clean their boats before leaving the park. The station would include educational messaging about managing the spread of invasive species for responsible environmental stewardship.

Under the proposals in the preferred alternative, there would be no net loss of picnic tables: some picnic tables would be removed from around the lake, decreasing opportunities to picnic lakeside, but others would be added at Loomis Plaza and near the reestablished parking area. Dispersing the picnic tables would reduce crowding conditions at the lake while providing space for picnics in other areas.

Under the preferred alternative, park managers would address accessibility (ABAAS and IBC) requirements and improve conditions and experiences for those with disabilities. Manzanita Lake's boat launch would be replaced with an accessible launch and a new accessible fishing pier to allow for more visitors with varying abilities to access and experience the lake. The construction of this infrastructure may temporarily prevent some visitors from accessing the lake surface. The new pier would provide 650 square feet of accessible area and new opportunities for all visitors.

Park staff would also improve trails throughout the area, both to improve the connectivity and to comply with ABAAS/IBC standards to provide accessibility for all visitors. Park staff would formalize the Nobles Emigrant Trailhead at Lassen Crossroads, providing clear direction and orientation for visitors, and the reestablished parking area would serve as a trailhead for Chaos Crags. This change would offer visitors closer parking and clear access to these trails. Both the Manzanita Lake Trail and Reflection Lake Trail would be improved by maintaining a firm and stable tread, filling in holes, and removing barriers along the trail. Some light grading would occur to ensure gentle, gradual slopes and adjustments to ensure consistent trail width. The trails would remain a natural surface to continue supporting the natural feeling and sense of discovery for visitors who want an undeveloped trail experience. Manzanita Lake would also include the addition of a bridge over the creek crossing. All upgrades to these trail treads would use materials that blend with the natural area and maintain high-quality visual standards that blend in with the natural beauty of the area. These actions would improve approximately 15,000 square feet of trail. These treatments would allow for those with wheelchairs, walkers, or other mobility devices and with strollers to use these trails.

The proposed multiuse paved path through the Manzanita Lake Developed Area would improve accessibility and connect key visitor use areas, including the lake, the campground, and Loomis Plaza. The path would allow those unable to find parking near the lake or Loomis Plaza to park and easily walk or bike to their desired destination. The path would provide visitors with

the ability to park in one spot for the duration of their visit and still be able to see and do all they would like to. Hardening the surface makes the trails more stable, covers roots or loose soil, and opens the trails to more visitors with diverse skill levels and abilities, such as those in wheelchairs or with walkers or strollers.

The amphitheater would also be improved under the preferred alternative. The 900-foot-long trail near the amphitheater would be improved with a hardened surface to make it more accessible. Park staff would add night sky-friendly lighting that improves visitor opportunities to experience dark skies; audiovisual equipment, including four accessible telescope platforms that would allow park staff to deliver more effective and accessible programming in the amphitheater; and additional seating to accommodate more visitors. Park staff would also add a native plant garden to educate visitors about traditional uses. These improvements would allow park staff to deliver more effective and inclusive programming. Visitors would be temporarily unable to experience the amphitheater while these improvements were underway.

In total, approximately 50,600 square feet of accessible paths and trails would be added to the area, making new and existing experiences available to visitors and better connecting these experiences.

Under the preferred alternative, park managers would also improve and diversify camping experiences within the park. The National Park Service would work with a concessioner to provide new glamping sites in addition to existing cabins and traditional tent camping. Additionally, this area would see approximately 12,000 square feet of new pavement in Loop A to expand the footprint and better accommodate oversized vehicle movement and parking. These improvements would allow opportunities for a more diverse range of overnight experiences.

The dam and dike improvements would result in significant benefits to the visitor experience by mitigating the risk of dam failure. More specifically, the improvement mitigates the risk of losing heavily visited park resources, extensive environmental damage, negative impacts on the scenic beauty of the park, and significant negative public impact. Upon final design, separate compliance would be completed for the dam and dike improvements before implementation.

Cumulative Effects. As previously described, no new impacts would occur under the no-action alternative, and thus, no cumulative impacts on visitor use and experience would occur.

Implementing the preferred alternative would result in a temporary disruption to visitor experiences as improvements and upgrades are implemented. This disruption may result in some visitors missing key experiences in the Manzanita Lake Developed Area and may cause some visitor conflicts among those competing for key spots, resources, and amenities. Nearly all of these missed opportunities would be temporary and likely would not occur at once, meaning that although visitors may miss a key experience, there will likely be others for them to experience. Additionally, the creation of new trails and the temporary disturbance of existing amenities and facilities will create new and more equitable experiences in the future for potential new visitors. Overall, the preferred alternative would produce negligible adverse cumulative impacts and create a multitude of beneficial cumulative impacts on visitor use and experience in the Manzanita Lake Developed Area.

Conclusion. The no-action alternative would be the continuation of current management. No new actions would occur, and thus, there would be no new impacts on visitor use and experience under this alternative.

Under the NPS preferred alternative, key visitor experiences would be temporarily impacted. Impacts on visitor use and experience would be mitigated by implementing upgrades and improvements on a staggered schedule that still allows visitors to experience key aspects of the park. The preferred alternative would create overall beneficial impacts on the visitor experience for the Manzanita Lake Developed Area.

HISTORIC STRUCTURES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The Manzanita Lake Developed Area is the first developed area encountered by visitors entering the park from the northwest entrance and is the largest developed area in the park, with visitor services, the headquarters of the interpretive program, a campground, general store, and NPS administrative offices. Development of the area for visitor enjoyment began in the 1920s, before the National Park Service acquired the area in 1929. The National Park Service made additional modifications to the area in the 1930s and 1940s, during the Mission 66 planning period, and in the 1970s and 1980s. Early to mid-century development consisted of new concessioner, visitor use, and park administrative facilities and structures and a campground expansion. Mid- to late-20th-century modifications included the removal of these and other structures and site features in response to visitor needs and the threat of rockslides from nearby Chaos Jumbles (Emmons and Caywood 2004; Phillips and Mori 2020; Phillips and Guettinger 2019), a rockfall area created approximately 350 years ago from the collapse of the of the Chaos Crags domes (USGS 2023). Because of the Manzanita Lake Developed Area's substantial alterations and the area's history of visitor use and development, several historic districts and historic structures are within the project area, described below.

Lassen Volcanic National Park Multiple Property Listing. This nomination was accepted by the keeper of the national register in 2006 for the themes of the park's and the Lassen area's historic context of overland emigration, extractive industry and permanent settlement, geologic studies, tourism and recreation, and NPS administration. The period of significance for these themes was vast, from about 1849 to 1953. The hydroelectric development at Manzanita Lake and the dam are discussed, as is the long recreational use of Manzanita Lake (Emmons and Catton 2006), but the listing did not include Native American recreational use. The built environment at Manzanita Lake, including historic structures such as buildings, roads, dams, and trails, are also discussed (Emmons and Catton 2006).

Nobles Emigrant Trail. This trail was listed in the National Register of Historic Places in 1975 for its regional significance in 19th-century commerce, communications, and transportation. The trail was blazed in 1851 by William Nobles, who later realized he had discovered a shortcut for emigration to Oregon and California and promoted his route. The trail crosses the northern part of Lassen Volcanic National Park for about 24 miles. The trail passes through Summertown, north of Manzanita Lake, and exits the park along the valley of Manzanita Creek.

The trail has no associated historic structures. Part of the trail is suitable for hiking, and park staff keep visitors informed of trail conditions on the park website. The national register nomination recommended the preservation of trail and 100 feet on each side of the trail (Chappell 1974b; NPS 2023b).

Nobels Emigrant Trail, while contributing to the cultural landscape of the Manzanita Lake Developed Area, is classified as a historic structure in the NPS Cultural Resource Information System. As the trail comprises different segments, its condition varies depending on the segment (Gibson, pers. comm., 2023b).

Manzanita Lake Naturalist's Services Historic District. This historic district was listed in the National Register of Historic Places in 2006 under National Register Criteria A and C for its significance in the areas of recreation, science, conservation, and architecture. The period of significance is from 1927 to 1936, with specific dates of 1927 and 1933–1936. The district includes only the naturalist's services and not the complete array of administrative and concession facilities that once characterized the area. The newer structures and site features that characterize the area today are also not included (Figure 17). The buildings and structures associated with this historic district represent two architectural styles: the Italian Renaissance style, elements of which are found on the Loomis Museum; and NPS Rustic, as developed by the National Park Service during the 1930s and 1940s. One element common to most of the buildings in the historic district is the prominent use of native stone on the exterior surfaces. All of the buildings are loosely clustered in the vicinity of the Loomis Museum, listed individually in the national register. The Loomis Museum and associated low stone wall, seismograph building, Loomis Residence and studio, and the Naturalist's Residence and garage/woodshed are contributing structures to the historic district. Two historic comfort stations also remain. A modern comfort station, Manzanita Creek footbridge, and the Loomis garage are noncontributing to the historic district. Finally, Lassen Peak is often reflected in both Manzanita and Reflection Lakes, two constructed water features, which originated as shallow natural lakes. Water from Manzanita Creek was trapped and diverted to enlarge these two lakes before the area's inclusion with the park boundary. Both Manzanita and Reflection Lakes contribute to the historic district. Only the Manzanita Lake campfire circle has been lost. The historic district retains its physical and associative integrity (Emmons and Caywood 2004).

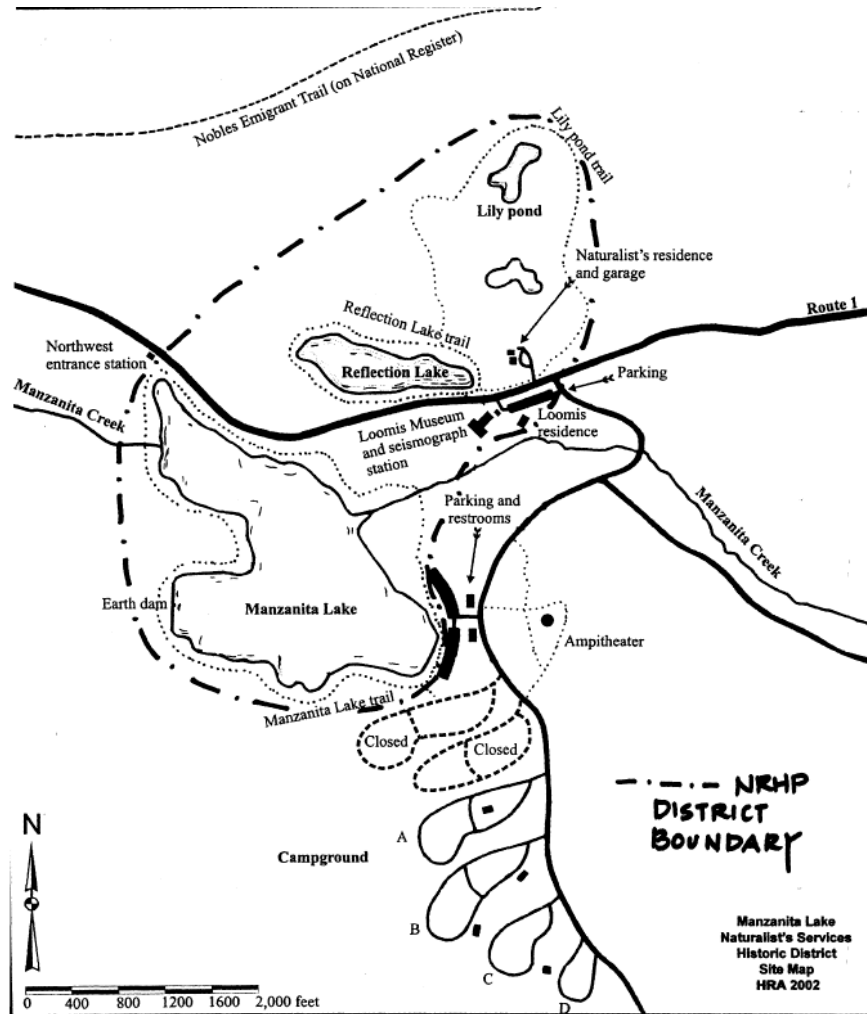


FIGURE 17. MANZANITA LAKE NATURALIST'S SERVICES HISTORIC DISTRICT SITE MAP (2002)
(EMMONS AND CAYWOOD 2004)

The Loomis Museum and associated low stone wall, Loomis Residence and studio, the Naturalist's Residence and garage/woodshed, and the two historic comfort stations (near the camp store and at Loop A) are listed as in good condition in the NPS Cultural Resource Inventory System. The seismograph building is listed as in fair condition.

Manzanita Lake Dam and Dike. The Manzanita Lake Dam and dike are located at the northwest entrance to the park in the Manzanita Lake Development Area. The dam and dike are two low earthen embankments with a concrete spillway. In recent publications and in modern terminology, the larger embankment is the Manzanita Lake Dam, and the smaller embankment is the dike. The dike, however, constructed across Manzanita Creek was sometimes referred to as the dam in older documents, including in a 1976 national register nomination draft (Figure 18, Torres 1976). The location and terminology used for the dam, indicated as the earth dam in the 2004 nomination figure (Figure 17, Emmons and Caywood 2004), dike, outlets, and spillways changed between these two nominations. Based on geomorphology, the lake's outlet where the dam was constructed is deeper and older than the outlet where the dike was constructed. Both dam and dike embankments are understood to be homogeneous fill,

consisting of silty sand, gravel, gray volcanic ash, and dacite rock, available in the local vicinity (NPS 2021a; Gibson, pers. comm., 2023b; NPS 2012b). Large-growth trees are present on the dam and dike embankments. As of 2021, the structural heights of the dam and dike are 12 feet and 4.5 feet, respectively. The crest elevation of the dam is about 5,845 feet, with the dike crest about 1 foot lower. The freeboard at the dam and dike is about 2 feet and 1 foot, respectively. The dam and dike form an approximately 50-acre reservoir, and the contributing drainage basin is 12 square miles. The main dam is currently rated as a significant hazard for the value of the lake as a scenic and recreational feature of the park (NPS 2021a).

Little is known about the construction of the dam and dike. As early as 1893, attempts were made to control the waters of Manzanita Lake for irrigation and power for farms and towns in Shasta County, California. After H. H. Noble deeded his property on Manzanita Lake to the Northern California Power Company in 1906, the company completed construction of the dam in 1911 across the natural outlet of Manzanita Creek. Park staff believe that this outlet, based on geomorphology, was the older and larger outlet where the current Manzanita Lake Dam is located. With the dam, the Northern California Power Company had planned to develop hydroelectric power for an iron ore smelting furnace. The Northern California Power Company cleared brush and debris from the creek bed and then developed a plan for an earthen dam that was 500 feet across, 10 feet high, and 8 feet wide at the top, with timber sheeting on the inside face. The timber sheeting was installed in 1912. When construction began, the lake level only rose 2 feet, whereas the plan had anticipated a lake level rise of 5 feet. The company decided that the volcanic rock was too porous to hold water and abandoned the project. Following the 1915 eruption of Lassen Peak, which partially filled Manzanita Lake, the company abandoned the dam and other structures related to the development of hydropower. The National Park Service inherited the dam when the park was established in 1916. The dam is briefly described in the Manzanita Lake Naturalist's Services Historic District national register nomination as measuring at about 10 feet high and 469 feet long. A concrete spillway, 10 feet in width, was also mentioned, located at the north end of the reservoir (NPS 2021a; Gibson, pers. comm., 2023b; Emmons and Caywood 2004; Emmons and Catton 2006; Torres 1976).

In 1976, a draft nomination for the National Register of Historic Places was completed for the dam and stated that the dam had received no maintenance and was deteriorating from natural causes. The nomination, however, also located the dam where the dike is located, so it is unclear whether the nomination was describing the condition of the dam or the dike (NPS 2021a; Emmons and Caywood 2004; Emmons and Catton 2006; Torres 1976) (figures 17–19). If the draft nomination was referring to the dike instead of the dam, park staff have records of plans for modifications to the dike in the mid- to late-1960s (Gibson, pers. comm., 2023b; NPS 1967, 1965). The concrete spillway at the northern end of the reservoir, mentioned in the 2004 nomination, may in fact be associated with the dike (Emmons and Caywood 2004; Torres 1976). The spillway, additionally, may have been added later in 1944, when local residents demanded the return of water flow to Manzanita Creek or in the 1960s. The reason for these terminology changes and different map locations is not currently known, and more research is needed on the history of the dam and dike's construction and their documentation. In 2004, the dam is noted as being part of the extant integrated system of visitor services for the historic district and as a resource conforming to NPS goals to encourage outdoor recreation and spontaneous discovery. The nomination states that the dam was retained by the National Park Service as a means of

perpetuating a water body of sufficient size for water recreation and as a means of securing hydroelectric power for Manzanita Lake facilities (Gibson, pers. comm., 2023b; Emmons and Caywood 2004; Torres 1976).

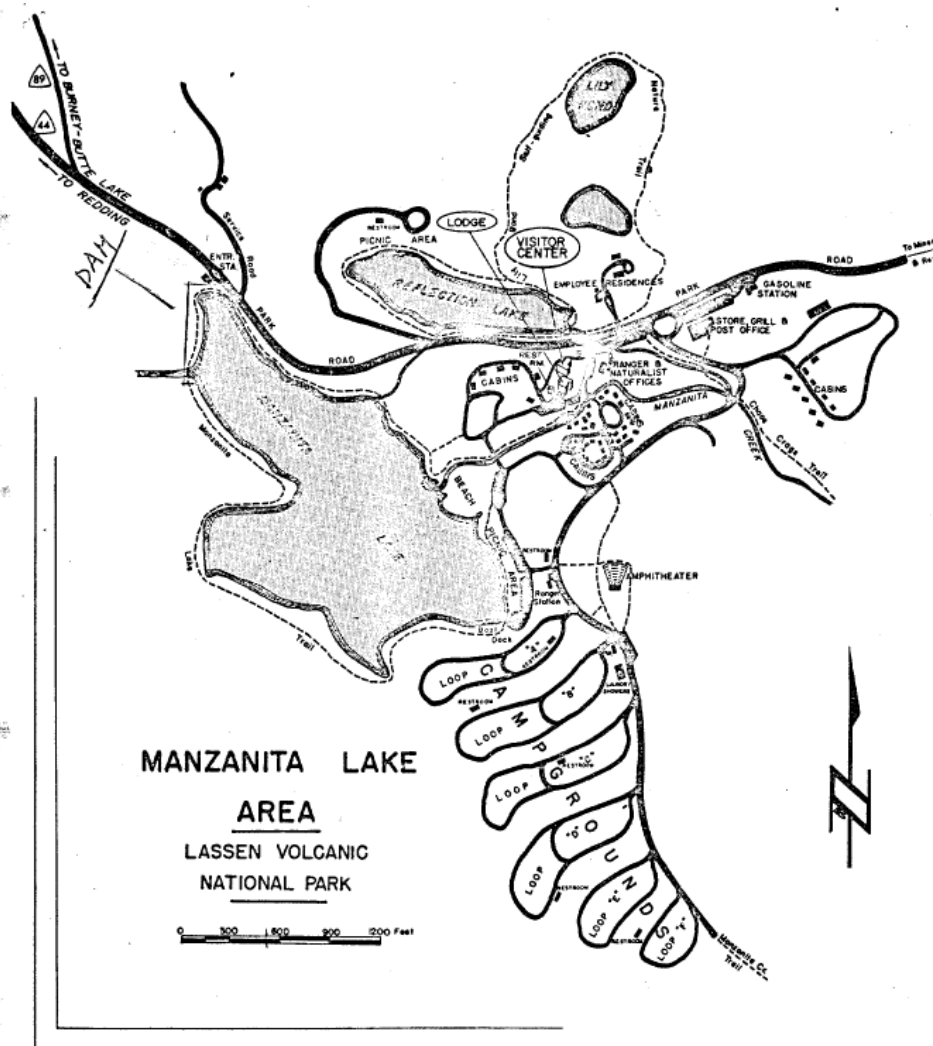


FIGURE 18. DRAFT NATIONAL REGISTER NOMINATION SHOWING THE DAM MARKED IN THE LOCATION OF THE DIKE (TORRES 1976)



FIGURE 19. ARIEL VIEW OF THE DAM, DIKE, AND SPILLWAY FOR TERMINOLOGY USED IN THIS PLAN (NPS 2021A, FIGURE 2)

Furthermore, the western path of the Manzanita Lake Trail, which encircles the lake and contributes to the historic district, runs along the top of the dam and across the lake's spillway. For most of its length, the constructed trail is between 4–6 feet wide, consisting of a dirt path adjacent to the edge of the lake. Between the Loomis Museum, individually listed in the national register (1975), and the northwest entrance station, the trail is built on the hillslope above the lake. Several small sections of stone retaining wall are integrated into the tread in this segment. Individual structural elements include a segment of dry-laid stone retaining wall in the vicinity of the north entrance station residence and a stone stair that leads to the top of the dam at its north end. The trail is furnished with log seats, placed in areas where one can rest and enjoy a view over the lake towards Lassen Peak (Emmons and Caywood 2004).

