

Executive Summary

Introduction

This Final Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) evaluates alternative approaches for the Wetland and Creek Restoration at Big Lagoon, Muir Beach. The project area is entirely within the boundary of the Golden Gate National Recreation Area (GGNRA) of the National Park Service (NPS), but only half of the project site is owned by NPS. Other landowners are the San Francisco Zen Center (SFZC), which operates Green Gulch Farm, and the County of Marin (County).

NPS and the County of Marin have prepared this Final EIS/EIR in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Final EIS/EIR identifies and analyzes potential impacts associated with multiple alternatives for ecological restoration, public access improvements, bridge replacement, and fill disposal locations. The alternatives are based on project goals, park values, effective restoration strategies, NPS and County policy, and applicable law.

This document has gone through an extensive public review process, resulting in a series of revisions prior to release of this Final EIS/EIR. A Notice of Intent and Notice of Preparation were prepared for the project, and comments were received from many agencies, organizations, and members of the public. A series of meetings were held during the scoping process including public meetings, informal stakeholder and interagency consultation, and public scoping meetings. As part of the 75-day public review period, the Draft EIS/EIR was then circulated to local, state, and federal agencies and to interested organizations and individuals to allow them to review and comment on the report. Comments received on the Draft EIS/EIR, and responses to those comments, have been compiled into Chapter 6 of this Final EIS/EIR document. In response to public comments, changes were made to the project alternatives, as discussed in the Master Responses section of the Final EIS/EIR in Chapter 6, Comments and Responses. Thus, the text presented in the Draft EIS/EIR has been modified. Revisions are shown as follows: text that has been deleted is shown in ~~strikeout~~, and text that has been inserted is underlined.

A Notice of Availability of the Final EIS/EIR has been published in the Federal Register, sent to the Governor's Office of Planning and Research, CEQA Clearinghouse, and posted at the Office of the County Clerk. Under CEQA guidelines the document is being made available for a 45-day public review and

comment period. This period will begin on the date of the Environmental Protection Agency's notice of filing published in the Federal Register. At the completion of this process, a Record of Decision (ROD) will be issued by NPS that will specify all elements of the selected plan which will be implemented. Following confirmation of available funding, the Final EIS/EIR will be certified by Marin County and the County will make a determination regarding improvements to Pacific Way and the Pacific Way Bridge and issue a Notice of Determination (NOD) pursuant to CEQA.

This executive summary provides a brief overview of the project purpose and need; project goals; alternatives; environmental consequences of the alternatives; plans and plan consistency; areas of controversy; issues to be addressed or resolved, and major conclusions.