The dike and dam have a known history of incidents and repairs, including improvements that support visitor education and recreation. In 1933, Emergency Conservation Work Organization crews spent over a month cribbing and filling the aging dam and felling and removing the snags of trees that died when the lake level was artificially raised. The newly cleared lake visually marked the transition of Manzanita as a centerpiece of Lassen Volcanic National Park's education and recreation program. With the lake and shore cleared of debris, crews began creating a swimming beach and picnic area at the south end of the lake. Brush was cleared, sand

imported, and 10 stoves and picnic tables were placed in a willow grove directly adjacent to the new beach. The beach has also undergone modifications over the years but is considered a contributing site within the Manzanita Lake Naturalist's Services Historic District (Emmons and Caywood 2004; Unrau and Willis 1983).

Other incidents and improvements to the dike include a September 1936 report in which the National Park Service evaluated impacts on the natural lake from the embankments in a report titled *Manzanita Lake and the Leakage Problem* (NPS 2021a). By the late 1930s, residents in the community of Viola, downstream from Manzanita Lake, demanded a return of the flow of water to the original Manzanita Creek channel. Protests ebbed during World War II, and after 1944, the outlet and spillway were ultimately constructed. The outlet and spillway postdate the period of significance (1925–1936) for the historic district and are defined as a noncontributing structure (Emmons and Caywood 2004). In the mid- to late-1960s, plans for dike improvements were developed (Gibson, pers. comm., 2023b; NPS 1965, 1967). From June 1985 to 2017, various safety evaluations, studies and plans, a proposed scope of work for improvements that were not completed, a finding of no significant impact concluding that “no action coupled with an emergency action plan” was the appropriate response to deficiencies, and changes to the hazard classification of the dam occurred. Flood events have also occurred, with the last one noted in 2017 (NPS 2021a).

The Manzanita Lake Dam does not meet current dam safety criteria. The dam is currently rated as a significant hazard due to its condition and the value of the lake as a scenic and recreational feature of the park (NPS 2021a). A potential failure of the dam would lead to the lowering of Manzanita Lake and impact the Manzanita Lake Trail. Both the lake and the lake trail are contributing historic structures to the historic district. An engineered design approach to address existing deficiencies and bring the structure up to current standards is ongoing.

Mission 66 Resources. The entirety of Lassen Volcanic National Park was noted as potentially having Mission 66 resources in the multiple property submission to the national register for National Park Service Mission 66 Era Resources (accepted to the national register in 2015). The multiple property nomination included the pre-Mission 66 era, 1945–1955; Mission 66 program, 1956–1966; and Parkscape USA program, 1967–1972 (Carr et al. 2015).

The Mission 66 program sought to improve park infrastructure to accommodate the large increase in visitation after World War II. At Lassen, Mission 66 funded the construction or modification of parking areas along the entire road, including major development at Manzanita Lake. A 1958 project expanded parking at the Loomis Museum and created new lodging facilities, stores, gas stations, and campground in anticipation of expanding concessioner operations (Figure 20). The 1930s-era campground and campfire circle were replaced with a newly configured campground with six large loops stemming from a single access road and an amphitheater. The campground loops and amphitheater are located outside of Manzanita Lake Naturalist's Services Historic District (see Figure 17 above), but they are part of the larger Manzanita Lake Developed Area (Emmons and Caywood 2004; Phillips and Guettinger 2019; NPS 2003, 1981).

In the 1970s, all elements of the concession-operated lodging facility, including the lodge, cabin clusters, camp store, and gas station, were removed in response to the threat of rockslides from

nearby Chaos Jumbles. Following the 1980 eruption of Mount St. Helens, the park's 1981 general management plan called for the removal of all structures within reach of a major geologic event, though it allowed for interim continued use of the Loomis Museum and the campground. By 1987, most of the concession resort and facilities, NPS employee housing, and maintenance areas had been removed. In that same year, a new report on the Chaos Crags found that rockslides would not reach Manzanita Lake, and the remaining historic structures were spared from demolition (figures 21–22) (Emmons and Caywood 2004; Phillips and Guettinger 2019; NPS 2003, 1981).

In 2019, a determination of eligibility for the Mission 66 Manzanita Lake Campground, associated comfort station, and small-scale features found that the campground did not possess the significance necessary to be eligible for inclusion in the national register. This conclusion cited the extensive alterations of the campground, including the nearly complete removal of the concessioner's resort facilities and the demolition and revegetation of one of the six campground loops, and the loss of integrity of original design, setting, and feeling (Phillips and Guettinger 2019). The California Office of Historic Preservation concurred with this ineligibility (Polanco 2020).

The 2019 determination of eligibility also noted that the amphitheater has had little alteration in its overall form, but it has undergone changes to accommodate improved audiovisual technology. Few of these changes have been documented aside from a major upgrade in 2006, and the condition assessment for this upgrade is the sole benchmark for modifications to the amphitheater. The 2019 determination of eligibility describes the amphitheater as consisting of a projection building, a seating area, and a fire circle, all arranged on an asphalt surface. The amphitheater is accessed from one of three trails, all of which are lined with metal outdoor path lights. The determination of eligibility noted that changes to the amphitheater since 2006 have included new lighting, trail lighting, handrails, plywood siding, and dimensional plastic composite boards for wooden bench seats. Original planting strips have been paved over. Some benches have been removed and parking stops installed to improve accessibility for wheelchair users. The amphitheater's campfire circle has been completely reconstructed. The amphitheater was the only structure associated with the Mission 66 campground that had retained integrity. While its design is emblematic of the Mission 66 period, the changes to the campground have diminished its context. Therefore, the amphitheater does not retain an association with an eligible Mission 66 historic district (Phillips and Guettinger 2019). The California Office of Historic Preservation concurred with this ineligibility (Polanco 2020). The 2019 determination, however, did not consider the eligibility of the amphitheater as an individual resource.

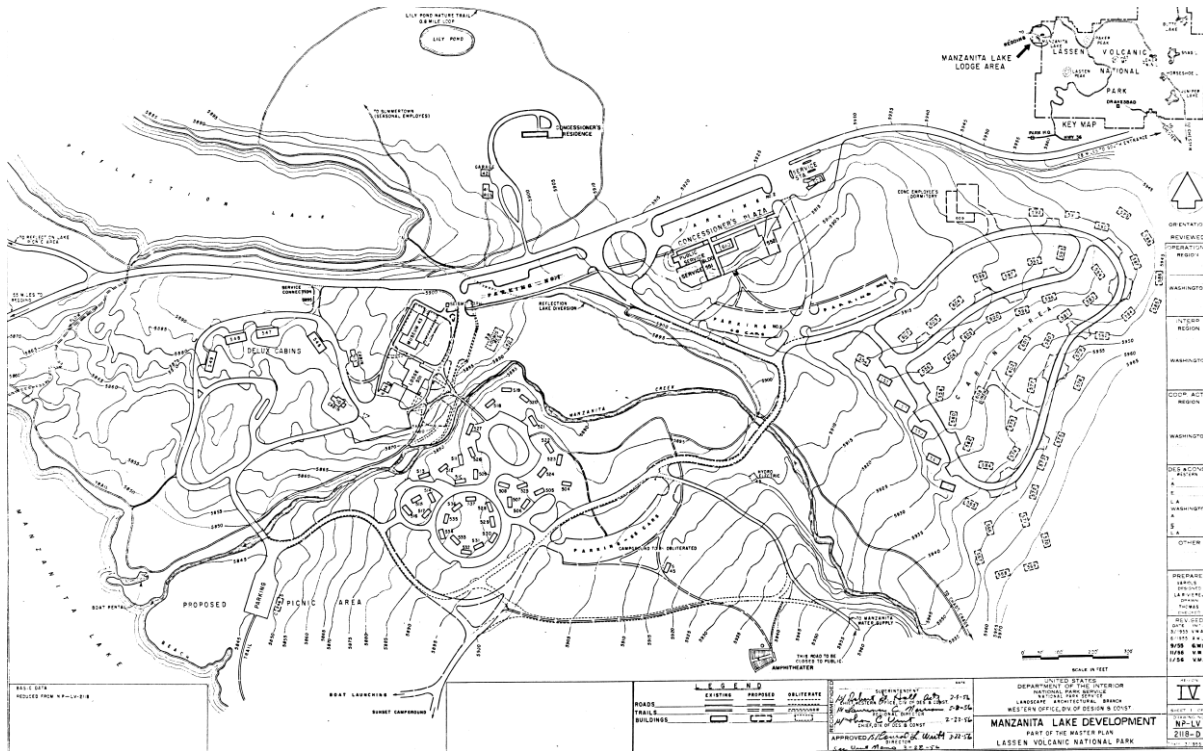


FIGURE 20. MANZANITA LAKE DEVELOPMENT, PART OF THE PARK'S MISSION 66 MASTER PLAN. NEARLY ALL OF THE CABINS, ROADS, AND OTHER DEVELOPMENT HAVE BEEN REMOVED. ONLY THE MUSEUM, RANGER STATION, PORTIONS OF THE PARKING LOT, AND THE NATURALIST'S RESIDENCE REMAIN (PHILLIPS AND MORI 2020, FIGURE 14)

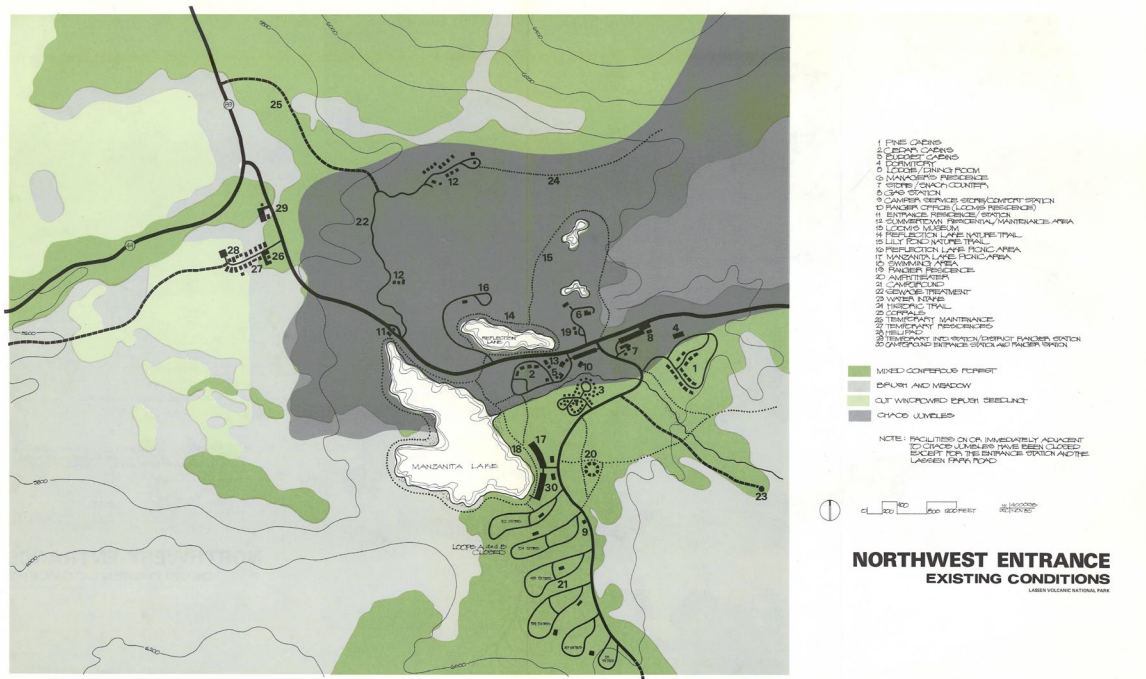


FIGURE 21. 1981 GENERAL MANAGEMENT PLAN ILLUSTRATION SHOWING EXISTING CONDITIONS AT MANZANITA LAKE DEVELOPED AREA

5. Manzanita Lake Unit

32 Lassen Volcanic National Park ■ General Management Plan

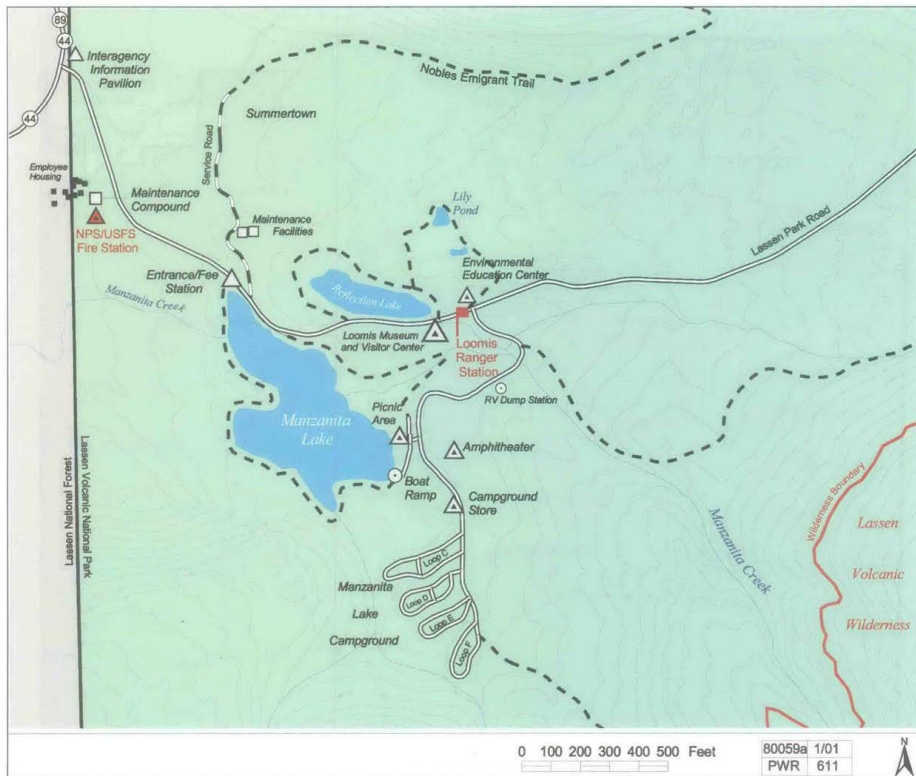


FIGURE 22. 2003 GENERAL MANAGEMENT PLAN MAP SHOWING EXISTING CONDITIONS AT THE MANZANITA LAKE DEVELOPED AREA

Loomis Museum/Loomis Visitor Center. The Loomis Museum/Loomis Visitor Center was listed in the National Register of Historic Places in 1975 for its significance in education and science. The period of significance of the Loomis Museum is 1926–1974. The Loomis Museum is a building of rustic appearance constructed of a gray, native volcanic rock with cut-face random ashlar masonry. The museum is single story and has walls topped by fortress-like crenelated parapets that are stepped in the center front and at the corners. The interior is composed principally of a large museum room and a smaller audiovisual room. Exhibits of photographs, geological specimens from the Lassen eruptions, and artifacts of Native Americans of the area, such as baskets, as well as artifacts of white emigrants and pioneers comprise the collections on display. About 15 yards northeast of the visitor center stands a seismograph station built of the same materials and in the same design as the Loomis Museum and that is considered as part of the museum for the national register nomination, although it is a separate building. Since 1927, the Loomis Museum has served as the focal point for visitor information and entertainment in Lassen Volcanic National Park and as the depository for the Loomis photograph collection of the Lassen eruptions (Chappell 1974a).

Lassen Volcanic National Park Highway. The Lassen Volcanic National Park Highway is a linear feature that extends 29.86 miles and winds through Lassen Volcanic National Park from the southwest entrance, near Lassen Peak and toward the northwest entrance near Manzanita Lake. There, the road passes between Manzanita and Reflection Lakes before exiting the park

boundary. The highway is regarded as an excellent example of early NPS road design. The road and associated features are listed in the National Register of Historic Places (2006) for the Lassen Volcanic National Park Highway Historic District. The period of significance for the park road under criteria A and C is 1925–1947, and criterion C for additional years 1948–1951. The northwest entrance checking station and ranger residence, completed in 1931 and located near the western shore of Manzanita Lake, contribute to the Lassen Volcanic National Park Highway Historic District. Remnant stretches of the Nobles Emigrant Trail crisscross the highway (Emmons 2004). Near Manzanita Lake, the trail passes north of Manzanita and Reflections Lakes through Summertown before turning south and exiting the park along the valley of Manzanita Creek. The Nobles Emigrant Trail was added to the national register in 1975, and there are no historic structures associated with it (Chappell 1974b).

The original Lassen Park Highway design included multiple pulloffs and several parking lots at popular trailheads. The road and parking areas have been modified over the years, including during the Mission 66 era (1945–1973). With the exception of the Emerald Lake pulloff, all of the extant parking lots off the park road date to the Mission 66 era. The park has also realigned major sections of road, added a bridge, built new structures, and altered the Mission 66 parking areas to varying degrees. Most parking areas have been completely redesigned, and associated structures removed. The intersections for utility roads and the entrance to the Manzanita Lake Developed Area have not yet been dated, and more research is needed to determine their significance (Emmons 2004). This additional research may provide new information to park managers and assist in determining and refining significance and eligibility for listing in the national register.

In 2017, damaged concrete curbs and gutters at 12 parking areas along the highway were replaced. The California Office of Historic Preservation concurred with the finding of no adverse effect (Polanco 2020) and concurred that the parking areas were not eligible nor contributed to the Lassen Volcanic Park Highway Historic District (Polanco 2018). In 2020, the California Office of Historic Preservation concurred with the park's determination of ineligibility for the Lassen Volcanic National Park Highway Mission 66 parking areas. The parking areas along the Lassen Volcanic Park Highway have lost enough integrity and associated features that they no longer convey their significance as part of Mission 66 development and do not possess enough significance and/or integrity for listing in the National Register of Historic Places. This determination of eligibility included the Loomis Museum parking lot, constructed in 1958 in anticipation of the expansion of concessioner facilities during the Mission 66 era. As nearly all of the concessioner facilities and a large portion of the Mission 66 parking lot were removed during the 1980s, the Loomis Museum parking lot has lost integrity of design, setting, materials, association, and workmanship without associated features and no context (Phillips and Mori 2020).

The Lassen Park Highway, retaining walls and culverts, the northwest entrance checking station, and ranger residence are listed as in good condition in the NPS Cultural Resource Inventory System.

Trends for Historic Structures. Both historical trends and future projections suggest future increases in temperature, wildfire, air pollution, severe weather events, and drought and decreases in precipitation levels and snowpack. Reduced precipitation and snowpack and

increased drought and wildfire in the Manzanita Lake Area, such as seen during the Dixie Fire in 2021 in Feather River Canyon in southeastern portion of the park, would threaten the historic structures of the Manzanita Lake Developed Area. Increases in severe weather events may result in increased occurrences of flooding, which may damage wooden components of historic structures, increase erosion, and lead to dam and dike failure.

Other reasonably foreseeable future actions that have the potential to impact historic structures include the following projects:

1. Repair stonework on the historic buildings and stone walls in-kind with locally sourced stones.
2. Conduct general repairs on historic buildings due to damage caused by weather, age and use. All repairs to the historic buildings will be done in-kind.

These projects will have beneficial impacts on historic structures by improving the preservation of the historic exterior fabric.

Impacts on Historic Structures

No-Action Alternative. Under the no-action alternative, the condition of historic structures would remain the same as described in the affected environment, and the current management of historic structures would continue. Current threats to historic structures under the no-action alternative, such as the continued deterioration of the Manzanita Lake Trail surface and the need for in-kind repairs, would continue.

Action Alternative. Under the NPS preferred alternative, the reconfiguration of the traffic lanes at the northwest entrance station would have no adverse effect on the Lassen Park Highway, contributing to the Lassen Volcanic National Park Highway Historic District. The highway is a two-lane roadway with a 22-foot-wide asphalt surface. Its shoulders range in width from 2 feet to 3 feet. The highway's current configuration was established during paving and widening projects in 1948–1951. While sections of the highway have been modified, the section at the northwest entrance, however, has not. The additional lane, built within the existing road shoulder at approximately 12 feet wide and 100 feet long, would require approximately 1,600 square feet of new pavement for the new lane. Since the pavement would be added within the existing road shoulder, no alteration to the original roadway is anticipated. Park managers have preliminarily determined that the action would not have an adverse effect on the historic district (Gibson, pers. comm., 2023b), yet discussion continues.

Conceptually, the dam and dike improvement project may require the construction of an access road and staging areas, which may temporarily cause adverse effects on portions of the Manzanita Lake Trail, a historic structure contributing to the Naturalist's Services Historic District and potentially to the Nobles Emigrant Trail, listed in the National Register with remnant stretches crisscrossing the Lassen Volcanic National Park Highway and exiting the park along the valley of Manzanita Creek. Widening portions of the trail for vehicle access and staging areas as well as potential soil compression and slumping, gouging, rutting, and erosion from heavy machinery may temporarily adversely affect the historic structure. Depending on final design details, the impacts on the trail are anticipated to be limited to the duration of dam

and dike improvements. Trail conditions would be returned to current levels as the disturbed ground would be restored to its pre-construction contour and condition following the completion of the project. Ultimately, therefore, the dam and dike improvement project would result in no adverse effects on the Manzanita Lake Trail. Following the completion of this project, NPS staff anticipate that the Manzanita Lake Trail would be rerouted over the new dam and dike, potentially changing the trail's historic alignment and circulation pattern, depending on the final engineering and design details. By addressing concerns about dam failure, however, the significance and use of the Manzanita Lake Trail would be retained. Finally, depending on engineering and design details, the dam and dike themselves may be adversely impacted by the improvement project since the structures or parts of the structures are historic. Additional research and consultation will be needed to determine any impacts on the dam and dike themselves once engineering and design details are more complete.

Improvements to the amphitheater, which would include night sky-friendly lighting, upgraded audiovisual equipment, seating, and accessibility would have no adverse effect on the integrity of the amphitheater as the lighting, audiovisual equipment, seating, and accessibility have been previously modified in or near 2006 as noted in the affected environment section above. The amphitheater is the only structure associated with the campground that has retained integrity. Its design is emblematic of the Mission 66 movement, and while the 2019 determination of eligibility did not consider the eligibility of the amphitheater as an individual resource (Phillips and Guettinger 2019), any upgrades would be carefully designed to avoid introducing visual elements that are incompatible with the amphitheater's character or aesthetics.

The rerouting of the Manzanita Lake Trail along the shoreline of the day use area would change the historic route of the trail through the creation of a new trail segment of 400 linear feet, resulting in an adverse impact on the historic trail alignment. Although the trail was modified in 1946 with resurfacing and widening projects, these modifications did not alter the trail alignment or the resources interpreted along the trail (Emmons and Caywood 2004). Improvements to the natural surface of the Manzanita Lake Trail and removing large openings (such as filling in holes) and threshold barriers to meet ABAAS/IBC standards would have no adverse effect on the historic structure.

Cumulative Effects. The park has additional improvement projects for historic structures outside of this planning process that may necessitate additional compliance. The historic buildings are in need of general repairs due to damaged caused by weather, age and use. All repairs to the historic buildings will be done in-kind. Stonework on the historic buildings and stone walls also need repairs and these repairs will be done in kind. The stones needed for replacements will be sourced locally. Park managers are also considering installing an accessible entrance for visitors with limited mobility to experience the Loomis Residence. Additional compliance may be needed for design options for this entrance and any if there would be potential modifications to the historic fabric of the structure.

Ongoing and reasonably foreseeable actions under the preferred alternative such as the project to repair the dam, dike, and spillway and general repairs to the historic structures would be overall beneficial to preserving the historic structures within the Manzanita Lake Developed Area.

Increasing visitation to the Manzanita Lake Developed Area and increased climate change impacts may result in additional repairs to historic structures, monitoring for visitor and climate change impacts, and adaptive management strategies to protect historic structures and provide for visitor use and enjoyment. Additional compliance may be necessary when the need for adaptive management actions are identified.

Conclusion. The no-action alternative would continue current management. No new actions would occur, and thus, there would be no new impacts on historic structures under this alternative. Current deterioration of historic structures would continue, potentially leading to the loss of these structures and dam and dike failure.

Under the NPS preferred alternative, the reconfiguration of the traffic lanes at the northwest entrance station would occur within the existing road shoulder and have no adverse effect on historic properties. Rerouting the Manzanita Lake Trail would require a new trail segment of approximately 400 feet and would adversely impact the trail's historic alignment. Improvements to the surface of the Manzanita Lake Trail and improvements to the Mission 66 amphitheater would not adversely impact the integrity of location, design, setting, materials, workmanship, feeling and association of these historic structures. No actions within the preferred alternative would impact the Nobles Emigrant Trail. Conceptually, improvements to the dam and dike have the potential to cause adverse effects on the historic dam, dike, and associated structures themselves and temporary adverse effects on the Manzanita Lake Trail as part of the access route to the dam and dike. Upon completion of this project, the Manzanita Lake Trail would be restored to its current surface condition or improved for accessibility. As this dam and dike improvement project develops, further compliance and consultation would be required to determine the impacts on the dam, dike, and associated structures and the impact of potentially rerouting the Manzanita Lake Trail.

CULTURAL LANDSCAPES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

As noted in the historic structures section above, the Manzanita Lake Developed Area contains several historic districts and cultural landscapes.

Nobles Emigrant Trail. This trail is classified as a historic structure with an unknown condition assessment in the Cultural Resource Inventory System, as noted above. The national register nomination recommended the preservation of trail and 100 feet on each side of the trail (Chappell 1974b).

Manzanita Lake Naturalist's Services Historic District. Listed in the National Register of Historic Places (2006), this historic district is made up of historic structures (listed above) and cultural landscape features dating from late 1920s to the present. Water from Manzanita Creek, which flows through the developed area, is trapped and diverted to enlarge the area's two primary constructed water features, Manzanita Lake and Reflection Lake. Originally shallow natural lakes, the lakes increased in volume through human intervention. The modifications occurred before the lakes were included within the park boundary; however, the lakes were

integrated into the park's interpretation and recreation planning of the 1930s and 1940s. Both Manzanita and Reflection Lakes contribute to the historic district. The earthen dam at Manzanita Lake, constructed across its natural outlet, raised the capacity of the impounded reservoir to approximately 50 acres. A cleared area with a beach made of imported sand is located at the south end of the lake and functions as a day use picnic area. The lakeshore for the beach was cleared in 1933 and the beach constructed in 1934. The infrastructure central to the integrated interpretive system of Naturalist's Services Historic District is largely intact, and therefore, the historic district retains the physical and associative integrity demanded of national register properties (Emmons and Caywood 2004).

Except for the Lassen Park Highway, individually listed in the national register (2006), the remaining vehicular paths in the Manzanita Lake Developed Area do not reflect historical patterns of development. The system of interpretive/recreation trails does, however, retain integrity. The Manzanita Lake Trail, the Reflection Lake Trail, and the Lilly Pond Trail are contributing resources to the historic district. The Manzanita Lake Trail circles the perimeter of Manzanita Lake (Emmons and Caywood 2004). Park managers have sought to preserve the natural surface and routes of these trails. For example, in 2005, the park received funding (PMIS 13236) to repair the Manzanita Lake Trail Surface. Approximately 100 tons of small gravel was spread to approximately 6–8 inches deep to restore the trail's surface, which had been damaged from concentrated foot traffic.

Mission 66 Resources. As mentioned in the historic structures section, during the Mission 66 planning period, the 1930s-era campground and campfire circle were replaced with a newly configured campground, with six large loops stemming from a single access road and a modern amphitheater. Additional concessioner, visitor use, and park administrative facilities were planned and constructed in the Manzanita Lake Developed Area as well. In the 1970s, these visitor use facilities were moved in response to the threat of rockslides from nearby Chaos Jumbles, and in the 1980s, the concession operation expansions at the Loomis Museum, NPS employee housing, and the maintenance areas were also removed (Emmons and Caywood 2004; Phillips and Guettinger 2019; Phillips and Mori 2020).

As described in the historic structures section under the 2015 Mission 66 Era Resources multiple property nomination, Mission 66 cultural landscapes were present within the Manzanita Lake Developed Area that were potentially eligible for the national register (Carr et al. 2015). Following this nomination, in 2019, a determination of eligibility for the Mission 66 Manzanita Lake Campground, associated comfort station, and small-scale features found that the “Manzanita Lake Campground does not possess the significance necessary to be eligible for inclusion in the National Register of Historic Places.” This conclusion cited the extensive alterations of the campground, including the nearly complete removal of the concessioner's resort facilities and the demolition and revegetation of one of the six campground loops. The campground and associated features had a loss of integrity of original design, setting, and feeling (Phillips and Guettinger 2019). The California Office of Historic Preservation concurred on March 20, 2020 (Polanco 2020).

Additionally, a 2020 determination of eligibility stated that the Mission 66 parking areas along the Lassen Volcanic National Park Highway were not eligible for the national register, as they lacked integrity so that they no longer convey their significance as part of Mission 66

development. This area included the Loomis parking area, the western portion of which survives (expanded to 4,000 square feet in 1935) and is included in the Naturalist's Services Historic District. The eastern portion, which was part of the Mission 66 master plan, was removed in the 1980s and, therefore, is not included in the historic district (Phillips and Mori 2020).

Lassen Volcanic National Park Highway Historic District. Listed in the National Register of Historic Places (2006), this historic district consists of the Lassen Park Highway (see historic structures section) and other sites and structures dating from the mid-1920s up to present-day modifications. The highway was designed in the 1920s as a recreational pleasure drive designed to display the park's most scenic and geologically interesting areas to automobile tourists. Although the mountainous terrain required the extensive use of cut-and-fill road building techniques to provide scenic vistas, designers ensured that, where possible, existing landscape features were carefully preserved. The preservation of the landscape, an essential component of the project landscape architect's design philosophy, improved the naturalistic design of the road corridor. Roadside amenities, including scenic pulloffs, trailhead parking areas, and roadside markers were designed and located to enhance the motorists' experience, allow hikers access to the park's extensive backcountry trail system, and add to the visitor's understanding of the dramatic geological processes that created the diverse volcanic landscape. The road offers distant views of the surrounding countryside within and beyond park boundaries, as well as a variety of distant and intimate views of the park's major natural landscape feature, Lassen Peak.

The Lassen Volcanic National Park Highway is a historic designed landscape and is significant as an intact example of early road design in the National Park Service. Significant features include the road's route and alignment, scenic overlooks, headwalls, bridge culverts, entrance pylons, and northwest entrance station. These features use native materials and a naturalistic design to blend the road with its setting. The Lassen Volcanic National Park Highway historic landscape characteristics that retain integrity include natural systems and features, spatial organization, topography, circulation, views and vistas, vegetation, land use, and constructed water features. Some buildings and structures and small-scale features do not retain integrity due to the loss of a significant amount of their original fabric. In addition, noncontributing modern elements, including contemporary buildings and signs, have been constructed along the road corridor. These modern changes are, in large part, mitigated by the large scale of the significant resource; the majority of land use characteristics retain integrity, particularly topography, views and vistas, and land use. The road configuration remains much as it was during the period of significance, with the views it was designed to showcase intact and its original use as a touring route still active.

Manzanita Lake Dam and Dike. Since the dam's construction in 1911, enlarging the naturally occurring lake and thereby creating Manzanita Lake, the dam and dike have had a series of incidents, examinations, environmental assessments, modifications, and hazard classifications. In 2014, the hazard classification was changed from low to significant because the loss of the lake would have a significant impact on the park. Manzanita Lake is a signature feature that defines the northwest part of the park. The lake provides aesthetic value and has been featured predominately in NPS photos. Recreational opportunities include nonmotorized boating and fishing, hiking on nearby trails, and opportunities for wildlife viewing, with the dam providing

wildlife habitat. Loss of the lake due to dam failure would have immediate impacts on recreation and long-term negative impacts on the scenic beauty and cultural landscape of the park. Because of the adverse effects that would be associated with the loss of the dam, the significant hazard potential rating remains active (NPS 2021a).

Trends for Cultural Landscapes. Both historical trends and future projections suggest future increases in temperature, wildfire, air pollution, severe weather events, and drought and decreases in precipitation levels and snowpack. Reduced precipitation, snowpack, and increased drought and wildfire in the Manzanita Lake Area, such as seen during the Dixie Fire in 2021 in Feather River Canyon in southeastern portion of the park, would threaten the Manzanita Lake Developed Area. Increases in severe weather events, may result in increased occurrences of flooding and erosion and lead to dam and dike failure.

Reasonably foreseeable future actions that have the potential to impact cultural landscapes include projects to:

1. Install a wood concealment fence around the propane tanks next to the Loomis Museum and next to the comfort station.
2. Relocate the propane tanks from the center of the circular drive of the Naturalist Residence to behind the garage and concealing the tanks with a wood fence.

These projects will have beneficial impacts the Naturalist's Service Historic District's cultural landscape by concealing and removing non-compatible features from the landscape.

Impacts on Cultural Landscapes

No-Action Alternative. Under the no-action alternative, the current management of cultural landscapes would continue. Adverse effects on the cultural landscape include continued crowding at the informal pulloff inside of the northwest entrance and the presence and the use of social trails, which impact the Lassen Volcanic National Park Highway Historic District's historic design philosophy of enhancing visitor's experience by preserving landscape features and providing views of the countryside and Lassen Peak. Beneficial impacts under the no-action alternative include maintaining the infrastructure and integrated interpretive system that contributes to the Naturalist's Services Historic District and the alignment of the Lassen Volcanic National Park Highway Historic District. Additional beneficial impacts include no contemporary additions (e.g., waysides, picnic tables, electric charging stations) to the cultural landscape and retaining the picnicking facilities and function at the day use area at Manzanita Lake, mentioned in the national register nomination. Finally, since the Manzanita Lake Developed Area was designed for visitor services, has been substantially altered since the Mission 66 period, and many of the Mission 66 campground resources lack integrity and association, no effects are anticipated to the Mission 66 cultural landscape under the no-action alternative.

Action Alternative. Under the NPS preferred alternative, the additions of an electric vehicle charging station, a vault toilet, and information displays at Lassen Crossroads would introduce nonhistoric features outside of the Lassen Volcanic National Park Highway Historic District, yet potentially within its viewshed. A new connecting trail to the Nobles Emigrant Trail would

also introduce a nonhistoric feature outside of the historic district. No impacts on historic resources are anticipated with these additions, but design compatibility with the historic district, vegetation screening, and interpretation or clearly differentiating the connector trail from the historic trail may be appropriate. The formalization of Nobles Emigrant Trailhead would not have an adverse effect on the Nobles Emigrant Trail cultural landscape since modifications to these areas already exist, and the improvements would lessen crowding and visitor wayfinding and circulation, improving the viewshed overall.

The reconfiguration of inbound traffic lanes at the northwest entrance would not have an adverse impact on the cultural landscape of Lassen Volcanic National Park Highway Historic District since the work would occur within the existing road shoulder. The highway, entrance station, road configuration, and circulation patterns would continue to remain much the same as they have during the period of significance. As noted in the 2006 national register nomination, other modifications (e.g., contemporary buildings, signs) have been installed along the road corridor and have not resulted in adverse effects on the historic district due to the large scale of the historic district. The formalization of the pull-off with views of Manzanita Lake just past the entrance station would not have an adverse effect on the cultural landscape. The improvement would lessen crowding and overall improve the viewshed at this pull-off.

The designation of additional administrative camping areas within the current administrative area or beyond Reflection Lake Road are not anticipated to have an impact on the cultural landscape, as this area is outside of the historic districts' boundaries. Furthermore, this action supports the use of the Manzanita Lake Developed Area, which was developed for visitor experience and administrative facilities, by providing administrative facilities and services. If another location is selected, however, such as the proposed locations near the Nobles Emigrant Trail and past the Naturalist's Residence (also formally known as the Discovery Center), careful design would be necessary to ensure the new additions would not impact the cultural landscape of the Nobles Emigrant Trail or the Naturalist's Services Historic District.

The construction of a reestablished parking lot near the Loomis Museum and the addition of visitor use facilities (electric vehicle charging stations, double vault toilet, picnic tables, Chaos Crags Trailhead) in the area where parking, cabins, and facilities were removed in the 1970s and 1980s would introduce new features into the Manzanita Lake Developed Area. However, the location of these new facilities is outside of the Manzanita Lake Naturalist Services Historic District, so no impact on the historic district's cultural landscape is anticipated. The reintroduction of visitor facilities, though not directly comparable with the historic facilities within this area, would be beneficial for the Manzanita Lake Developed Area, as this area was designed for visitor experience and administrative facilities. The addition of new signage to direct visitors to this parking area would be designed to complement the aesthetic design of signage within the nearby Naturalist's Historic District. Furthermore, this parking area and visitor use facilities would improve the cultural landscape of the Manzanita Lake Naturalist Services Historic District by providing additional parking, thus eliminating unauthorized parking, which has impacted natural and cultural resources through vehicular and pedestrian trampling.