Project Overview

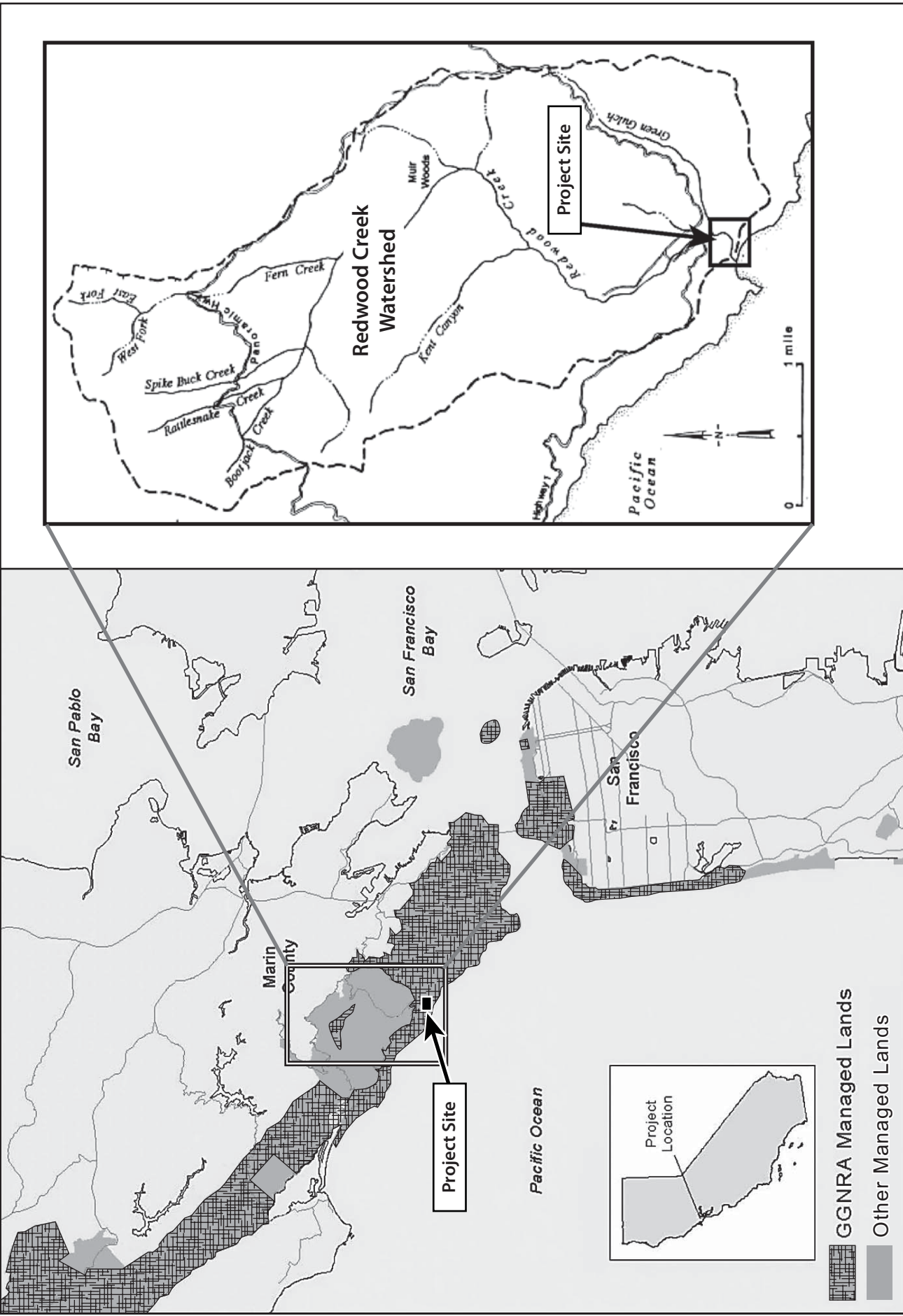
Project Area

The project area is the mouth of the Redwood Creek Watershed, which is recognized for its local and regional importance. The watershed is part of one of 25 global biodiversity "hot spots" recognized by The Nature Conservancy and targeted by the global conservation community as key to preserving the world's ecosystems (Stein et al. 2000). It is within the Golden Gate Biosphere Reserve, one of 411 reserves designated by the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Man and the Biosphere Program to provide a global network representing the world's major ecosystem types.

The project area includes 38 coastal acres at Muir Beach and encompasses the entire wetland, creek, and riparian area extending from just downstream of Highway 1 (Hwy 1) to the beach, along with a small intermittent tidal lagoon at the beach (see Figure ES-1). The project area is referred to as "Big Lagoon" because an extensive open water body at the site was first mapped in 1853 and labeled as a "big lagoon" on the map. Although the large open water body no longer occurs, the site retains the name "Big Lagoon."

Project Background

Restoration needs and opportunities at the site have long been recognized because a history of prior land uses have highly altered the creek, wetland, riparian, and dune systems at the site. Restoration planning at the Big Lagoon site was first initiated in the early 1990s by the California Department of Transportation (Caltrans). Caltrans identified the project as possible mitigation for damage caused by their disposal of fill material in the intertidal and subtidal zone during the repair of the Lone Tree Slide on Hwy 1, near Stinson Beach. Caltrans worked with NPS and other agencies to develop preliminary restoration design alternatives, and numerous public meetings were held at that time. A



 **Jones & Stokes**

Figure ES-1
Project Location

Preliminary Environmental Assessment of Wetland Restoration Alternatives for Big Lagoon, at Muir Beach, Marin County (PWA et al. 1994) was prepared describing Restoration Alternatives. Three of the conceptual Restoration Alternatives entailed creation of a freshwater lagoon at the site, and one entailed expansion of the intermittent tidal lagoon. The proposed freshwater lagoon alternatives ranged from 7.9 to 16.2 acres of open water, with required excavation ranging from 50,000 to 120,000 cubic yards of material. The intermittent lagoon excavation entailed about 3,600 cubic yards of excavation.

The Preliminary Environmental Assessment identified six locations in the Redwood Creek watershed as potential disposal sites for the excavated fill material. These included most of the 28-acre former agricultural field at the Banducci site, the Franks Valley riding ring area on State Parks land, and the lower portions of Green Gulch Farm closest to the project area. Following completion of the Preliminary Environmental Assessment, NPS put the Big Lagoon restoration project on hold because Caltrans dedicated its Lone Tree Slide mitigation funds to help NPS purchase 563 acres of the Giacomini Ranch at the southern end of Tomales Bay for future wetland restoration.