Within the Naturalist's Services Historic District, the system of interpretive/recreation trails retains integrity. The addition of an accessible, paved, multiuse path connecting the

reestablished parking area to Loomis Plaza, day use area and boat launch, camper store, amphitheater, campground, and night sky program area may have an adverse impact on the cultural landscape. Where the new path follows the alignment of original paths and trails, adverse effects on the cultural landscape are limited to the widening and paving of the path. Where new alignments are suggested, adverse effects will occur on the integrity of the trails system and historic circulation. Additional interpretive wayside and lighting along these new and improved paths would introduce nonhistoric features into the landscape, but their impact would be minimized through compatible design of the waysides and lighting.

The rerouting of the Manzanita Lake Trail would have an adverse impact on the cultural landscape due to changes in the alignment and design of infrastructure central to the area's interpretive program, as the trail contributes to the Manzanita Lake Naturalist Services Historic District. The addition of waysides and a bridge over Manzanita Creek would also introduce nonhistoric features into the landscape. Minimization of these impacts could include compatible design with the historic district, and mitigations may include the interpretation of the original route and landscape appearance. Surface improvements to the Manzanita Lake Trail would be a beneficial impact on the cultural landscape, as the improvements would be compatible with the current surface treatment and maintain the historic design and feeling of the trail. The widening and minor rerouting of the Reflection Lake Trail would also have an adverse effect, as this trail also contributes to the Manzanita Lake Naturalist Services Historic District. This trail's surface treatment improvements would have a beneficial effect on the cultural landscape by retaining the natural firm surface.

The addition, a temporary contact station, information kiosks, interpretive wayside, wayfinding, formal paved interpretation area and temporary shade structure, picnic tables, water filling stations, and new trails and paths through Loomis Plaza would be carefully designed to have no adverse effects on the cultural landscape the Manzanita Lake Naturalist Services Historic District. Careful design would ensure that any new construction in the historic district would be compatible with the historic district and be clearly differentiated from historic structures to avoid creating a false historical appearance. Careful design would ensure that additions to the cultural landscape would be compatible in terms of mass, scale, and materials.

Removing the picnicking facilities at the day use area at Manzanita Lake would have a beneficial impact on the cultural landscape. The action would retain the designed use of the day use area and manage crowding and resource damage to the lake. The replacement of a boat launch to better meet the design character of the area would also be a beneficial impact on the cultural landscape. The bulkhead and fishing pier would be new features within the cultural landscape, potentially causing an adverse effect on the landscape. However, through compatible design, these features would be physically and visually unobtrusive to minimally affect the scale and visual relationships among landscape features, retain the historic use of this area for recreation, and provide a beneficial impact on the cultural landscape by fostering this use. The boat cleaning station at the existing RV dump station may have a temporary adverse impact on the cultural landscape during use by boaters, but when not in use, it should not be noticeable, as there would be no human activity in this area to draw attention to the station.

Modifying the road running through the Mission 66 campground loops; sequencing facilities and road alignment at the camp store; lengthening campsite spurs and expanding turning radii

with new pavement at Loop A; and adding glamping sites, multiuse paved, and unpaved pathways, interpretive panels, new lighting, a formalized night sky area, native plant garden, and new pavement would not adversely impact cultural landscape in this area since this area, outside of the historic district's boundaries, was designed for visitor use and experience compatible with these modifications. Modifications to the amphitheater and campground through the installation of a paved, wide multiuse trail would improve connectivity between the Mission 66 period structures and their association with each other. As these trails are currently paved, the expansion of the pavement would not have an adverse impact on the historic paths. The 2019 determination of eligibility for the Mission 66 Manzanita Lake Campground, associated comfort station, and small-scale features found that the campground did not possess the significance necessary to be eligible for inclusion in the national register.

Anticipated action for improving the dam and dike may be a mixture of adverse and beneficial impacts on the cultural landscape, depending on final engineering and design. The primary beneficial impact is that these improvements will prevent dam and dike failure. Adverse effects on the cultural landscape may include the temporary construction and installation and use of a heavy vehicle access road, staging areas, and construction within the viewshed. Potential limited tree and vegetation removal along the dam and dike may also be a temporary adverse impact on the cultural landscape. The dam and dike areas would be revegetated following the completion of the project. New features, such as improved spillways and pedestrian bridges, would be additions to the cultural landscape, and their design would complement the historic district.

Cumulative Effects. Ongoing and reasonably foreseeable actions under the preferred alternative, such as additions to repair the dam, dike, and spillway, would be overall benefits to preserving the historic districts and cultural landscapes present within the Manzanita Lake Developed Area. The restoration of visitor use facilities in a previously disturbed area within the Manzanita Lake Developed Area would also be an overall beneficial impact on the historic districts and cultural landscapes by addressing overcrowding and resource concerns, with visitation anticipated to continue to increase in the future. Finally, increasing visitation to the Manzanita Lake Developed Area and increasing climate change impacts may result in additional monitoring for visitor and climate change impacts and adaptive management strategies to protect the historic districts and cultural landscapes for visitor enjoyment. Additional compliance may be necessary when the need for adaptive management actions are identified.

Conclusion. The no-action alternative would continue current management. No new actions would occur, and thus, there would be no new impacts on cultural landscapes under this alternative. Adverse impacts on the cultural landscape under current management include crowding at the informal pulloff inside the northwest entrance and the presence and use of social trails. Beneficial impacts under current management include maintaining the infrastructure and integrated interpretive system that contributes to the Manzanita Lake Naturalist's Services Historic District and the alignment of the Lassen Volcanic National Park Highway Historic District. Other beneficial impacts include no contemporary additions to the cultural landscape and retaining the picnicking facilities and function at the day use area at Manzanita Lake, mentioned in the national register nomination.

Under the NPS preferred alternative, nonhistoric features, such as an electric vehicle charging station, a vault toilet, and information displays at Lassen Crossroads, would be added, and a new

connecting trail to the Nobles Emigrant Trail would be added. No impacts are anticipated on the Lassen Volcanic National Park Highway Historic District nor the Nobles Emigrant Trail's cultural landscape. Design compatibility, vegetation screening, interpretation, or differentiating the connector trail from the historic trail, if appropriate, may improve the larger viewshed outside of these cultural landscapes.

The reconfiguration of the traffic lanes at the northwest entrance would not result an adverse impact on the cultural landscape since new asphalt would be installed within the existing road shoulder. The function of the entrance station and road, the scale and visual relationships among landscape features, and historic circulation patterns at the northwest entrance would remain largely the same as historic conditions and support other documented improvements to the highway.

Neither the formalization of the pulloff inside the northwest entrance, the designation of administrative camping areas, nor the construction of a parking lot near the Loomis Museum with electric vehicle charging stations, a double vault toilet, picnic tables, and a trailhead at Chaos Crags would have an adverse impact on the cultural landscape. This parking area at the Loomis Museum and visitor facilities would improve the cultural landscape, as they would allow for the dispersal of vehicles and eliminate vehicular and pedestrian trampling within the Manzanita Lake Naturalist's Services Historic District.

Where new alignments are suggested for the Manzanita Lake Trail, adverse impacts on the cultural landscape are anticipated. Surface improvements and new trail alignments for other historic paths and trails, new interpretive waysides, new lighting, new wayfinding signage, temporary contact stations and information kiosks, a formal paved interpretation area, temporary shade structure, new picnic tables, water filling stations, and a bulkhead and fishing pier would also introduce nonhistoric features into the cultural landscape; however, no adverse impact is anticipated on the cultural landscape, as these improvements and additions would be compatibly designed and carefully placed within the historic districts.

Removing picnic tables from the day use area would improve the cultural landscape here by lessening crowding and resource damage in the day use area. Replacing the boat launch would be a beneficial impact on the cultural landscape by better meeting the design character of the area. The boat cleaning station may have a temporary adverse impact on the cultural landscape during use by boaters, but when not in use, it should not be noticeable.

Modifications to the Mission 66 campground road, road alignment, campsite spurs, expanded turning radii, new pavement, glamping sites, and surface improvements to pathways, interpretive panels, lighting, formalized night sky area, and native plant garden would not adversely impact the cultural landscape. Modifying the amphitheater and campground through the installation of a paved, wide multiuse trail would improve the cultural landscape by connecting between these two Mission 66 historic structures and their association with each other.

Conceptually, the dam and dike would have a mixture of adverse and beneficial impacts on the cultural landscapes depending on the final engineering and design. Overall, improving the dam and dike to prevent failure would be beneficial impact on the cultural landscapes by preserving the Manzanita Lake reservoir.

ARCHEOLOGICAL RESOURCES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

As of the 2018, 15,000 acres, only 14% of Lassen Volcanic National Park, had been inventoried for archeological resources. The known archeological resources of the park, however, reflect a diverse and long history of human activity extending at least 4,000 years ago. Of the documented archeological sites, precontact Native American sites are most abundant, with site types ranging from major summer villages to temporary camps to lithic workshops (NPS 2018, 1994).

Although archeological investigation began at the park in 1962, since the 1990s the National Park Service has emphasized the preservation of cultural resources. Therefore, few archeological sites within the park have been subsurface tested (Krahe and Catton 2010). Archeological sites within the park have only been evaluated when a management action is planned and compliance documentation is required. The archeologically sensitive zones of the park have had a continual lack of a thorough inventory of (NPS 1994), and some archeological sites have dated baseline knowledge and lack current condition assessments (NPS 2017).

Archeological sites are present within the Manzanita Lake Developed Area and are listed in the NPS Cultural Resource Inventory System with conditions ranging from destroyed (or unknown) to good. Within the campground area, subsurface testing has led to the conclusion that sites in this area were destroyed during the campground's development (Krahe and Catton 2010). Near the Naturalist's Residence, there are two previous archeological surveys by DuBarton and Brunzell (2004) and Griffin (1995). These surveys, along with a recent project at the park to ready the new ranger operations building (formally known the Discovery Center) at the Naturalist's Residence for power outages by installing a propane generator and propane tank behind the Naturalist's Residence (contributing) and garage (noncontributing), found that the area was previously disturbed by the installation of an underground powerline and that the archeological sensitivity of this area was low (Gibson, pers. comm., 2022). This project also included building a concrete pad and roof structure behind the garage, upgrading a utility/electric box for the generator, digging a ditch and installing a powerline from the generator to the Naturalist's Residence, constructing a concealment fence, and removing a light pole and utility. The design of the generator structure and concealment fence was compatible to the historic district, and the removal of the light and utility pole improved the cultural landscape. The California Office of Historic Preservation did not object to the park's proposed finding of no adverse effect for this undertaking (Polanco 2022).

Both historical trends and future projections suggest future increases in temperature, wildfire, air pollution, severe weather events, and drought and decreases in precipitation levels and snowpack. Reduced precipitation and snowpack and increased drought and wildfire in the Manzanita Lake Area, such as seen during the Dixie Fire in 2021 in Feather River Canyon in southeastern portion of the park, would threaten the archeological resources within of the Manzanita Lake Developed Area due to tree/root burning or fall or impacts related to cleanup and restoration efforts. Increases in severe weather events, may result in increased occurrences of erosion or landslides, leading to the potential exposure of archeological resources.

Reasonably foreseeable future actions that have the potential to impact archeological resources include the following projects:

1. Install a wood concealment fence around the propane tanks next to the Loomis Museum and next to the comfort station.
2. Relocate the propane tanks from the center of the circular drive of the Naturalist's Residence to behind the garage and concealing the tanks with a wood fence.

The new pipes for the relocation of the propane tanks were installed as part of the previous project to install the propane generator and propane tank described above. For this previous project, the California Office of Historic Preservation did not object to the finding of no adverse effect (Gibson, pers. comm., 2022; Polanco 2022). Therefore, installing the wood concealment fences, relocating the propane tanks, and capping the old tanks in place in the center of the circular drive of the Naturalist's Residence are not anticipated to have adverse impacts on archeological resources (if present) since there will be minimal ground disturbance in previously disturbed areas.

Impacts on Archeological Resources

No-Action Alternative. Under the no-action alternative, the current management of archeological resources would continue. No ground disturbance associated with the proposed alternative would occur. Ground disturbance associated with potential future actions outside of this planning process would require additional archeological survey and compliance.

Action Alternative. Conceptually, the dam and dike construction would present the largest single impact on archeological resources. In a future compliance process, park managers would need to consider if the historic dam and dike would be left in place or removed, vehicle access and staging areas, tree and root removal, and additional ground disturbance that would accompany this project such as excavation, gouging, rutting, and soil compression. Archeological surveys would precede any ground-disturbing activities to ensure that national register-eligible or -listed archeological resources are avoided to the greatest extent possible during construction. If significant archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the California Office of Historic Preservation and, as necessary, Native American Tribes traditionally associated with park lands.

Ground disturbance associated with changes to existing or the installation of new road alignments, parking areas, or improved trails and trailheads for modifications to meet ABAAS/IBC requirements may include leveling and grading actions, potentially having an adverse effect on archeological resources. An archeological survey will be conducted ahead of planned changes to the alignment of the Lassen Volcanic Park Highway. Since modifications to the highway would occur within the existing road shoulder, no adverse effects on archeological resources are anticipated. The installation of small-scale features along these trails (e.g., bridges, wayside, lighting) would also require ground disturbance. Some surveys had been completed before this plan, indicating the presence of archeological sites within new trail alignments. Park staff have concluded that these archeological sites are ineligible for the national register based on these older surveys (Gibson, pers. comm., 2023b). While park staff would avoid archeological sites to the extent feasible, in some cases, trail alignments may impact archeological sites. Park

staff would continue to document the determination of eligibility for these sites and consult with the California Office of Historic Preservation and Tribal Nations before implementing these ground-disturbance activities.

The Loomis parking area, totaling 22,000 square feet of paving for a 40-vehicle lot, would be situated in a previously disturbed location (the former concession resort and facilities, park service employee housing and maintenance areas, which were removed between 1970 and 1987). In 2019, a determination of eligibility found the area ineligible for inclusion in the national register, though the nomination focused primarily on the lack of remaining historic structures and circulation patterns rather than the potential for archeological resources (Phillips and Guettinger 2019). Park staff are currently conducting surface surveys of this area and are working on completing a report that would document the lack of archeological context and the few surface artifacts and features. Park staff have preliminarily concluded that archeological sites in this area are ineligible for the national register (Gibson, pers. comm., 2023b). Park staff will complete these surveys, report, and consult with the California Office of Historic Preservation and Tribal Nations before installing this parking lot.

Modifications to the campground loops, including the removal of trees, lengthened campsite parking, and expanded turn radii in Loop A, and associated scraping and grading also require more recent archeological survey to identify national register-eligible sites and to avoid archeological sites. At Loomis Plaza, scraping and grading may also be needed to support the installation of a formal paved interpretation area. These actions would cause ground disturbance, and survey should precede the installation of this paved area. Park staff have reviewed previous archeological surveys and have determined that there are no national register-eligible sites that would be impacted by the actions in this plan. Park staff are working on completing new surveys of the area (Gibson, pers. comm., 2023b), and park staff will complete these surveys, report, and consult with the California Office of Historic Preservation and Tribal Nations before ground-disturbance actions.

The archeological reports for surveys for the anticipated modifications to road alignments, parking areas, and trail alignments, the Loomis parking lot, modifications to campground loops and Loomis Plaza are being written with an anticipated completion date of summer 2024. If any resources eligible for the national register are found, appropriate mitigations would occur. These actions will allow park staff to avoid adversely impacting the archeological sites.

The installation of vault toilets, water filling stations, electric vehicle charging stations, and glamping sites (and associated utility lines) would also require ground disturbance. The installation of a native plant garden and the hardening of telescope platforms may also result in ground disturbance (leveling, excavation) and should be surveyed before installation. These features would avoid archeological sites.

Within the administrative camping area, when the location and level of development is determined, archeological survey would precede the installation of new camping sites, fire rings, picnic tables, and a vault toilet. Known ground disturbance would occur with the installation of the vault toilet. The installation of these items would avoid archeological sites.

Improving the day use area at Manzanita Lake, such as removing the old boat launch and installing a new one; installing an accessible fishing pier and a boat cleaning station (including

associated utility lines); and moving the concession boat storage would also result in ground disturbance and impacts on archeological resources. Installing the bulkhead platform (8 feet long) would require metal posts driven into the soil, and the accessible fishing pier would require ground disturbance for six metal pilings driven into the lakebed. Installing the concrete pad would require leveling. Park staff would avoid archeological sites on actions that would require ground-disturbance activities, and if archeological sites could not be avoided, park managers would undertake mitigation actions, as described in appendix C and in consultation with the California Office of Historic Preservation and Tribal Historic Preservation Officers.

Additionally, rerouting the Manzanita Lake Trail along the shoreline of the day use area would require constructing a new segment of 400 linear feet. The old trail alignment would be left in place, and no ground disturbance would occur along this segment. Ground disturbance may be needed to construct the new segment. Additionally, improvements to the natural surface of the Manzanita Lake Trail by removing large openings and threshold barriers to meet ABAAS/IBC standards may also require ground disturbance. The route of the new segment would avoid archeological sites, and an archeological survey would precede any ground disturbance such as scraping or grading for the new segment and improvements to the natural surface. Archeological monitoring would occur, as determined by park managers in consultation with the California Office of Historic Preservation and Tribal Historic Preservation Officers. Because of the requirements for survey before ground disturbance, no adverse effect is anticipated for archeological resources related to this action.

New surveys of previously disturbed areas that had not been the subject of archeological survey, such as the former parking and cabins area, removed in the 1970s and 1980s, may provide new information to early park and Mission 66 developments. Additional survey to determine the presence of archeological resource and documenting these resources would help park managers plan for future decisions.

Cumulative Effects. Ongoing and reasonably foreseeable actions under the preferred alternative include improving the percentage of archeological survey data conducted within the park. Coupled with increasing visitation and climate change impacts as noted above, knowing the location of archeological resources will support park managers' future decision-making to protect resources and provide for visitor enjoyment.

Conclusion. The no-action alternative would continue current management. No new actions would occur, and thus, there would be no new impacts on archeological resources under this alternative.

Under the NPS preferred alternative, ground disturbance associated with changes to existing road alignments or trails and the installation of new road alignments, parking areas, trails, bridges, vault toilets, water filing stations, electric vehicle charging stations, new camping sites and glamping sites, fire rings, picnic tables, formal paved interpretation area, native plant garden, small-scale features like waysides and lighting, and utility lines to support new infrastructure may have an adverse impact on archeological resources. Additionally, the improvement of trails and trailheads; the hardening of telescope platforms; and the modification of the campground loops, campsite parking, and turn radii may also have an adverse impact on archeological resources. Removing the old boat launch and installing a new launch and

bulkhead platform, an accessible fishing pier and a boat cleaning station (including associated utility lines), and a concrete pad and moving the concession boat storage may also require ground disturbance and result in adverse impacts on archeological resources. Improvements to the surface treatment of trails may require ground disturbance and result in impacts on archeological resources. An archeological survey, however, would precede these ground-disturbance actions, and known archeological sites would be avoided. If archeological sites could not be avoided, park staff would engage in mitigation measures, as described in appendix C and in consultation with the California Office of Historic Preservation and Tribal Historic Preservation Officers. Thus, because of the requirements for a survey before ground disturbance and the preliminary determination of eligibility provided by park staff, no adverse effect under the National Historic Preservation Act is anticipated for archeological resources related to the preferred alternative.

ETHNOGRAPHIC RESOURCES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Ethnographic resources are traditional park sites, structures, objects, landscapes, and natural resource features that have significance due to their importance to the present way of life by members of a sociocultural group associated with the park (NPS 1998). The lands that make up the park were shared by three different Native peoples, the Yana/Yahi, Atsugewi, and Maidu. These Indigenous peoples had a spiritual attachment to Lassen Peak that is reflected in their legends (NPS 1994). Ethnographically documented Tribal populations with clear ties to Lassen Volcanic National Park include the Yana/Yahi, Atsugewi, and Maidu, communities. Descendants of these historic populations have been integrated into current federally recognized Tribes, including Enterprise Rancheria, Greenville Rancheria, Mooretown Rancheria, Redding Rancheria, Shingle Springs Band of Miwok Indians, and Shingle Springs Rancheria (Verona Tract), California; and Susanville Rancheria, the Pit River Tribe, and United Auburn Indian Community. Other Tribes of northern California, most notably the Wintu, Nomlaki, and valley Maidu (Konkow) of northern Sacramento Valley, also have a strong sense of attachment to the park, with Tribal members having occasionally participated in trade at the multi-Tribal villages, such as at Manzanita Lake (Deur 2004; Gibson, pers. comm., 2023a).

The Yana/Yahi, Atsugewi, and Maidu peoples may have come together seasonally at Manzanita Lake, which was a center of trade and recreational activity. Fishing and food gathering occurred in the lake and around the lake edge. Native people played games, including hand games, and gambled while at Manzanita Lake as well. In the available documentation, Manzanita Lake can be characterized as a place of enjoyment and recreation (Deur 2004; Gibson, pers. comm., 2023a).

Research conducted in 2002–2003 documented a rich and enduring tradition of religious use of specific sites within the park boundary, traditions of plant use, burning practices, and historical hunting and fishing. The research included discussions on the changing significance and uses of the resources within the park boundary following European American settlement in the area as well as NPS management. Tribal consultants also proposed a number of actions the National

Park Service could take to improve relationship with the Tribes and account for Tribal values and practices in the management and interpretation of the park (Deur 2004). Poor anthropological understanding and minimum consultation decreases ability to meet law and policy requirements, inhibits relationship building and educational opportunities, and presents the potential for adverse impacts on ethnographic resources (NPS 2017).

As noted above, both historical trends and future projections suggest future increases in temperature, wildfire, air pollution, severe weather events, and drought and decreases in precipitation levels and snowpack. Reduced precipitation and snowpack and increased drought and wildfire threaten the natural and cultural resources and places significant to these Tribal Nations. Relationship building and consultation would continue to document and protect these resources and places.

Impacts on Ethnographic Resources

No-Action Alternative. Under the no-action alternative, the current management of ethnographically important resources, such as archeological sites near Manzanita Lake, would continue. There would be no area set aside for private Tribal Nation use, no Tribal Nation interpretation areas, and no native plant garden with accompanying traditional use interpretation. Current management would thus perpetuate the challenges in improving relationships with Tribal Nations and their access to culturally important areas and resources. Thus, the no-action alternative presents adverse impacts on ethnographic resources.

Action Alternative. Under the NPS preferred alternative, administrative camping areas would be designated, including an area for private Tribal use; an area for Tribal interpretation would be designated, and a native plant garden and accompanying interpretation would be installed. These actions would help improve relationships with the Tribal Nations, their connection to the resources within the Manzanita Lake Developed Area, and the park's management of ethnographic resources.

Cumulative Effects. Ongoing and reasonably foreseeable actions under the preferred alternative include actions that lead to improved relationships with Tribes through more informal and formal consultation. Encouraging and facilitating Tribal Nations' connection to Manzanita Lake, discussing potential co-stewardship of important resources, and increasing the education and interpretation of Tribal history and culture at the park would improve resource protection and visitor understanding.

Conclusion. The no-action alternative would continue current management. No new actions would occur, and there would be no new impacts on ethnographic resources under this alternative. However, under the no-action alternative, the relationship between the park and Tribal Nations and Tribal Nations' access to cultural important areas and resources would be adversely impacted if current management continued.

Under the NPS preferred alternative, beneficial impacts on ethnographic resources would occur as a result of designating an administrative camping area, including an area for private Tribal use, designating an area for Tribal interpretation, and installing a native plant garden and accompanying interpretation. The preferred alternative would help improve relationships with

the Tribal Nations, their connection to the resources within the Manzanita Lake Developed Area, and the park's management of ethnographic resources.

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Consultation and Coordination

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CHAPTER 4: CONSULTATION AND COORDINATION

The National Park Service consulted with a number of agencies, Tribes, and interested persons while preparing this document. The public had numerous avenues for participation during the development of the plan—participation in public meetings and providing feedback by submitting comments via regular mail and electronically using the NPS Planning, Environment, and Public Comment (PEPC) website.

PUBLIC INVOLVEMENT

Lassen Volcanic National Park initiated the development of the Manzanita Lake Developed Area Design Concept Plan in the summer of 2021. However, the project was put on hold. On July 13, 2021, the Dixie Fire started in Feather River Canyon, southeast of Lassen Volcanic National Park, and then entered the park. Development concept plan planning efforts resumed in January 2022 after the fire was contained.

Between August 25, 2022, and September 26, 2022, park staff presented goals and objectives associated with the Manzanita Lake Developed Area development concept plan to the public to gather input to inform the planning process and development of the “preliminary proposed action.” While no meetings were held, the National Park Service released a press release, newsletter, and StoryMap to gather public feedback on the preliminary design concepts. In addition to the virtual materials, the newsletter was available in person at 10 local locations, including public libraries and visitor centers. The public was asked to identify management strategies and concepts that would be most helpful in supporting the plan purpose and need and whether any additional management strategies and concepts should be considered for the plan. Members of the public were invited to enter comments on the PEPC website or submit them via e-mail or postal mail. Twenty-one correspondences were provided via PEPC, e-mail, and mailed letters, with one being a duplicate submission, resulting in a total of 20 correspondence received during the civic engagement process.

To solicit public opinions on the planning effort for the Manzanita Lake area, the National Park Service asked four questions in the newsletter and on the project PEPC website:

1. What input do you have to share about these design concepts?
2. How would these design concepts influence your visit to Lassen Volcanic National Park?
3. Are there any other design concepts not already presented that the National Park Service should consider and analyze? What is missing, and why should it be considered?
4. What other comments or suggestions do you have?

The following topics represent pertinent comments and concerns identified during the civic engagement phase:

Recreation. Commenters were pleased with improving accessibility, retaining tent-only camping opportunities, adding a new boat launch, and having a designated area for night sky viewing. Commenters would also like to see additional trails in the area and proposed an

accessible fishing pier. Comments included concern that improving the lake area may bring more visitors, and the location of some proposals, including the administrative camping, should be moved to already-disturbed areas. Additionally, noise and light disruptions between different campground users was noted as a problem, with the suggestion of separating tent camping and RV camping to reduce these conflicts.

Parking and Transportation. Most commenters were in favor of increased parking capacity, electric vehicle charging stations, and an additional inbound lane at the entrance station. Many commenters supported the proposed multiuse paved accessible path that would connect visitors throughout the Manzanita Lake area and increased safety features to cross the park highway. Some commenters expressed concerns about an increase of cars parked along the lake and impacting views; however, some commenters would like to see more pulloff parking spots to enjoy the views. Some commenters suggested having accessible parking spaces by the night sky viewing area for easier access. Commenters suggested that shuttle services may alleviate parking congestion on the park highway.

Interpretation and Education. Some commenters suggested more programs focusing on local Indigenous history and at the amphitheater. Commenters were in favor of increased signage and wayfinding throughout the area to inform visitors on the park's resources and activities. One commenter suggested bringing back the Manzanita Lake webcam to help visitors gauge the current conditions of the area before coming.

Visitor Services and Facilities. Commenters supported the addition of water filling stations and restroom upgrades at Loomis Plaza and would like to see unisex or family bathrooms added to the remodeled restrooms. Some commenters suggested adding a lodge to the park.

CONSULTATION WITH TRIBES AND AGENCIES

During preparation of this design concept plan, members of the planning team met and/or consulted with various entities.

Tribal Consultation

In accordance with section 106 of the National Historic Preservation Act, Lassen Volcanic National Park staff initiated consultation with eight local federally recognized Tribes (Enterprise Rancheria; Greenville Rancheria; Mooretown Rancheria of Maidu Indians of California; Pit River Tribe, California; Redding Rancheria, California; Shingle Springs Band of Miwok Indians, Shingle Springs Rancheria (Verona Tract), California; Susanville Indian Rancheria, California; and United Auburn Indian Community of the Auburn Rancheria of California) about the proposed development concept plan in a letter dated August 23, 2022. This letter was informational, describing the need for the plan, identifying actions and resources that may be of interest to the Tribes and requesting feedback on these actions, resources, and potential mitigations if actions would have an adverse impact on resources. On August 29, 2022, Mooretown Rancheria of Maidu Indians of California replied, noting that they were not aware of cultural resources within the plan area and requesting a site visit to assess the project and further their knowledge of the tasks being planned. This site visit is scheduled for summer 2024.

California Office of Historic Preservation

In accordance with section 106 of the National Historic Preservation Act, Lassen Volcanic National Park staff initiated consultation with the California Office of Historic Preservation about the proposed development concept plan in a letter dated December 21, 2022. This letter was informational, describing the need for the plan, the actions suggested within the plan, a series of projects park managers are developing within the area of potential effects of the plan, and a list of the historic properties that could be affected.

In response to the park, on March 2, 2023, the California Office of Historic Preservation replied, stating that the project, as described in the December 21, 2022, letter constituted an undertaking with the potential to affect historic properties, that the horizontal area of potential affects was sufficient, and requested the National Park Service provide the anticipated depth of ground disturbance at each work location and define the vertical area of potential affect that will account for the depth of the disturbance in the next consultation submittal. Park staff submitted a letter to the California Office of Historic Preservation on February 26, 2024, with a determination of no adverse effects.

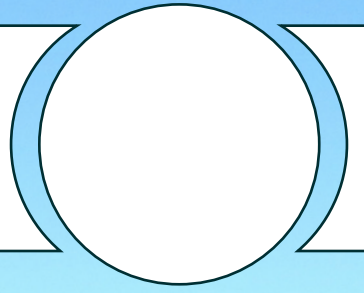
As this plan has progressed, the National Park Service has determined that there would be no adverse impact on cultural resources per the National Environmental Policy Act. The National Park Service has preliminarily determined that there may be adverse effects on historic properties per the National Historic Preservation Act and is working to provide details to the California Office of Historic Preservation. Currently, park staff have preliminarily determined that the reconfiguration of the traffic lanes at the northwest entrance station would not have an adverse effect on the historic district (Gibson, pers. comm., 2023b), yet if an adverse effect per the National Historic Preservation Act is determined in consultation with the California Office of Historic Preservation, a memorandum of agreement would be written to identify the appropriate mitigations. Furthermore, at the conceptual level, the dam and dike improvement project may result in adverse effects on historic properties, though this preliminary determination may change as engineering and design details are developed. Based upon current understanding, park managers anticipate rerouting the Manzanita Lake Trail upon completion of the dam and dike improvement project. Rerouting the trail may result in an adverse effect on the historic structure and the cultural landscape by changing the trail's historic alignment. Additionally, changes to the dam and dike themselves, understood to potentially be historic or retain historic components, may be adversely affected by the improvement project, depending upon project details. As design details are better known, park staff will consult with the California Office of Historic Preservation to more thoroughly identify potential beneficial and adverse effects on the historic properties potentially impacted by the dam and dike improvement project and explore ways to minimize or mitigate these potential adverse effects.

US Fish and Wildlife Service

Lassen Volcanic National Park staff sent a letter to the USFWS Sacramento field office on January 4, 2023, to confirm the species list being used for this project. No response was received. In December 2023, the National Park Service requested, via the USFWS Information for Planning and Consultation website, the most recent list of species and their designated critical habitat protected under the federal Endangered Species Act that may be impacted by projects in Lassen Volcanic

National Park. This action served as a record that the National Park Service had initiated informal consultation with the US Fish and Wildlife Service pursuant to the requirements of the Endangered Species Act and NPS management policies. Park staff sent an updated letter to the Sacramento field office on January 2, 2024, with the updated species list and species determinations. Park staff received confirmation from the US Fish and Wildlife Service on January 18, 2024, that the species list was accurate and that the species determinations were aligned with the USFWS office.

Appendixes



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APPENDIX A: INDICATORS AND THRESHOLDS

INTRODUCTION

As part of the NPS preferred alternative described in chapter 2, the National Park Service would implement indicators, thresholds, monitoring protocols, and management strategies specific to visitor use at Manzanita Lake to assist in achieving and maintaining desired conditions. The development of these components follows the guidance of the Interagency Visitor Use Management Council's Visitor Use Management Framework (IVUMC 2016). Indicators translate the desired conditions identified in chapter 2 into measurable attributes (e.g., linear extent of visitor-created trails) that, when tracked over time, evaluate change in resource or experiential conditions from visitor use. These are critical components of monitoring the success of management actions and strategies. Thresholds represent the minimum acceptable condition for each indicator and were established by considering the desired conditions, data on existing conditions, relevant research studies, and professional judgment of staff from management experience. An additional monitoring tool is the use of triggers, which identify conditions of concern for an indicator enough to prompt a management response before any threshold is crossed.

Monitoring is the process of routinely and systematically gathering data to assess the status of specific resource conditions and visitor experiences (IVUMC 2019). Monitoring is an integral component of resource and visitor use management at Lassen Volcanic National Park and allows managers to objectively and effectively evaluate whether desired conditions are being achieved and maintained. Monitoring also reveals how conditions change over time, including the rate and magnitude of change.

The indicators identified in this document do not represent an exhaustive list of all monitoring related to natural and cultural resources and visitor experience that is currently and will continue to be conducted within the Manzanita Lake Developed Area. The four indicators identified in this plan were selected to evaluate changes in conditions related to visitor use levels. They consider which changes in resource conditions would prompt a different management response and what changes would cause the most concern. Additionally, the indicators are meaningful to the purpose of the unit, sensitive to change so they can be monitored, and directly connected to visitor use.

Visitor use management is an iterative process in which management decisions are continuously informed and improved through monitoring to determine the most effective way to manage visitor use to attain desired visitor experience and resource conditions. Information about NPS monitoring efforts, related visitor use management actions, and any changes to the indicators and thresholds would be available to the public. For each indicator, potential management strategies have been identified. Several of these strategies are currently in use at Manzanita Lake and may be increased in frequency and/or intensity in response to changing conditions. These strategies represent the range of actions that the National Park Service may take to best meet the goals of this plan and desired conditions. If it were determined through monitoring that thresholds are being approached or exceeded, the National Park Service would implement one or more of these management strategies. Adaptive management strategies are also identified.

These strategies would be implemented based on feasibility, staff resources, and funding and only if and when conditions dictate they are necessary. If additional strategies are needed, details of their application would be developed as thresholds are exceeded or approached and would be informed by monitoring results.

The interdisciplinary planning team considered the central issues driving the need for the plan and developed related indicators that would help identify when the level of impact would become a cause for concern and management action may be needed. The indicators described below were considered the most critical, given the importance and vulnerability of the resource or experience affected by types of visitor use. The indicators were also informed by current and ongoing monitoring at the park.

The following indicator topics have been selected for monitoring at Manzanita Lake:

1. Crowding in and on Manzanita Lake
2. Parking and safety
3. Impacts on vegetation
4. Human/wildlife interaction

Thresholds can vary across these areas based on the resources within them and the type of visitor experience being offered.

INDICATOR TOPIC: CROWDING IN AND ON MANZANITA LAKE

Indicator: Boats per viewscape

Threshold:

- No more than 10 boats in the viewscape 70% of the time at the northwest corner of the lake near the entrance station (boats include kayaks, canoes, paddleboard, inflatable vessels, and other small, human-powered watercraft)
- No more than 15 boats in the viewscape 70% of the time from the middle of the dam towards the boat launch

Rationale:

This indicator aids managers in understanding the density of visitor use occurring at destinations and key locations and its impact on visitor experience. Boats per viewscape is not a measure of the *total* number of people who visit a site; rather it is a measure of use levels across time that can be applied to understanding social conditions related to the visitor's experience (Manning 2007). A study used photosimulations to measure crowding norms at Delicate Arch in Arches National Park and found a strong relationship between the number of people in the photographs and acceptability ratings (Manning et al. 1996); that is, there is a certain point at which the number of people in the photo is no longer considered acceptable or in line with visitor norms. This indicator, or some variation thereof, is in use at many other parks and areas to monitor visitor experience.

Park staff agree that current use levels are manageable and that the area is meeting desired conditions. However, the area cannot accommodate much more use without compromising desired conditions. The thresholds are based on current use levels and are described in more detail below. The boats per viewscape indicator allows NPS staff to accurately and efficiently evaluate the number of boats visible at one time or in a viewscape, usually at a specific viewpoint or area of interest where visitors congregate and then compare conditions to desired conditions for the area. It is critical for park staff to manage to its desired conditions. Specifically, keeping boats in the viewscape within acceptable levels will allow the park to maintain that the “the iconic views from Manzanita Lake of Lassen Peak are preserved and showcased as key elements of a visit to the area,” as stated in the desired conditions. Further, the Manzanita Lake Developed Area is managed to “allow access to a variety of recreational uses is available, including hiking, bird watching, the world-class catch-and-release fishery, boating, swimming, and overnight use.” By keeping boats per viewscape to lower levels, park staff can ensure nonboating visitors are having quality experiences as well. The boats per viewscape indicator will allow park staff to better manage its visual resources and create a more memorable visitor experience.

This indicator is particularly important for protecting visual resources in high-use areas, where crowding or congestion may impact visitor experience or resource conditions. For the Manzanita Lake Developed Area, this means the northwest tip of Manzanita Lake near the entrance station, as well as the center of the dam looking towards Lassen Peak. These two locations were surveyed via a visual inventory completed by the park in 2021. Both locations received high ratings for their scenic quality, vividness, visual quality, and landscape character integrity. These important visual resources are critical to the visitor experience and highlight some of the fundamental values and resources of the park, including a wide variety of volcanic and hydrothermal features and associated geology and biodiversity and a distinctive range of flora and fauna. By monitoring and protecting visitor experiences at these key destinations, the effectiveness of management strategies that influence specific destinations can be assessed and adjusted as needed. Data for this indicator would be collected at the two locations identified above. This indicator will also support monitoring the effectiveness of management actions related to implementing the visitor capacity (see appendix B).

Small, nonmotorized vessels are the most common form of recreation on Manzanita Lake. Monitoring visitor use on the lake surface through boats will provide the most meaningful information about use levels and impacts on views. A negligible amount of motorized use occurs on the lake and only through a special permit. Visitors can rent kayaks through a concessioner at Manzanita Lake at the one formal boat launch, and private boaters can also use the launch. Private boaters have also created other informal boat launches at various points on the lakeshore. Although these vessels are small, they are often bright colors and detract from the natural beauty and iconic park views. Since there are other informal boat launches and visitors do not need a permit to kayak on the lakeshore, park staff do not have accurate data on how many visitors are typically on the lakeshore. Additionally, the kayak rental concessioner does not provide data to park staff on rentals.

Although park staff do not have precise data on the number of boats on the lake surface, on-the-ground expertise and experience can provide detailed insight about common use patterns. Park

staff estimate that on any given day, approximately 10–20 boats are on the lake surface. Typical non-busy weekdays usually see fewer than 15 boats on the lake surface. However, busy weekend days or holidays often have up to 20 boats on the lake surface. Peak season (or summer season), when boats are most prominent, runs approximately from Memorial Day to Labor Day.