Additional planning for the Big Lagoon project did not resume until 2002, when GGNRA secured funds for this purpose from the NPS Recreation Fee Demonstration program and the California Department of Fish and Game Fisheries Restoration Grant program. While current planning efforts have drawn substantially from earlier data and analyses, agency planners have made the following modifications to key planning elements:

- The original 1994 project boundary was expanded to include 6.75 acres of NPS land upstream of Pacific Way. This wooded area extends from Hwy 1 on the east to Redwood Creek on the west and borders property owned by the Pelican Inn. The expanded boundary allows Restoration Alternatives to incorporate a more integrated approach to creek realignment.
- The NPS visitor parking lot was added as a project feature to be modified to reduce its hydraulic impacts.
- A new range of Restoration Alternatives was developed.
- The Pacific Way road and bridge, owned by Marin County, were added as project action elements, and Marin County became a project partner. A range of alternatives for a new bridge was developed.
- Many previously considered fill disposal sites were eliminated from further consideration due to potential impacts on wetlands or other natural hydraulic functions.

The current planning effort is also working under a different set of management conditions and constraints compared to those in 1992–94. Some of the primary changes are as follows:

- The U.S. Fish and Wildlife Service (USFWS) listed coho salmon, steelhead trout, and the California red-legged frog, which all occur at the site, as threatened species on the federal Endangered Species List in 1996. USFWS

has recently changed the status of coho salmon from “threatened” to “endangered.”

- Project managers have more information regarding the quantity of summer creek flows. Under normal to dry years, with existing upstream permitted water diversions, the summer habitat for salmonids in the project area is poor on a more frequent basis because of poor water quality and insufficient flow (PWA 2004). Therefore, this project did not identify a primary objective to enhance summer rearing habitat, although it will still make such enhancements where possible. This project does identify primary objectives to enhance winter and early spring rearing habitat for salmonids.
- Project managers better understand current sediment loads and sediment sources from the watershed in relation to historic sediment loads (Stillwater Sciences 2004). The additional data have facilitated a more specific analysis of the function and longevity of Restoration Alternatives than was available previously.
- Flooding on Pacific Way has grown worse, with more frequent flooding during small events when flooding generally does not occur elsewhere in Marin County.
- Confined reaches of Redwood Creek identified in the early 1990s became more obstructed due to sediment deposits, and the creek lost significant conveyance capacity by the late 1990s. The creekbed aggraded, causing groundwater in the adjacent pasture to also rise. Cattails became established on the Green Gulch pasture that had been formerly grazed by horses.

Role of Lead Agencies

This project has two lead agency sponsors, the County and NPS. Although it is a joint project, the County and NPS each play a unique role in the project. The County’s role is limited to actions related to improvements to Pacific Way and the Pacific Way Bridge, with a joint role with NPS for interim flood reduction actions. All other actions are the responsibility of NPS. All components of the project are related and necessary to achieve the overall goals and objectives of the project; for this reason, they have been included as the whole of the project.

Project Purpose and Need

Project Purpose

The purpose of the proposed action is to restore a functional, self-sustaining ecosystem, including wetland, riparian and aquatic components and to conduct the restoration in a manner that will re-create habitat for sustainable populations of special status species, reduce flooding on Pacific Way, and provide a compatible visitor experience.

Project Need

Loss of Natural Creek Function

Human modifications in the project area are so extensive that not only does its most prominent original landscape feature—a big lagoon—no longer exist, but Redwood Creek and its associated floodplains, wetlands, and aquatic habitat have steadily lost their natural function. In particular, the ability of the creek to convey high flows to the ocean, carry sediment loads, support rearing habitat for federally-listed salmonids, and flow naturally on floodplains is severely diminished. The landscape once defined by a lagoon that stretched from today's Hwy 1 to the beach is now highly fragmented, both visually and functionally. Redwood Creek is confined by a levee, a public road, a small bridge, and a parking lot, and its natural processes are limited by structures in the floodplain. Landowners installed these features between the 1920s and the 1980s to improve the land for agriculture, recreation, residential access, and commercial enterprises, but the cumulative effect is that the creek in its altered state functions poorly for even its most fundamental purpose of conveying routine winter flows and transporting sediment loads. The most visible consequence of the diminished natural function is the increased frequency of flooding on Pacific Way, which causes road closures at least annually. More details related to this issue can be found in Chapter 3, Section 3.1.1, *Watershed Processes*. This project is needed to restore a functional, resilient ecosystem while also providing habitat for special-status species and reducing flooding on Pacific Way.