From the viewpoint on the northwest corner of the lake near the entrance station, visitors can see approximately 50% of the lake surface. From the center of the dam, visitors can see nearly the entire lake. Although park staff consider use levels manageable, they determined that it is in the best interest of the visitor experience and visual resources to manage to the lower and middle range of these estimates. Since peak visitation is approximately 20 boats on the lake surface, park staff identified 10 boats per viewscape and 15 boats per viewscape as the thresholds for the views from the northwest tip of the lake and center of the dam, respectively. By allowing flexibility for busy weekends and holidays, park staff believe they can maintain desired conditions if this threshold is achieved 70% of the time annually.

Strategies:

- Close or section off known informal boat launches and visitor-created trails leading to them, especially along the highway in between the fee station and Loomis Plaza.
- Formalize a limited number of informal boat launches, especially along the highway in between the fee station and Loomis Plaza.
- Develop and implement a public information effort about the desired conditions for the park and actions the National Park Service is taking to achieve those conditions and how visitors can best experience the park. This information could be distributed through direct visitor contact, park publications, wayside exhibits, maps, social media, websites, and park partners. The goal would be to have visitors self-disperse throughout the lake surface or come during lower-use periods of the day, week, or season to accommodate similar levels of boat use but without concentrating that use during peak periods.
- Ensure that informational materials cover a wide variety of topics—such as locations for permitted activities, park rules and regulations, considerations for preventing the introduction of invasive species, and Leave No Trace practices—are available for visitors in a variety of languages, including when visitor centers are closed.
- Use up-to-date technology to provide real-time information to visitors on lake usage before and during their visits.
- Collect data for sites, viewpoints, or destinations where additional information on visitor use patterns, levels, and behaviors could further inform thresholds. This information would be collected and used to refine thresholds before actions that limit or reduce visitor use are taken.
- Provide information on nearby visitor destinations in or outside of the park. Focus on destinations that typically have lower-use levels.
- Manage commercial uses to obtain boat rental data.

- Separate when and where visitor use occurs at a location. Possibly separate by allowing private and commercial entities to access a location at different times or by physically separating where one type of use occurs from others.

Adaptive Management Strategies:

- Consider unidirectional travel along the lake during peak use times.
- Close the lake surface to additional vessels at peak times.
- Require permits for private access to the lake surface during peak times.

Monitoring Protocol:

Park staff will take at least one photo per month from the same preidentified spots during peak visitor use times (approximately 11:00 a.m.–1:00 p.m.) at the two above-mentioned locations between the months of May and October. Park staff will review the data throughout the season and determine if the threshold is exceeded on a seasonal basis (i.e., if the number of boats does not exceed the thresholds 70% of the sampling periods). These photos will be cataloged in an internal photo library where park staff can count and analyze the number of boats in each photo. Park staff will also work with concessioners to collect data on rentals.

INDICATOR TOPIC: PARKING AND SAFETY

Indicator: Number of incidences of illegal parking

Threshold:

- No more than 30 instances of illegal parking in the Manzanita Lake area at one time during 80% of counts

Rationale:

This indicator is related to both natural resource conditions and visitor experience. It measures the need for parking in excess of available, designated parking by tracking the number of individual vehicles parked in unendorsed areas (on the side of the road, outside the bounds of a designated parking lot or road pulloffs). Perhaps most concerning of all are the safety and circulation issues that high volumes of illegal parking present. This indicator can also help directly inform the relationship between the number of vehicles in the area and visitor capacity for the area (see appendix B).

By managing and limiting instances of illegal parking, park administrators can better manage to desired conditions. Desired conditions state that, “Manzanita Lake Developed Area is a main entry point to Lassen Volcanic National Park, welcoming visitors and providing orientation to the activities and opportunities available in the park. The area is a launching point for visitors starting their park visit as well as those heading into the park’s backcountry and wilderness, providing access and information that support visitor orientation.” Therefore, it is important that this iconic introduction to the park is well managed and vehicle circulation is safe. Additionally, desired conditions state that “while the visitor experience is highly social and encounters with other visitors and park staff are expected, the park has a duty to ensure the area

does not feel overcrowded, and visitors are able to access and move through the area freely. Park staff want to ensure that Circulation around different parts of the Manzanita Lake Developed Area is clearly marked and easy to navigate. Trails, facilities, services, and programs are convenient and accessible to all visitors to the greatest extent possible. Pedestrian and bicycle routes are separated from vehicle traffic to provide a safer and more enjoyable visitor experience. The area provides connectivity between activity areas via paths or trails.”

Illegal roadside parking is highly prevalent in the Manzanita Lake Developed Area. This happens in high volumes nearly every weekend in the summer, and the Loomis Plaza parking lot can even be crowded in the winter season. Law enforcement rangers are often patrolling the area and helping guide vehicles. Most tickets issued are warnings, not parking violations, but there are often conflicts between visitors and law enforcement rangers as visitors become frustrated with crowds, lack of parking, and enforcement. Desired conditions state that “management operations emphasize visitor protection and safety and that limited conflict exists between park operations and visitors.” Therefore, it is imperative that park staff understand and manage illegal parking for both the benefit of the park and visitors.

Illegal roadside parking poses threats to natural resources by damaging or killing vegetation, compacting soil, and increasing the amount of bare ground along the historic park highway. In addition, roadside parking that damages native shrubs and grasses can also provide a path for the introduction of nonnative plant species, which may ultimately lead to landscape-level changes in the park’s vegetation. Invasive species directly degrade one of the parks fundamental values and resources: biodiversity and a distinctive range of flora and fauna. Further, the loss of vegetation in some areas can lead to soil erosion into waterways, which is a key concern for the park. Impacts on vegetation and soils also contribute to the degradation of the wildlife habitat and the park’s visual resources.

The amount of illegal roadside parking is causing issues for both visitor safety and experience. In the Manzanita Lake Developed Area, visitors often park on both sides of the road; this unendorsed parking can decrease the width of the roadway, increase the number of pedestrians in the roadway, and, at times, cause pavement damage at the road’s edge. Unendorsed parking may also decrease the quality of visitor experience because it detracts from scenic views along the roadway, creates difficult visitor mobility and circulation, and indicates a higher risk of surpassing other indicator thresholds (such as people per viewscape). Visitors parking alongside the road have an increased risk of being struck by vehicles, especially around blind corners, as they cross or walk alongside the highway to get to their destination. Additionally, vehicles are often unable to pass along the road because it becomes too narrow. When the highway is particularly narrow, there is often one-way traffic, and vehicles must wait for a line of cars to pass before moving on. This becomes especially dangerous if emergency vehicles are unable to pass in a timely manner, which has been documented at the park. Park staff believe that the area can maintain desired conditions and safety standards if unendorsed parking does not exceed 20% of available parking (30 instances at one time). Park staff also acknowledge that some instances of unendorsed parking may exceed acceptable conditions on busy holidays and weekends. Although this level of parking is undesirable, it is temporary, and park staff do not believe that resources would be damaged to a severe enough degree to require the threshold to be met 100% of the time. By allowing some flexibility, this ensures that park staff will not

significantly alter the visitor experience on a frequent basis. By monitoring where and when unendorsed parking occurs, the National Park Service will be able to make informed management decisions related to the timing and level of visitor use that occurs in an area.

Strategies:

- Provide information to visitors upon entering about what to do if they cannot locate a designated parking spot.
- Increase patrols, ticketing, and enforcement.
- Enforce parking and access restrictions, as well as site management (signage, curbing, paving, revegetation) to resolve overparking and visitor-created parking.
- Provide information about alternate locations to enjoy within the park and surrounding area.
- Explore the potential for an automatic monitor (video camera) of parking, signs that say “full,” or an automatic gate.
- Provide a forecast for parking conditions to help inform visitor decisions regarding trip timing.
- Post signs near the park entrance indicating that parking is available at these specified locations.
- Add signage that says all roadside parking is prohibited.

Adaptive Management Strategies:

- Place temporary or permanent barriers to prevent instances of illegal parking.
- Temporarily close the entrance station.
- Enact a temporary or permanent permit system.

Monitoring Protocol:

Park staff will conduct monthly counts on weekend days of illegal roadside parking. The time and day will vary to get a more accurate depiction of parking patterns in the area and provide an understanding of how visitors use the area throughout the day. Counts will be conducted along the highway in between the fee station and boat launch/picnic area parking, where the majority of instances of unendorsed parking occurs. This information will be stored in an internal database where staff can analyze the data and make management decisions based on the volume of illegal parking.

INDICATOR TOPIC: IMPACTS ON VEGETATION

Indicator: Change in the number of instances of visitor-created trails (social trails) at key locations

Threshold:

- No net increase in visitor-created trails within the areas of concern annually, as averaged over a three-year period

Rationale:

This indicator relates to natural resource protection and visitor experience at Manzanita Lake. Visitor-created trails (also referred to as social trails or informal trails) are linear tracks created by users that are noticeable to observers and are not an element of the designated trail system.

Visitor-created trails can detrimentally impact natural and cultural resources. Wetland vegetation is of primary concern due to its sensitivity to trampling. As these trails develop, vegetation is trampled and lost, soil is displaced or compacted, and erosion can begin or worsen. Additionally, these informal trails can lead to and impact sites where visitor access is inappropriate, such as sensitive nesting areas or archeological sites.

Visitor experience can also be impacted by the presence of visitor-created trails. These trails can be unsightly, negatively affecting the viewscape and the feeling of being immersed in nature. Further, visitor-created trails can confuse visitors if it is unclear which path is the official trail, leading people off the correct route and potentially getting lost.

Desired conditions for the area state that “Natural resources and associated values are protected, restored, and maintained in good condition and managed within the broader ecosystem. Specifically, the lakes and surrounding forests and canopy experience natural species evolution with minimal human intervention. Although the area has substantial development and concentrated human use, natural processes and sensitive habitat are not significantly affected. Further, the habitats in and around the Manzanita Lake Developed Area, including the forest, shrubs, lakes, creeks, and wetlands, are intact and protected as refuges that attract and sustain diverse wildlife.” This indicator also supports monitoring related to achieving desired conditions around visitor experience, and that “the area is managed to enhance visitor experience with nature, including the ability to engage and connect with the natural environment and feeling separated from their day-to-day lives.”

Of specific concern at Manzanita Lake are impacts on water quality and disturbance to sensitive wildlife and wetland habitat. Visitor-created trails trample vulnerable habitat and can lead to erosion, which affects water turbidity, sedimentation, oxygen, and nutrient levels and likely reduce the quality of aquatic habitat for invertebrate and fish populations. Further, visitor-created trails lead visitors into wetland areas with nesting wildlife species along the lakeshore and near Manzanita Creek. The Superintendent’s Compendium (NPS 2021d) states that “nesting and wetland areas near Manzanita Creek and Lake are closed to all persons except authorized staff, researchers, and guided persons as marked by signs stating extent of closure. This area is generally described as the nesting and wetland area at the confluence of Manzanita Creek inlet and Manzanita Lake, and immediate surrounding area. Specific boundaries of

closure are marked with corresponding signs. This closure protects nesting birds and their habitat.”

The 1.7-mile Manzanita Lake Trail is a dirt trail that loops around the lake and is popular with visitors of all ages, providing iconic views of Lassen Peak and Chaos Crag. The trail is one of the key visitor experiences in the Manzanita Lake Developed Area. Most of the trail closely follows the lakeshore, coming within 10–20 yards in some sections. Access from the trail to the lake is discouraged in most areas, and visitors are encouraged to stay on the trail. For those wanting to get to the lake, access is focused on the southeast side of the lake.

Park staff have noted the occurrence of visitor-use trails leaving the formal loop trail. These instances almost always lead closer to the shore, into the closed wetlands areas, or between the campground and the lake. While the total number and location of all the informal trails is not currently known, there are several visitor-created trails along the southwest portion of the lake and a few along the northeast side, coming in from the highway. Some are along Manzanita Creek as well, which comes off the main trail to the creek.

The strategies proposed in this development concept plan include actions that could alter patterns of use in the area, potentially leading to more or different types of use on the trail. To continue to protect the natural resources of the lake during the implementation of this plan, monitoring social trails is a priority for the management team.

Management Strategies:

- Clearly communicate on park website, at visitor centers, and along the trail that on-trail travel is required. Messages will vary seasonally, as allowable visitor use at the lake also varies over the course of the year.
- Include educational messaging about the need to protect water quality and habitat for terrestrial and aquatic plant and wildlife species.
- Clearly identify the official trail with appropriate signage, markers, and well-maintained tread.
- Add vegetation, rocks or other natural barriers to conceal informal trail beginnings.
- Add plantings and temporary signed barricades as needed to protect and restore denuded or vulnerable areas.

Adaptive Strategies:

- Consider unidirectional travel along the trail.
- In areas where visitor-created trails are prolific, continue to formalize the main trail to clarify routes and concentrate use.
- Increase staff or volunteer educational patrols around the lake.

Monitoring:

Baseline GPS and photo data would be collected along the lake's loop trail from the fee booth station to the boat launch since this was identified as the main area of concern by staff.

Monitoring points would primarily be established along this section. In subsequent years, the lake and key areas would be monitored for changes in the number and location of visitor use trails. Annual monitoring would occur in late summer.

INDICATOR TOPIC: HUMAN/WILDLIFE INTERACTION

Indicator: Number of reported and observed negative human/wildlife interactions

Threshold for Major Carnivores: One reported or observed interaction with a major carnivore (major carnivores include mountain lions, bears, red foxes, coyotes, and bobcats)

Trigger for Major Carnivores: Two *sightings* of a major carnivore in or within 100 yards of Manzanita Lake Development Area in one week

Threshold for Noncarnivore Mammals and Birds: Four or more reported or observed negative interactions with a single noncarnivore mammal or bird over three consecutive days (small mammals and birds include squirrels and ducks)

Rationale:

This indicator supports the health of animal species within the Manzanita Lake Developed Area. The park's 2016 foundation document (NPS 2016b) identified the "biodiversity and a distinctive range of flora and fauna" as a fundamental resource and value. This indicator includes a wide range of intact ecosystems and rich biological diversity, providing essential natural conditions for a distinctively large and unique assemblage of animal species. Primarily, the National Park Service is concerned about habituation and more animals moving into visitor use areas, thus increasing negative interactions. This indicator will help inform managers about trends in these types of interactions and related management actions to be taken.

A large body of research is available on the impacts on wildlife from human disturbance in natural areas. "Disturbance" includes all visitor-wildlife interactions related to wildlife seeing, hearing, or smelling visitors and altering their behavior, habitat use, and level of stress (see Marion 2019). Visitors to natural areas can disturb wildlife through noise, litter, pollution, people approaching or feeding animals, and vehicle collisions that can lead to injury or death, among others. These disturbances can lead to direct and indirect effects on wildlife. Direct effects on wildlife include disturbance/harassment, habitat loss, and decreases in population from hunting, fishing, or other methods (including mortality from vehicle collisions). Indirect effects include wildlife behavior or habitat modification or temporal or spatial displacement from habitat, food, or water.

The Lake Manzanita Developed Area is a popular habitat for songbirds, raptors, and waterbirds. Additionally, black-tailed deer, Douglas squirrels, and golden-mantled ground squirrels are frequently spotted on the loop trail. Bears, mountain lions, coyotes, and bobcats, while much rarer, may also be in the area. Additionally, the red fox is a species of concern in the area, and while there have not been reported issues recently, monitoring for any sighting or interactions is

important for protecting this species. Seeing, hearing, photographing, and even just feeling close to wildlife can be a key component for many visitors to the park. Many visitors go into the outdoors with the hope of seeing wildlife. It is important that NPS management balance providing visitors opportunities to see wildlife with protecting these resources so that visitor use does not disturb or impact the wildlife to an unacceptable degree.

Negative wildlife interactions at Manzanita Lake are a concern, and future impacts from new visitor use patterns, a changing climate, and other unforeseeable factors could exacerbate the issue. Anecdotally, there have been numerous incidents over the years of visitors feeding ducks and deer, with some visitors approaching wildlife too closely. Additionally, waterfowl and shorebirds often get tangled in discarded fishing line when they are swimming or if they are attracted to a lure that an angler has broken off in the lake. In one of the more unique recent incidents, a river otter attacked a visitor swimming in the lake in 2020, causing a temporary closure to the area. While this visitor was not doing anything wrong, monitoring and understanding these types of interactions could help prevent them in the future.

While major carnivores are not often seen around Manzanita Lake, sightings do occur and with changing visitor use patterns, impacts from climate change, and other factors, more sightings or interactions are possible. Bears have been observed in and around the campground, likely attracted to the smells of food from campers. One instance included a bear in the campground that damaged several cars and ultimately was killed when struck by a vehicle on Highway 44. Additionally, in recent years a mountain lion was seen in the NPS housing area and on the Manzanita Creek Trail, though fortunately no incident occurred.

This indicator supports the achievement of the following natural resource-focused desired conditions that “Wildlife moves through the area and can often be viewed by visitors. Conflict between visitors and wildlife is minimized; that Manzanita Lake Developed Area showcases the significance of Lassen Volcanic National Park and the fundamental resources and values for which the area was set aside as a national park; and finally, that Bears do not encounter or engage with visitors, their property, or the area’s facilities (e.g., buildings, cars, trashcans). Additionally, it will support visitor experience desired conditions that the area is managed to enhance visitor experience with nature, including the ability to engage and connect with the natural environment and feeling separated from their day-to-day lives.”

Management Strategies:

- Use volunteer patrols around the lake to engage with the public and provide education on safe distances to maintain with wildlife.
- Conduct proactive visitor and wildlife mediation (e.g., intervening when visitors are observed feeding wildlife or shooing ducks into the lake).
- Clearly communicate on the park website and at visitor centers about proper wildlife etiquette.
- Post signs throughout the area educating about safe wildlife interactions, especially discouraging feeding wildlife and properly disposing of fishing materials.

- Create social media posts about safe human-wildlife interactions, including alerts about any current concerns.

Adaptive Strategies:

- Increase ranger patrols and presence throughout the area, educating visitors and observing conditions.
- Add volunteer patrols around the lake to engage with the public and provide education.
- Issue tickets and fines for negative or serious visitor-wildlife interactions.
- Install fencing or other barriers in areas of concern.
- Implement temporary or permanent closures of areas of concern.

Monitoring:

Monitoring will occur based on staff and visitor reporting. Data are recorded on a sheet in the Manzanita Lake Visitor Center. All staff at Manzanita Lake are oriented to this document and the need to record incidences. Park staff will collect data on this topic at least once per week during the monitoring period, which runs during the busy summer season from Memorial Day to Labor Day, to get frequent and reliable data. This monitoring can be performed by a variety of staff and volunteers.

APPENDIX B: VISITOR CAPACITY

VISITOR CAPACITY OVERVIEW

This appendix provides information about the visitor capacity identification as it relates to the Interagency Visitor Use Management Council's (IVUMC) Visitor Use Management (VUM) Framework.

Broadly speaking, visitor use management is the proactive and adaptive process of planning for and managing characteristics of visitor use and its physical and social setting, using a variety of strategies and tools to sustain desired resource conditions and visitor experience. Within this framework, desired conditions, indicators and thresholds, and management strategies have been developed as part of this design concept plan. Another component of the VUM framework is the development of visitor capacities. Visitor capacity is the "maximum amount and types of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences, consistent with the purpose for which the area was established." Visitor capacities inform management strategies that keep use levels within the identified number. This visitor capacity identification is also directed by legal mandate in the 1978 National Parks and Recreation Act, which requires that national parks address capacity in planning by defining capacities for all areas of the park unit. Depending on a unit's needs and characteristics, capacities can be developed unit-wide or based on specific areas or zones. Because this plan focuses only on the Manzanita Lake area of Lassen Volcanic National Park, the capacity analysis is only for this area of the park.

A primary goal of this planning effort is to preserve the fundamental resources and values of Lassen Volcanic National Park. The park's 2016 foundation document (NPS 2016b) identifies these as the wide variety of volcanic and hydrothermal features and associated geology, biodiversity and a distinctive range of flora and fauna, human pathways and ties with the landscape, lands with wilderness character and other backcountry areas, and a diversity of traditional recreational values and visitor experiences. The foundation document further emphasizes providing educational, recreational, and exceptional scientific opportunities for the benefit of the public.

The visitor capacities will be used to inform management strategies for all parts of the project area. For the two analysis areas identified by the project team, an overview of the setting and relevant existing direction and knowledge, such as visitor use issues, and current use levels are described. The limiting attributes that most constrain use are then identified and analyzed and the visitor capacity is identified. Current use levels have been informed by relevant studies, data, and observations. Visitor capacities can be defined in a number of ways, including people per day, which refers to the total number of people who can be in an area over a 24-hour period and is used when resource conditions and preservation are of primary concern.

The visitor capacities will be implemented along with other actions in the design concept plan. Specific management strategies will be used to implement the capacities that have been included in this visitor capacity identification process. Visitor use levels will be monitored, and if they approach or exceed capacities, additional management strategies would be implemented.

This appendix outlines the considerations and process used to identify visitor capacity and strategies for implementation.

PROCESS FOR IDENTIFYING VISITOR CAPACITIES

Visitor capacities were identified using best practices, data, and contributions from resource experts. The approach for developing visitor capacities is based on the IVUMC-VUM Framework and associated publications and is consistent with the literature and best practices on this topic (for a full description of the IVUMC-VUM Framework and additional resources, please visit <https://visitorusemanagement.nps.gov/VUM/Framework>).

Through a virtual workshop and several conference calls, the interdisciplinary planning team used the recommended process for identifying visitor capacity: (1) determine the analysis areas, (2) review existing direction and knowledge, (3) identify the limiting attribute, and (4) identify visitor capacity. The team considered all potential attributes that would constrain each area's ability to accommodate use and determined which were most meaningful for guiding the analysis. Following are the results of this process.

Determine the Analysis Areas

This guideline involves identifying where the visitor capacity will be implemented. For the Manzanita Lake Developed Area, two geographic analysis areas were identified and analyzed based on management.

The analysis areas, which are shown in figure B-1 below are:

1. Manzanita Lake, lakeshore, and Loomis Plaza
2. The rest of the Manzanita Lake Developed Area

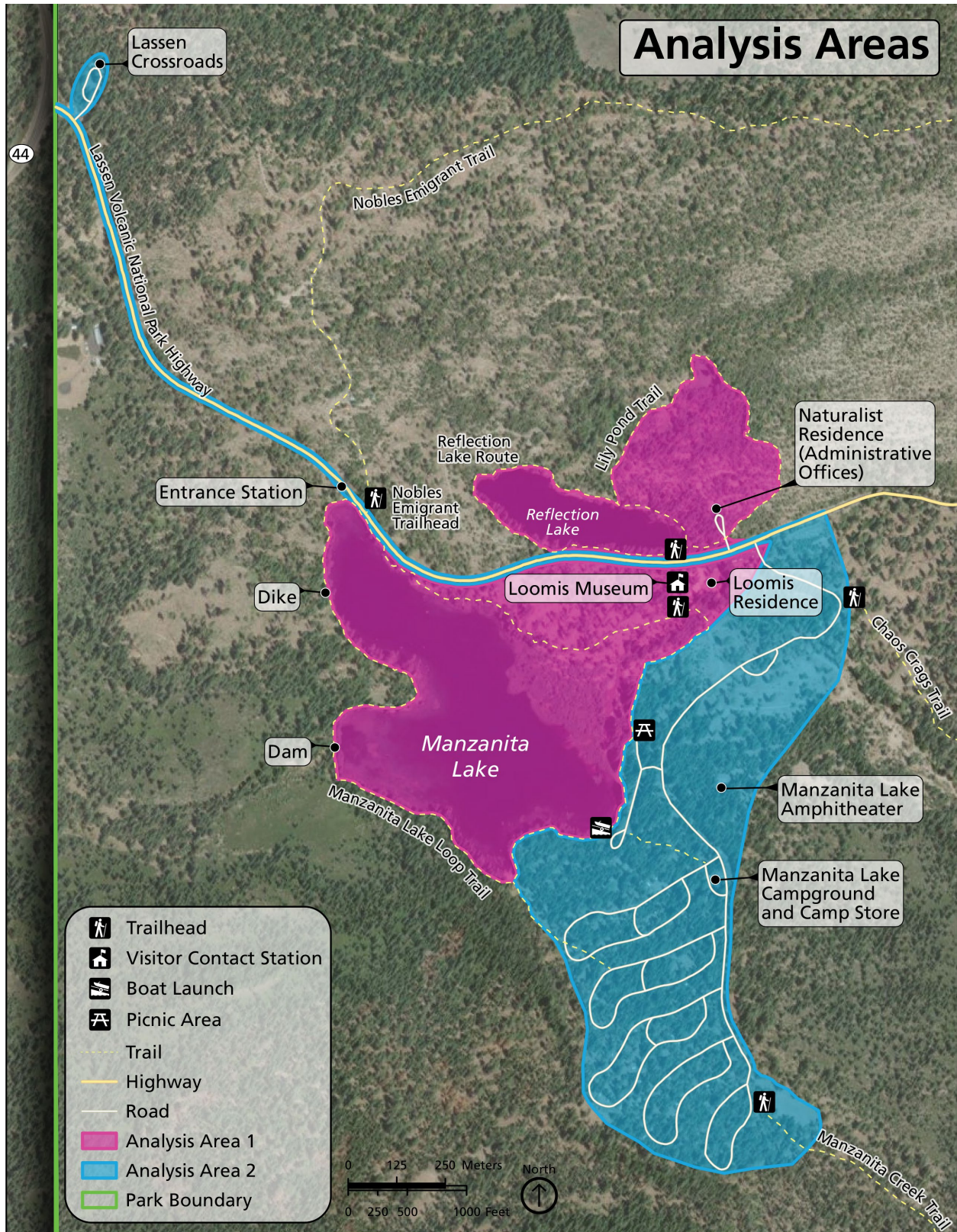


FIGURE B-1. VISITOR CAPACITY ANALYSIS AREAS

Review Existing Direction and Knowledge

A review of existing direction and knowledge of the area includes reviewing applicable law and policy, prior applicable planning and guidance, existing conditions, existing monitoring, and applicable existing management strategies and actions. This review also included relevant desired conditions for both resources and visitor experiences in the analysis areas.

The amount, timing, distribution, and types of visitor use in the Manzanita Lake Developed Area influence both resource conditions and visitor experiences. Since its establishment in 1916, visitation to the park has increased from only a few thousand visitors per year to averaging around 459,000 annually over the past 10 years. In the Manzanita Lake Developed Area specifically, visitation has been steadily increasing, almost 34% over the last 20 years. However, the data from 2017–2022 is particularly complex due to disasters and emergencies outside of the park’s control, such as heavy smoke from surrounding wildfires, the Dixie wildfire, related closures, and the COVID-19 pandemic.

To identify the appropriate amount of use for each analysis area, planning team members reviewed visitor use issues and data to understand current conditions compared to desired conditions.

Identify the Limiting Attribute

This guideline requires the identification of the attribute(s) that *most* constrains the analysis area’s ability to accommodate visitor use. Given that use areas can experience a variety of challenges regarding visitor use, there can be more than one limiting attribute. The limiting attributes vary across the analysis areas and are described below under each analysis area.

Identify Visitor Capacity and Implementation Strategies

This guideline involves identifying the visitor capacities and the strategies to implement them. To identify the visitor capacities, outputs from the previous three steps were reviewed to understand current conditions and to identify the maximum levels of visitor use that will maintain and achieve desired conditions for the Manzanita Lake Developed Area. The capacity identification varies by analysis area. A range of management strategies that will be most effective in implementing the visitor capacity is also outlined.

IDENTIFICATION OF VISITOR CAPACITY BY ANALYSIS AREA

The following section presents the analysis for each area, using the process described above. The outcome is the identification of a visitor capacity for each analysis area and associated strategies for implementing the capacity.

ANALYSIS AREA 1: MANZANITA LAKE, LAKESHORE, AND LOOMIS PLAZA

Area Description

The first analysis area includes the Loomis Plaza and the surrounding structures (historic museum, other buildings, and parking lot), the Manzanita Lake and lakeshore, the Manzanita Lake Trail, and both the Lily Pond Interpretive Trail and the Reflection Lake Loop Trail. These

areas are all located near the entrance station, which is situated on the northwest corner of Manzanita Lake.

Loomis Plaza is a relatively small area, approximately 0.55 acres, and is 1 mile from the entrance station. The plaza serves as the main visitor contact area of the Manzanita Lake area and is a key stop for visitors, especially given its proximity to the entrance station. Buildings and structures in the plaza include restrooms, parking area, the historic Loomis Museum, Loomis Residence, seismograph building and the Naturalist Residence. The Loomis Museum was added to the National Register of Historic Places in 1975 and is part of the Manzanita Lake Naturalist's Services Historic District. The Loomis Museum also serves as a visitor center and is only open during the summer months. Finally, visitors have access to Reflection Lake, the Reflection Lake Trail, and the Lily Pond Trail from Loomis Plaza, but they are not included within this analysis area.

Manzanita Lake welcomes visitors at the entrance station and is in the northwest corner of the park. The lake and surrounding trail are part of the Manzanita day use area. The area includes a boat launch, Manzanita Lake Trailhead, and picnic area, which are located on the southeast shore of the lake. Visitors can access these areas by following the Manzanita Lake Campground Road south of the Lassen Volcanic National Park Highway. The highway is part of the Lassen Volcanic National Park Highway Historic District, but the lake, trail, and other amenities are not. The lake is a popular habitat for songbirds, raptors, semiaquatic mammals, and waterbirds. Black-tailed deer, Douglas squirrels, and golden-mantled ground squirrels are also commonly seen.

Surrounding the lake is the Manzanita Lake Trail. This 1.7-mile trail is relatively flat and sits at an elevation of 5,890 feet. The trail is popular among visitors, and the trail surface is mostly firm dirt with tree roots and exposed rocks in some places. Most visitors begin their hike near Loomis Plaza. Along the trail, visitors can capture scenic views of the park, Lassen Peak, and other natural features. Bikes and pets are not permitted on the trail, and it is not considered accessible.

Some moderate hiking is also available in the area. According to park staff, visitors who tend to use the Manzanita Lake trails also tend to use the Lily Pond Interpretive Trail, as well as the Reflection Lake Trail. The Lily Pond Interpretive Trail is a short, half-mile trail that explores the rich diversity of plant and animal life in the unique volcanic landscape. The Reflection Lake route is a half-mile route that circles the lake, providing unobstructed views of Chaos Crags and Lassen Peak, which are often reflected in the still lake. The three trails within this analysis area provide scenic views of the park a wealth of recreation opportunities for day use visitors.

Existing Direction and Knowledge

In 2021, 83,455 vehicles passed through the Manzanita Lake entrance station. This number accounts for approximately 250,000 visitors coming into the area. For many of these visitors, the Manzanita Lake Developed Area is the primary destination when they arrive at the park. The exact amount of use within the area is unknown, but visitor use occurs within a relatively concentrated area. Within analysis area 1, visitors often spend the day at the lake, hike the trails, visit Loomis Plaza and the historic museum, camp, or explore other areas of the park. However, this number also represents visitors who may only stop for a short amount of time and others

just driving through the Manzanita Lake Developed Area to access other areas within the park. Congestion and crowding are situational and depend on a variety of factors, including the day of the week, holidays, school schedules, season, and weather. Weekends and holidays typically have higher levels of congestion than weekdays, but weekdays can still have moderate levels of congestion.

The highest visitor use days for Manzanita Lake have occurred during the busy summer months, between May and October. Visitor use is much lower once the snow arrives in November until it melts in April or May. In the winter, Lassen Volcanic National Park Highway, named California Highway 89 outside of the park, is plowed to just east of the Loomis visitor contact station. The Manzanita Lake Developed Area consists of gentle topography, offering the easiest routes for snowshoeing and cross-country skiing in the park, but winter use is comparatively less busy.

Some key desired conditions that inform the capacity determinations for “both analysis areas include that while the visitor experience is highly social and encounters with other visitors and park staff are expected, it does not feel overcrowded, and visitors are able to access and move through the area freely. Further, the area is managed to enhance visitor experience with nature, including the ability to engage and connect with the natural environment and feeling separated from their day-to-day lives.”

More specific for analysis area 1 and the visitor services provided at Loomis Plaza, the National Park Service identified a desired condition that the Manzanita Lake Developed Area “is a main entry point to the Park, welcoming visitors and providing orientation to the activities and opportunities available. Additionally, Visitors to Loomis Plaza have opportunities to view and engage with the Loomis family photo archive, current and previous artists-in-residence, and other art.”

Park staff observations identify Manzanita Lake, lakeshore, and Loomis Plaza as the most popular areas of the Manzanita Lake Developed Area. During summers, visitors from hotter parts of the state and country visit the park to escape the high temperatures. Some of the most popular activities in and around the lake include boating, hiking, fishing, picnicking, bird/wildlife watching, photography, limited amounts of swimming, and night sky activities like stargazing. In and around Loomis Plaza, most visitors enjoy viewing the exhibits, visiting the historic museum and seismograph building, reading waysides, and having opportunities to picnic. Visitors can also experience interpretive programs here. The museum is small and can quickly reach its fire safety capacity.

Although the area sees some winter use, it is relatively low, even on weekends and holidays. Park staff usually plow the Loomis Plaza parking lot, but the parking lot does not usually fill. Short walks and enjoying the scenic views are the most popular ways to enjoy the area during winter. Some visitors also enjoy snowplay, cross-country skiing, and snowshoeing, but park staff estimate that this is less than 50% of winter use in the area. The winter season has limited overnight use. The park does not offer interpretive programming in the winter. All-terrain vehicles and snowmobiles are not permitted in the area, and although rare, some instances of this unpermitted use occur. Most visitors are intercepted from engaging in this activity at the entrance station or by a law enforcement ranger.

Primary visitor use-related issues for the area around Loomis Plaza include insufficient parking, poor vehicle circulation, and natural resource concerns. The area has two main parking lots: Loomis Plaza parking lot has 33 striped, angled parking spaces for private vehicles and 4 striped double-length, parallel spaces for RVs. These double-length spaces are often occupied by two cars each during busy times. The Manzanita Day use area has 12 striped, perpendicular spaces on the north end and 21 striped, perpendicular spaces on the south end. Additionally, there is a small roadside pulloff area near the entrance to the Manzanita Lake Developed Area lot with 4 striped perpendicular spaces. There is no parking for vehicles with trailers in this area. On busy weekends and holidays, these lots often fill up, and visitors will park along the highway, which can create a variety of safety and visitor experience issues. The highway would benefit from crosswalks and traffic-calming devices, such as speed bumps, to improve visitor safety. This roadside parking can also cause circulation issues and is most apparent when vehicles, including emergency responders, cannot pass through. Parking availability and congestion is the main complaint among visitors. Finally, vehicle congestion is also causing natural resource concerns, since roadside parking often leads to both vehicles and visitors trampling vegetation, and vehicles can leak lubricants, coolant, and other hazardous fluids in close proximity to the lake and damage the ecosystem. The plaza experiences some invasive species and has a dedicated weed management plan and crew to address this issue. Crowding within the plaza itself is not a major concern, but restroom facilities are sometimes insufficient on crowded days. Crowding is most prevalent in the form of vehicle congestion in the parking lot. This is apparent when visitors park in the Loomis Plaza parking lot but spend the majority of their time around Manzanita Lake.

Most of the issues related to visitor use in and around the lake (including the Manzanita Lake Trail) are related to natural resources, but these issues are often connected to visitor experience, safety, and, at times, cultural resources. During summer months, it is common to see kayaks, canoes, inflatable tubes, and other nonmotorized vessels on the lake surface. As mentioned, the park only has one formal boat launch, but visitors have created informal boat launches at various points on the shore. This has led to shore erosion, soil disturbance, and some visitor conflicts. Vessels sometimes get too close to fishing boats or those fishing on the shoreline, which can create conflict between visitors. Anglers have caused some natural resource impacts because waterfowl sometimes get caught in fishing lines, and other wildlife can be injured by fishing equipment, most prominently when monofilament or other fishing line is not properly disposed of. The Manzanita Lake Trail has a large system of social trails that leads visitors to unofficial viewpoints, and this has led to trail widening, erosion, and soil disturbance. Social trailing and other visitor roaming have caused disturbances to nesting areas and wildlife habitat, such as when visitors travel to the closed inlet area or when visitors to feed wildlife in less visitor-dense areas. Social trailing has compounded the lack of delineation and connectivity among trails and issues related to wayfinding. Unauthorized dog walking occurs on the trail, and dogs also cause resource damage in the picnic area. Excluding instances in which boats get too close to anglers, few visitor use conflicts occur in the area. Some visitor use conflicts are related to noise and loud music, but sometimes conflicts occur among anglers and other visitors regarding right-of-way to a particular space, especially on the lake surface. The Manzanita Lake Developed Area is also experiencing issues with overflowing trashcans and recycling bins. Abandoned or improperly disposed of fishing line, microtrash, and other debris harm both

natural resource conditions and the visitor experience. Some cultural resource impacts also occur within this analysis area (see chapter 3 under the archeological resources impact topic).

Finally, the Lily Pond and Reflection Lake Trails have seen a slight increase in visitor use in the past few years, particularly families. However, use levels tend to be lower than what is typically seen on the Manzanita Lake Trail.

Limiting Attributes

A variety of factors limit the park's ability to manage to a specific capacity; however, the three most limiting attributes are that (1) the analysis area is part of two different historic districts, (2) park staff must protect natural resources in and around the lake, and (3) there is a need to provide quality visitor experiences.

Loomis Plaza and many of the associated buildings, as well as the Manzanita Lake Trail and other circulation features, contribute to the Manzanita Lake Naturalist's Historic District. Furthermore, the Lassen Volcanic National Park Highway Historic District passes through the Manzanita Lake Naturalist's Historic District and terminates at the northwest entrance. These historic districts and cultural resources make up part of the park's fundamental resource and value of "diversity of traditional recreational values and visitor experiences." Thus, in determining visitor capacity, park managers must not only consider federal law and regulations for the protection of cultural resources but also the priority they have placed on upholding the historic districts' character. Desired conditions state that visitors should be able to "enjoy a sense of the 20th century history of the area as they engage with the architecture and landscape of the Manzanita Lake Historic District." Although the area lacks facilities to accommodate high use, park managers cannot simply build more structures to solve overcrowding without considering the effects of modifications and alterations on the integrity of the Manzanita Lake Naturalist's Historic District and the Lassen Volcanic National Park Highway Historic District.