Hydraulic Obstruction from Parking Lot and Levee

Muir Beach is a very popular coastal attraction for San Francisco Bay Area residents, but its convenient parking lot is a notable obstruction to a functional creek system. The NPS parking lot and adjoining picnic area, serving about ~~260,000~~^{440,000} visitors per year, are built on a fill pad three to four feet higher than the adjacent floodplain. The 500 foot-long fill pad extends prominently across the valley, leaving only about 50 feet of width for the creek and its floodplain. High winter flows from an 8.9-square mile watershed from the top of Mt. Tamalpais must wash through this remnant narrow passage to reach the natural end point at the ocean, but the passage is too restrictive. The opposite side of the creek is also confined by a levee built during the 1960s agricultural era. In the approximately 25 years since the parking lot fill pad was built, high flows have been obstructed routinely upstream of the parking lot, causing large loads of sediment that would have otherwise been carried to the ocean to be deposited in the creek and riparian area upstream of the parking lot. The creek upstream of the parking lot filled with such large volumes of sediment that it lost its channel definition; excess fine sediment buried the whole floodplain between the parking lot and levee road. Fences installed in the 1960s are buried in sediment up to the top of the fence posts. This rapid sedimentation of the creek upstream of the parking lot has raised portions of the creekbed to elevations higher than the adjacent Green Gulch pasture. This is a geomorphologically unstable condition with a high risk for channel avulsion, which could cause a sudden migration of

the stream channel into the lowest position in the valley. Because it is a substantial hydraulic obstruction, the current parking lot configuration, primarily the lower 90 feet of the parking lot, is not compatible with a functional fluvial system. Yet, with a high visitor demand, the project is needed to provide both public access and a visitor experience that is compatible with ecosystem restoration. More details related to this issue can be found in Chapter 3, Section 3.1.1, *Watershed Processes*.

Diminished Habitat for Salmonids

Redwood Creek is the southernmost stream in the United States with a healthy population of coho salmon, but its numbers are significantly lower than those of historic populations. Coho in the central coast of California are now formally listed by both the state and federal governments as endangered, and resident steelhead trout are listed as threatened. The habitat in the project area has been diminished both in its areal extent and its quality, with the loss of historic creek and floodplain habitat through landscape modifications. Floodplains are known to provide important habitat for outmigrant coho to feed and build body mass, thereby increasing their chance of survival upon returning to the ocean. Fish passage from the project area's biggest floodplain may be impaired, however, because a 1,300 foot-long levee across the site provides only two culverts back to the mainstem channel, one of which routinely fills with sediment and requires maintenance. Large woody debris that naturally falls in the main channel and maintains pools with cover is currently removed periodically to facilitate sediment passage and reduce flooding impacts on human development, and sediment has been periodically excavated from the channel. The existing channel conditions led to this conflict between managing for protection of natural resources and managing for flood reduction. More details related to this issue can be found in Chapter 3, Section 3.2.3, *Biological Resources*. This project is needed to regain vital habitat, particularly winter rearing habitat, for federally listed salmonids.

Flooding on Pacific Way

Muir Beach residents and GGNRA visitors access the site via Pacific Way, a Marin County road with a small bridge spanning Redwood Creek. However, water flows over the road routinely each winter, even when other county roads in low lying areas remain passable. Water depths can reach two to three feet in moderate rain events. This problem has grown noticeably worse in the past two decades as the confined creek has accumulated sediment and lost conveyance capacity. The creek upstream of the Pacific Way Bridge was measured to be about five feet deeper ten years ago; today's shallower creek causes more water to wash over the floodplain and across the road during even minor flood events. The problem, however, is not a matter of keeping the creek deep enough to pass high flows; the problem is that the road is on a floodplain that will always flood under some events and residents now depend on the road for year-round access. The road was originally built across the floodplain in the 1920s, with a small

bridge over the creek, which was apparently repositioned to the side of the valley. The road sits atop an area that was underwater—a part of the “big lagoon”—in the 1853 U.S. Coast Survey map, and it was remapped in 1892 as a marsh with multiple drainage channels. The road was originally not intended for year-round use, but for access to a tavern and cottages for summer use. The next road upstream from the project area (Hwy 1, to the north) was also built across the floodplain and was also inundated periodically until Caltrans raised the road elevation in the 1970s. The Caltrans solution of raising the road across the entire floodplain cannot be applied to Pacific Way, because structures are now built in the floodplain very close to the road. A higher road all the way across the floodplain, with a small bridge only at one end, would effectively dam the creek during higher flows, and cause an increase in flood elevations at the structures. Some of these structures, such as the Pelican Inn and AT&T utility boxes, sit on fill pads that have collectively reduced the available floodplain width by about 40%, or by about 200 feet out of a maximum of about 475 feet of floodplain width. While the history of development has had an impact on creek and natural function, the dependency on the road for residential access has created the necessity of reducing flooding on Pacific Way, but this project is needed to provide public access in a manner that is compatible with a natural, resilient fluvial system. More details related to this issue can be found in Chapter 3, Section 3.1.1, *Watershed Processes*.