Park staff must maintain a healthy habitat for the flora and fauna in the area. "Biodiversity and a distinctive range of flora and fauna" are a fundamental value and resource and desired conditions state that "natural resources and associated values are protected, restored, and maintained in good condition and managed within the broader ecosystem. Specifically, the lakes and surrounding forests and canopy experience natural species evolution with minimal human intervention. Although there is substantial development and concentrated human use, natural processes and sensitive habitat are not significantly affected." Although visitor use is compatible in this area, park staff must prioritize the health of the ecosystem, including water quality, vegetation, soil, wildlife, and habitat.

Finally, park managers' ability to maintain quality visitor experiences constrains and influences visitor capacity within the area. Vehicular crowding already occurs in the area, and desired conditions state that "iconic views from Manzanita Lake of Lassen Peak are preserved and showcased as key elements of a visit to the area." These desired conditions describe a key experience that could be compromised by a highly dense area, thus not allowing a high visitor capacity. This limitation can be challenging to maintain because a limited number of official viewpoints exist, and most of the shoreline around the lake is inaccessible due to the character of the ecosystem and vegetation that surrounds the lake. Geography and natural resources limit the amount of use in this area while still being considered quality for visitors.

Capacity Identification

Based on the review of existing direction and knowledge, desired conditions, and the limiting attributes, NPS staff identified that the current use levels for analysis area 1 could be *maintained*.

Visitor Capacity: No more than 410 people at one time

Implementation Strategies

- Implement one-way traffic in buildings where visitors are able to enter.
- Disperse and encourage use away from the lake and lakeshore to trails and other attractions in this area (i.e., Reflection Lake Trail, Lily Pond Trail, Crag's Lake Trail, Manzanita Creek Trail)
- Improve wayfinding and orientation throughout the Manzanita Lake Developed Area.
- Improve existing signage to the highway and pulloffs about parking regulations.
- Add information to the park website about visitor use opportunities in this area (e.g., trails, programs).

Adaptive Implementation Strategies

- Provide pop-up interpretive services and information in Loomis Plaza.
- Provide real-time information on parking space availability.
- Implement one-way traffic on the Manzanita Lake Trail.

ANALYSIS AREA 2: MANZANITA LAKE SERVICE AREA

Area Description

This analysis areas covers everywhere in the Manzanita Lake Developed Area that is not in analysis area 1. This area includes the Lassen Crossroads, the entrance station, Lassen Peak Highway from the entrance to Nobles Pass, several pulloffs along the highway, trailheads and trails, and the campground and amphitheater.

Described as a “great place to begin your Lassen Volcanic adventure,” Lassen Crossroads is located outside the Manzanita Lake entrance and serves as the crossroads between the park and the surrounding Lassen National Forest. The crossroads include interpretive panels within multiple open-air pavilions that describe the region’s rich cultural history and natural features. The area includes a restroom facility and a large parking area with accommodations for RVs, trailers, and buses. The crossroads is closed during the winter and is most often used as a highway rest stop for those traveling along Highway 44.

Currently, one fee both accommodates access into the park at the Manzanita Lake entrance station. An unpaved pulloff is located right after the fee both and provides visitors with a view of the peaks and a classic photo opportunity. Some visitors stop for a photo of the view or with the NPS sign.

This analysis area includes easy-to-moderate hiking trails of different lengths that provide access to different kinds of experiences. The Nobles Emigrant Trail is an easy, 3.5-mile trail that includes shady areas. The Craggs Lake trail is 4.2 miles roundtrip, with high sun exposure. Manzanita Creek is a longer, moderate 7-mile hike that takes visitors through meadows and provides views of Lassen Peak, Chaos Craggs, and Loomis Creek.

The Manzanita Lake Campground is 1 mile east of the Manzanita Lake entrance and is the largest campground in the park. The campground is popular with families and provides space for groups, tents, trailers, and RVs, as well as rustic camping cabins. The campground includes showers, a general store, flush toilets, and running water during the summer. The campground has 179 sites, 20 cabins, and 2 glamping sites. The campground's amphitheater provides both day and night programming.

Existing Direction and Knowledge

The overall visitation numbers to the Manzanita Lake Developed Area described in analysis area 1 apply to this analysis area. Visitor use in analysis area 2 has similar seasonal variability as area 1. While the exact amount of current use within analysis area 2 is not known, anecdotally, these locations accommodate lower amounts and more dispersed use than that of analysis area 1.

Specific desired conditions that inform the capacity for analysis area 2 state that “visitors are able to safely move around the area and cross the highway, and access and enjoy the trail system, exploring the volcanic rock jumbles around the ranger office. These trails offer a less-crowded experience and connectivity to other areas within Manzanita Lake. Further, and specific to overnight use, the Manzanita Lake Campground is a highly social area, alive with the sights, sounds, and smells of people of all ages and backgrounds. More restrained noise and light levels prevail during nightly quiet and dark hours.”

Primary visitor use-related issues for this area include insufficient parking lots, resulting in illegal roadside parking, traffic safety for vehicles and pedestrians along Lassen Peak Hwy, and connectivity between this area to the lake and Loomis Plaza. While analysis area 1 more regularly accommodates the most concentrated use in the Manzanita Lake Developed Area, analysis area 2 also experiences concentrated use, as well as overflow use when area 1 becomes too crowded.

The trails in this analysis area experience moderately light traffic compared to the Manzanita Lake Trail. The Nobles Emigrant, Craggs Lake, and Manzanita Creek Trails all have the capacity for increased use.

At the campground, each reservation allows up to 6 people per site and 3–8 people in the cabins, for a total of up to 1,200 people per night in the campground. All sites require reservations via recreation.gov. Each campsite/cabin is generally occupied from June through September, though the total numbers of campers is not known. The campground is closed between January 1st and May 19th for the winter/spring snow season. As stated above, the Manzanita Lake Developed Area offers the easiest snowshoeing and cross-country skiing routes in the park, including the campground loops that become snowshoeing and skiing routes.

In the NPS preferred alternative, an overflow parking lot would be established in analysis area 2, off the Manzanita Campground Access Road and east of the main parking area, and would provide parking for all of the Manzanita Lake Developed Area and specifically serve as the trailhead for the Chaos Crags Trail (see Figure 13). This parking area would help accommodate vehicles for visitors using the lake and Loomis Plaza but also disperse use to areas and trails where parking has historically been a challenge.

A proposed multiuse paved path going through the Manzanita Lake Developed Area would connect visitors from the reestablished parking area to most other areas of the area and provide more direct, nonmotorized bike and pedestrian access throughout the area. This trail would also help disperse visitor use to areas where it has been more challenging to access. The multiuse path would be more accessible, accommodating new users who had previously not been able to access the area due to limitations.

Additionally, the proposed change to the campground road in the parking area near the camp store will improve circulation and ease congestion in the area, addressing current crowding issues.

Limiting Attributes

The two limiting attributes that *most* constrain the amounts of visitor use this area can accommodate are (1) protecting the area's wetland and water resources and (2) providing an uncrowded visitor experience.

High numbers or concentrations of visitors in an area can lead to vegetation trampling and soil compaction, either through visitors hiking off-trails or vehicles illegally parking on the side of the road. The loss of vegetation can lead to loosened soil that erodes, getting into wetlands and water and contributing to increased sedimentation that affects the overall health of the water and ecosystem.

Providing an uncrowded visitor experience and preserving the iconic views of Lassen Peak are both desired conditions. Visitors feeling crowding can impact their ability to engage with the natural world, and too many people on the landscape can impact the views for which many visitors come to Lassen Peak. Currently, the visitor experience is primarily uncrowded and allows visitors to engage with the resources, enjoying the trail system. Park managers seek to continue providing this positive visitor experience and achieving desired conditions for visitor use.

Capacity Identification

Based on the review of existing direction and knowledge, desired conditions, and the limiting attributes, NPS staff identified that the current use levels for analysis area 2 could be *maintained*.

Visitor Capacity: 3,300 people per day (including an overnight campground capacity of 1,200 people per night)

Implementation Strategies

- Implement an overflow parking lot.
- Implement a paved multiuse pathway connecting areas within the Manzanita Lake Developed Area.
- Implement a new road in the campground.
- Disperse and encourage use from the lake and lakeshore to trails in this area.
- Improve wayfinding and orientation throughout the Manzanita Lake Developed Area.
- Improve the existing signage on the highway and at pulloffs about parking regulations.
- Add information to the park website about visitor use opportunities in this area (e.g., trails, programs).

Adaptive Implementation Strategies

- Increase the enforcement for illegal parking in the area (e.g., more staff, patrols).
- Study managed access strategies further if conditions require.
- Implement engineering solutions in areas that experience high volumes of unendorsed parking.
- Provide real-time information on parking space availability.

APPENDIX C: MITIGATION MEASURES

PREFERRED ALTERNATIVE MITIGATION MEASURES

Congress charged the National Park Service with managing the lands under federal government stewardship “in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations” (NPS Organic Act, 16 USC 1). As a result, NPS staff routinely evaluate and implement mitigation measures whenever conditions occur that could adversely affect the sustainability of NPS resources.

Mitigation measures are the practicable and appropriate methods that would be used under the action alternatives to avoid and/or minimize harm to park natural and cultural resources, visitors, and the visitor experience.

The following mitigation measures have been developed to minimize the degree and/or severity of adverse effects and would be implemented, as needed, during construction activities proposed in the action alternative:

General

- Any construction or maintenance would be coordinated and supervised, per NPS standards. Park staff would be responsible for ensuring that crews perform the necessary work in accordance with NPS instructions and standards.
- All resource protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities outside the project area. Disturbances would be limited to roadsides, culvert areas, and other areas inside the project area.
- A preconstruction meeting would be held to inform contractors about sensitive areas, including natural and cultural resources.
- Construction zones would be delineated outside existing disturbed areas with flagging, and all surface disturbance would be confined to the construction zone.
- Site staging and storage areas for construction vehicles, equipment, materials, and soils in previously disturbed or paved areas would be approved by the National Park Service. These areas would be located outside high visitor use areas and clearly identified before construction.
- Contractors would be required to properly maintain construction equipment to minimize noise, and construction vehicle engines would not be allowed to idle for extended periods.
- All tools, equipment, barricades, signs, and surplus materials would be removed from the project area upon completion of the project.

Natural Resources

Erosion Control

- Staging areas would be protected from spillover impacts through the placement appropriate barriers and would be returned to preconstruction conditions upon the completion of the proposed project.
- Substantial ground-disturbing work would be scheduled to occur outside of anticipated heavy rain events. Erosion control devices would be used, as necessary, to protect water quality and reduce the potential for stormwater runoff into Manzanita Lake.
- Soil erosion would be minimized by limiting the time soil is left exposed and by applying erosion control measures, such as erosion matting and silt fencing, in construction areas to reduce erosion, surface scouring, and discharge to drainages.
- Only natural fiber erosion control materials would be used. Erosion control materials (such as wattles) that incorporate plastic monofilament have the potential to entrap wildlife.
- Topsoil would be respread as near to the original location as possible and could be supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area as determined necessary. Conserving native topsoil would minimize vegetation impacts and potential compaction and erosion of bare soils. The use of conserved topsoil would help preserve microorganisms and the seeds of native plants.

Invasive Species

- Aggregate material, such as topsoil, gravel, and fill material, imported from outside the park would be from approved commercial sources and would be inspected and/or approved by NPS staff before importing into the park.
- Materials used in project work would be transported and stored so as not to acquire noxious weed seeds from adjacent areas.
- Although most site restoration would include only the replacement of rocks, if revegetation (seeding or planting) occurred, only native species appropriate to the site would be used.
- Where possible, native plants would be salvaged and transplanted.
- Invasive plant monitoring and treatment would be conducted prior to and for several years following construction.

Vegetation

- Trail alignments would be designed to avoid and minimize the removal of mature, healthy trees.

- Because vegetation at high elevations is sensitive and takes a long time to establish, care would be taken to avoid disturbance of or damage to plants during construction and staging to the extent possible.
- Plant surveys would be conducted by qualified biologists before ground disturbance to ensure that construction would not destroy or alter special or rare vegetation and plant communities. If federally listed or other special status plants were located, they would be clearly flagged and avoided when possible. If avoidance were impossible, park managers would consult with the appropriate federal and state agencies and measures would be examined to avoid or minimize impacts, such as transplantations.

Wildlife

- Wildlife surveys would be conducted by qualified biologists before ground disturbance to ensure that construction did not destroy or alter sensitive wildlife and important wildlife habitat.
- Future California spotted owl surveying would occur before construction, and construction would not occur during species-specific sensitive times.
- Visual encounter surveys for northwestern pond turtles would be conducted prior to work occurring within or adjacent to the shores of Manzanita Lake, Reflection Lake, and Lily Pond.
- Care would be taken to avoid or minimize the disturbance of sensitive wildlife species found nesting, hibernating, foraging, or otherwise living in or immediately near the worksites. Resource management personnel would be notified/consulted when wildlife must be disturbed or handled.
- Vegetation clearing, such as that proposed for the parking lot expansion work, would be done outside the bird nesting season (May–July) to minimize direct impacts on nesting songbirds.
- Where possible, natural features with obvious high value to wildlife would be preserved (e.g., tree snags).
- Surveys of the state-protected bald eagle would be undertaken before the construction of trails. Bald eagle surveys should be conducted beginning in early spring (February or March).
- To mitigate the impacts on the bald eagle, a limited operation period on construction activities would be put in place if active nesting of bald eagle were identified.
- If rare species or active nests were found in new construction areas, project implementation would be modified to avoid potential effects.
- Trash and food wastes would be removed daily from worksites to reduce the attraction of wildlife.

- If necessary, park managers would use temporary or seasonal visitor use restrictions or area closures to protect sensitive wildlife habitat and sensitive wildlife behavior or life stages from visitor use.
- Noise abatement measures would be implemented during major construction projects. Standard noise abatement measures would include the following:
 - A schedule that reduces impacts on adjacent noise-sensitive uses would be used, and the best available noise-control techniques would be used wherever feasible.
 - Equipment would not idle any longer than is necessary for safety or mechanical reasons.
 - Hydraulically or electrically powered impact tools would be used when feasible, and temporary noise sources would be located as far from sensitive uses as possible.
- Low-impact development and/or infiltration techniques would be incorporated into new construction or the reconstruction of existing, impervious areas, such as rain gardens, constructed wetlands, infiltration swales or basins, grass (or vegetated) filter strips or swales, tree islands or planters, permeable pavement, and surface sand filters.

Wetlands

- Mitigation measures would be applied to protect wetland resources. Once a management strategy was selected, a survey would be performed to certify wetlands within the project area and to identify the locations of wetlands and open water habitat more accurately. Wetlands would be delineated by qualified NPS staff or certified wetland specialists and marked before any construction starts. All pathway construction facilities would be sited to avoid wetlands, or if that were not feasible, to otherwise comply with Executive Order 11990, "Protection of Wetlands," the Clean Water Act, and Director's Order 77-1: *Wetland Protection*. Additional mitigation measures would include the following, as appropriate:
 - Employ standard avoidance, minimization, and mitigation strategies.
 - Avoid wetlands during construction, using bridge crossings or retaining walls wherever possible. Increased caution would be exercised to protect these resources from damage caused by construction equipment, erosion, siltation, and other activities with the potential to affect wetlands. Measures would be taken to keep construction materials from escaping work areas, especially near streams or natural drainages.
 - Use elevated boardwalks over wetland sections where it is not feasible to avoid the wetland or apply feasible mitigation measures. Boardwalks along shorelines would be placed on helical piers or other elevated structures that could be periodically shifted toward the water to maintain the shoreline experience as isostatic rebound occurs.

- Design footbridges to completely span the channel and associated wetland habitat (i.e., no pilings, fill, or other support structures in the wetland/stream habitat). If footbridges could not be designed to avoid wetlands, then additional compliance (e.g., a wetland statement of findings) would be done to assess the impacts on wetlands and ensure no net loss of wetland area.
- Ensure that the design process evaluates opportunities to improve wetland conditions and quality when trail elements are adjacent to or within a suspected wetland.
- Use boardwalks, fences, signs, and similar measures to route people away from sensitive resources, such as wetlands or riparian habitats or historic resources, while still permitting access to important viewpoints.
- Perform a formal delineation and any applicable Clean Water Act permitting upon final design before groundbreaking, if warranted.

Cultural Resources

- As appropriate, archeological surveys would precede any ground disturbance. National register-eligible or -listed archeological resources would be avoided to the greatest extent possible during construction. If such resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the California Office of Historic Preservation and, as necessary, Native American Tribal Nations traditionally associated with park lands. If, during construction, previously unknown archeological resources were discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and, if the resources could be preserved in situ, an appropriate mitigation strategy would be developed in consultation with the California Office of Historic Preservation and Tribal Nations. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony were discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001), as amended, would be followed. If non-Indian human remains were discovered, standard reporting procedures to the proper authorities would be followed, as would all applicable federal, state, and local laws.
- Archeological monitoring during ground-disturbance activities would be conducted on a case-by-case basis.
- Park staff would continue to inform visitors and others of the importance of protecting and not disturbing archeological resources and historic resources. Visitors would be informed (through NPS educational and interpretive programs and/or interpretive media products, and ranger contacts) of the penalties for illegally collecting artifacts or otherwise causing resource damage.
- Park managers would consult with associated Native American Tribal Nations to ensure that project actions are conducted in a way that respects the beliefs, traditions, and other cultural values of the Tribes who have ancestral ties to park lands. Sensitive, sacred, or

traditional use areas would be protected to the greatest extent possible by avoiding or mitigating adverse impacts on ethnographic resources, retaining site confidentiality as appropriate, and continuing to provide Tribal access to resources and places of cultural importance.

- Known archeological sites would be routinely monitored to assess and document the effects of natural processes and human activities on the resources. Archeological resources would be left undisturbed and preserved in a stable condition to prevent the degradation and loss of research values unless intervention could be justified based on compelling research, interpretation, site protection, or park development needs. Recovered archeological materials and associated records would be treated in accordance with NPS *Management Policies 2006*, the *NPS Museum Handbook*, and 36 CFR Part 79.
- To appropriately preserve and protect national register-listed or -eligible historic buildings, structures, and landscapes, all stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).
- Prior to reconfiguring traffic lanes at the northwest entrance station, research would be conducted to establish the date for constructing the entrance road and its significance to the Lassen Volcanic Park Highway Historic District.
- Research would be conducted on the history of the construction of the dam and dike. Pending results of this research, an update to national register documentation for the Manzanita Lake Naturalist's Services Historic District would be prepared.

Visitor Safety

- Park staff would implement measures to reduce the adverse effects of construction on visitor safety and experiences. Measures may include, but are not limited to, noise abatement, visual screening, and directional signs that aid visitors in avoiding construction activities.
- Appropriate barriers and barricades would be used to clearly delineate work areas and provide for safe visitor travel near construction areas.
- The construction contractor would be required to follow NPS construction contract standards during construction, including the implementation of an accident prevention program, the installation of warning signs at the construction site and along the nearby parking lot, and the installation and maintenance of construction fences around the construction sites to prevent noncontractors and the public from entering the construction areas.
- Visitors would be informed in advance of construction activities via a number of outlets, including the park's website, various signs, the visitor center, and bus and shuttle drivers.
- To the extent practical, work would be scheduled to avoid construction activity and construction-related delays during peak visitation.

- Pedestrian crossings in parking lots and driveways would have appropriate signage and pavement striping to minimize the potential for pedestrian-vehicle conflicts.
- Provisions for emergency vehicle access through construction zones would be developed.

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

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