Unsustainable Frog Habitat

California red-legged frogs (CRLFs) occur at the project site in a habitat that is maintained by the same structures that make the overall creek system dysfunctional. The 1,300 foot-long levee built in the 1960s to confine the creek also allows water to pond in the Green Gulch pasture. Emergent vegetation grows in the ponded water, providing suitable breeding habitat for the frogs. However, the ponding is dependent on NPS maintaining flashboards on a culvert under the levee each spring and managing it to make sure that water stays ponded long enough to allow successful CRLF reproduction. The number of frogs at the site is so low that their continued existence is in jeopardy, and yet their current habitat is reliant on both human management and a constructed levee that contributes substantially to larger ecosystem dysfunction. There are no other known populations of CRLFs in the Redwood Creek watershed, and as such there is an urgent need to provide hydrologically sustainable habitat CRLFs in this watershed. More details related to this issue can be found in Chapter 3, Section 3.2.2, *Wildlife and Wildlife Habitat*.

Summary

This project is needed to address the extensive loss of natural function for channel conveyance, sediment transport, channel stability, and diminished habitat for federally endangered coho and federally threatened steelhead; the increased flooding on Pacific Way; and the critical need for sustainable habitat for the CRLF. With many of the impacts resulting from facilities that have

accommodated public and residential access, public access is needed in a manner that is compatible with ecosystem function.

Goals

This project will conduct ecological restoration and public access improvements at Big Lagoon to meet the following goals:

- Restore a functional, self-sustaining ecosystem, including wetland, aquatic and riparian components;
- Develop a restoration design that (1) functions in the context of the watershed and other pertinent regional boundaries, and (2) identifies and, to the extent possible, mitigates factors that reduce the site's full restoration potential;
- Consistent with restoring a functional ecosystem, re-create and maintain habitat adequate to support sustainable populations of special status species;
- Reduce flooding on Pacific Way and in the Muir Beach community caused by human modifications to the ecosystem, and work with Marin County to ensure that vehicle access is provided to the Muir Beach community;
- Provide a visitor experience, public access, links to key locations, and resource interpretation that are compatible with the ecosystem restoration and historic preservation;
- Work with the Federated Indians of Graton Rancheria to incorporate cultural values and indigenous archaeological site resources into the restoration design, visitor experience, and site stewardship;
- Provide opportunities for public education and community-based restoration, including engaging local and broader communities in restoration planning and site stewardship; and
- Coordinate with local transportation planning efforts to identify project features that are compatible with transportation improvements and consistent with the ecosystem restoration.

The project is considered self-sustaining if it does not require routine maintenance, but landforms in the area may still change substantially compared their constructed forms.

A list of 34 specific objectives to meet these goals is provided in Table 1-1, Project Objectives and Indicators for Big Lagoon Restoration, in Chapter 1.

Alternatives

This Final EIS/EIR evaluates three alternatives for ecological restoration, six alternatives for public access, and four alternatives for a new Pacific Way Bridge and road, in addition to the No Action Alternative (no restoration and no changes to public access or bridge construction). The conceptual designs for these alternatives were developed by Philip Williams and Associates and John Northmore Roberts through an iterative process between NPS, Marin County, and the SFZC and through a series of public meetings of the Big Lagoon Working Group held in 2003 and 2004.

Alternatives were described in the Feasibility Analysis (PWA 2004), but the Restoration, Public Access, and Bridge Alternatives have all undergone some conceptual design refinements since 2004 to reduce their environmental impacts and enhance their benefits.

Alternative 1—No Action

Under the No Action Alternative, Redwood Creek would remain in its current alignment, and no large-scale physical modifications of the site would occur. Pacific Way road and bridge would remain unchanged in size and design and would continue to serve as the primary access route to the parking lot, which would also remain unchanged at its current location, as well as for residences along Pacific Way and Lagoon Drive. The No Action Alternative would allow for the continued periodic flooding of Pacific Way during storm events, resulting in the need for emergency intervention to prevent prolonged road closures. Periodic maintenance, including dredging, would continue to be needed to remove sediment and fallen trees from Redwood Creek, although its implementation would be hindered by the difficulty in obtaining permits from regulatory agencies for such actions. Channel avulsion of Redwood Creek (i.e., sudden relocation of the channel alignment during a large storm) would be likely under this alternative because the existing channel, in its confined condition, continues to aggrade (i.e., build up with sediment) in response to elevated sediment delivery from the watershed. Active seasonal management of the culvert and flashboards in the lower Green Gulch pasture would continue to be necessary to maintain ponded surface water for the CRLF.

Action Alternatives

Activities Common to All Action Alternatives

Restoration Activities Common to All Action Alternatives

The activities common to all Restoration Alternatives would be as follows:

- **Interim Flood Reduction Measures.** Interim flood reduction measures consist of excavating the Redwood Creek channel from a maximum of about 400 feet upstream of the Pacific Way Bridge to about 100 feet downstream of the bridge. Actions may be performed once, or repeated on a more limited basis if needed. Interim actions would include removing log jams in the project area only if they are shown to be obstructing flood flows or contributing to sediment aggradation that is worsening flooding or the risk of channel avulsion. These measures would be performed during the interim period prior to implementation of the Restoration and Bridge Alternatives, which may not be completed until 2010 or 2011.
- **Relocation of Redwood Creek Channel.** For each action alternative, the Redwood Creek channel from the upstream project boundary to approximately 100 feet downstream of Pacific Way would generally be relocated to the topographically lowest portion of the valley; because this low point is very close to the Pelican Inn, the new channel would be located approximately 150 feet from the Pelican Inn driveway at Pacific Way. Most of the existing channel would be filled upstream of Pacific Way under Alternatives 3 and 4, but most of this reach would not be filled under Alternative 2 to create a backwater channel for use by salmonids and to increase flood storage capacity.
- **Construction of New Drainage Swale and Upper Pasture Modifications.** Under all restoration approaches, a drainage swale would be constructed downstream of Pacific Way between the realigned creek channel and the eastern project boundary. Fencing around an equestrian ring on the southwestern side of the access road would be removed under all alternatives, and the area would be revegetated with seasonal wetland vegetation.
- **Backbeach Lagoon Enhancement, Channel Realignment, and Dune Restoration.** All action alternatives would include excavation to expand the potential natural variation in the intermittently tidal lagoon along its landward side, and installation of large woody debris (LWD) in the lagoon or at its edge to enhance habitat for juvenile steelhead and salmon. The stream channel downstream of the existing footbridge would be shifted seaward from its existing location to an alignment consistent with an 1853 map and early aerial photographs of the site. Finally, dune enhancement would occur through the possible natural lowering of the water table, combined with wind activity to develop dunes from newly dry (hence, erodible) sands. Fencing or other means would be used to restrict public access to dune restoration areas, and revegetation of native dune vegetation may be implemented to improve dune formation and quality. The removal of most fill shoreward of the parking lot where kikuyu grass occurs would be scraped about 1 foot deep, creating additional wetlands in the short-run and, possibly converting to dunes in the long-run with the build-up of wind-blown sand. Fill may be newly placed on a small portion of the area immediately adjacent to the reconfigured parking lot to function as a picnic area.
- **Removal of Levee Road.** The 1,300 foot-long levee road would be removed under each action alternative to allow lateral channel migration and to reconnect Redwood Creek to the floodplain.

- **Invasive Species Removal.** All action alternatives would involve removal of invasive non-native plant species, both during the construction phase and throughout the lifetime of the project. In particular, Cape ivy, Himalayan blackberry, non-native invasive perennial grasses, such as kikuyu grass, Harding grass, and tall fescue, and other non-natives would be removed from various locations at the project site. Non-native species outside the project boundary that would be likely to spread to the project site would also be targeted for removal.
- **Removal of Tavern Remnants.** Remnants of the Muir Beach Tavern between the parking lot and the mouth of Redwood Creek/inboard end of the tidal lagoon, in the southwest portion of the project site, would be removed. including a buried retaining wall and a chimney. This would include removal of the buried retaining wall; however, the chimney would remain in place.
- **Removal and Relocation of Utility Lines.** Each action alternative would involve the removal and relocation of water, phone, and electric lines along the levee road and/or near Pacific Way. Existing AT&T utility boxes would be relocated, and a decommissioned well pump adjacent to the levee road and associated above-ground power lines across Green Gulch pasture would be removed.
- **Removal of Concrete Channels and Revetment.** Gabions and other channel armoring upstream of the existing footbridge would be removed to allow the restored channel to migrate more naturally. In addition, concrete channels along Green Gulch Creek and the unnamed tributary in the project area would be removed, as would the concrete weir structure controlling flows between the existing emergent wetlands and Redwood Creek channel and the culvert from Green Gulch Creek under the levee road to Redwood Creek.
- **Modifications to Green Gulch Field 7.** The windrow of Monterey cypress trees on the southwest edge of the field would be removed. Fencing around the perimeter of Field 7 would be adjusted to reflect the new project boundaries. An existing horse shelter would be relocated in the new boundary of Field 7.
- **Application of Traditional Ecological Knowledge.** A traditional ecological knowledge study will be prepared in consultation with the Federated Indians of Graton Rancheria to compile and analyze the archaeological, ethnographic, and ethnohistoric data available to inform the restoration design, revegetation, and interpretation of the site.
- **Removal of Lower End of Existing Parking Lot and Picnic Area.** All restoration alternatives incorporate the removal of at least the southeast end of the existing parking lot, including the picnic area, to improve hydraulic conveyance of the creek. At least 90 feet of the parking lot would be removed. Public Access Alternatives evaluate a range of options for the new parking lot and picnic area design.
- **Mosquito Management.** Information would be provided to visitors and residents on how to reduce exposure to mosquitoes (e.g., wearing long-

sleeved shirts). Monitoring for larval mosquitoes will occur when surface water is present. Should numbers be present at levels sufficient to pose public health risks, the Park's IPM coordinator will treat the ponded areas. In the long term, colonization of the created wetland habitat by predatory insects should also assist with reducing the risk posed by mosquitoes.

Public Access Activities Common to All Action Alternatives

The activities common to all Public Access Alternatives would be as follows:

- **Pedestrian Access from Hwy 1.** A pedestrian trail, accessible by persons with disabilities, would be constructed along Pacific Way from Hwy 1 to the beach parking lot/drop-off. The portion of the trail closest to the parking lot would be separated from the road by up to a 5 foot-wide buffer, and could also be grade-separated from the road by approximately 1 foot.
- **Pedestrian Access to Beach.** The pedestrian boardwalk and bridge crossing from the new parking lot to the beach would be relocated to a location where its effects on channel function are minimized.
- **Interpretive Displays.** Interpretive displays would be installed at the parking lot or drop-off, and at the intersection of the Coastal Trail and Green Gulch Trail. Public Access Alternative C would include an additional interpretive display at the Alder Grove parking lot. In addition, an interpretive blind/overlook for bird watching could be constructed.
- **New Emergency Access Route.** The existing road along the eastern edge of the site would be upgraded to serve as emergency access route from Pacific Way to the southern project boundary. This route would replace the levee road for access to the Coastal Trail and Coyote Ridge. The road would remain unpaved and the existing alignment would not be altered, but vegetation that has grown over the edges would be removed to extend the width of the road to 11 feet to accommodate emergency access vehicles. A bridge crossing at the southern end of the Green Gulch pasture would be improved to facilitate vehicle passage.
- **Interpretation.** Interpretive facilities would be provided during construction, including interpretive signage and possible kiosks located at strategic locations. Interpretation will also be an on-going activity at the site into the future.

Restoration Alternatives

The Restoration Alternatives are as follows:

- **Alternative 2—Creek Restoration.** Alternative 2 would involve relocating approximately 2,500~~2,000~~ linear feet of Redwood Creek to the topographically lowest portion of the valley, while maintaining a habitat mix

similar to current conditions. Creek relocation and restoration would be designed and graded to remove existing hydraulic constraints and minimize the need for ongoing maintenance. The new channel would include low sloping banks slightly higher than the adjacent floodplain to simulate the natural depositional levees that would occur in this reach. These low berms upstream of Pacific Way would accommodate bankful flows, maintain the low flow channel, and support riparian vegetation, thus increasing sediment transport and channel sustainability. Downstream of Pacific Way, the channel would be designed to accommodate more frequent out-of-bank flows of at least a 1-year frequency to create frequent floodplain habitat for salmonids. Most of the existing primary channel of Redwood Creek upstream of Pacific Way would not be backfilled in order to retain its function as backwater habitat. Several other backwater features downstream of Pacific Way would also remain unfilled, and new backwaters would be excavated and connected to the new channel. The area adjacent to the backwaters will be graded to expand available floodplain habitat during base and peak winter flows.

Two areas would be excavated to create emergent wetland habitat. One emergent wetland area would be in the upper pasture, and the other emergent wetland area would be adjacent to the Green Gulch tributaries, but outside the boundaries of existing cattail habitat. The excavated wetland areas would have gradual slopes to provide suitable habitat conditions for the CRLF under the expected range of groundwater levels. The two tributaries from Green Gulch would be realigned and allowed to dissipate into the newly excavated wetland, mirroring historic conditions in which the Green Gulch drainage was not connected to the main channel. Concrete lining in the southern-most Green Gulch drainage channel would be removed.

- **Alternative 3—Creek and Small Lagoon Restoration.** Alternative 3 would combine riparian restoration components with restoration of open water and wetland habitats. Under Alternative 3, two open-water lagoons would be created, one on either side of the new channel. The two small lagoons would be backwaters, connected to the creek near the downstream end of each lagoon. The banks of the lagoons would have varied slopes to favor a variety of habitats. The lagoons would maintain a minimum water depth of 3–4 feet year-round.
- **Alternative 4—Large Lagoon Restoration.** Alternative 4 would create a periodically brackish open-water habitat similar to historic (1853) conditions, modified to reflect existing constraints of Pacific Way and private property. This alternative would involve the creation of a large lagoon with fringing wetlands extending to the edge of the valley immediately landward of Muir Beach. The lagoon would be excavated with gentle side slopes to encourage colonization of emergent wetland vegetation. Like the small lagoons under Alternative 3, the large lagoon would maintain a minimum water depth of 3–4 feet year-round.

Public Access Alternatives

The Public Access Alternatives are as follows:

- **Alternative A—No Action, 175 Cars at Beach.** Under the No Action Alternative, the parking lot would retain its 175-car capacity and current configuration.
- **Alternative B1—50 Cars at Beach.** Public Access Alternative B1 would construct a 50-space parking lot at the beach at the site of the existing parking lot.
- **Alternative B2—145 Cars at Beach.** The parking lot under Public Access Alternative B2 would retain the same footprint as the existing parking lot, but the lower 90 feet would be removed to accommodate a maximum of 145 vehicles.
- **Alternative B3—175 Cars at Beach.** Public Access Alternative B3 would accommodate a maximum of 175 vehicles, the same number as the existing parking lot. The lot would be about the same size as the existing parking lot, but it would be pulled back from the creek further than the minimum 90 feet to create a minimum distance of about 180 feet from the creek. It would expand further northward into existing riparian habitat.
- **Alternative B4—175 Cars Rotated Parallel to Pacific Way.** The parking lot under Public Access Alternative B4 would have the same 175-car capacity as Alternative B3, but would be rotated parallel to Pacific Way. The lot would include a new turn-off from Pacific Way and would include 310 linear feet of stacking room for cars between the entrance and the first parking stall. The distance of the parking lot from the creek bank would be about 350 feet.
- **Alternative B5—200 Cars at Beach.** Public Access Alternative B5 proposes the largest parking lot of all the alternatives, with a maximum of 200 vehicle spaces. The parking lot would be located in the same area as Alternatives B4, but would be larger.
- **Alternative C—118 Cars at Alder Grove plus 14 Disabled-Accessible Parking Spaces and Drop-off at Beach.** Under Public Access Alternative C, a new parking lot would be constructed at Alder Grove along Hwy 1, north of Pacific Way. This parking lot would accommodate a maximum of 118 vehicles. Pedestrians would walk the 0.5 mile from the lot to the beach on a new trail through the alder grove that would be developed as part of this alternative. Additionally, an area within the footprint of the existing parking lot at the beach would accommodate 14 parking spaces for persons with disabilities and a drop-off/turnaround. The parking lot would be generally visible from Hwy 1 through a 25 foot-deep screen of trees.

Bridge Alternatives

All action alternatives have a consistent deck width that will be designed ~~between a total up to a maximum~~ of 30 to 32~~6~~ feet, including the width of a pedestrian trail and railings, and a bridge deck approximately 2 feet thick. The road approach would consist of a road, including embankments, up to 34 feet wide. Portions of raised roads would have embankments extending from the road at a 3:1 slope, expanding the road footprint. The pedestrian trail would be built atop the embankment on the south side of the road.

All alternatives would be designed to be aesthetically compatible with site character, meet Marin County's bridge standards, include a disabled-accessible pedestrian path on the downstream side, and contain rails that minimize blockage of infrequent high stream flows which could overtop the bridge deck.

The Bridge Alternatives are as follows:

- **Alternative BR0: No Action.** The No Action Alternative has been described previously above; the existing bridge has an approximately 24-foot span with a deck elevation of 15.2 feet National Geodetic Vertical Datum (NGVD).
- **Alternative BR1: 50 foot-long bridge with a raised road.** The short bridge spans the 35 foot-wide channel with a deck at 16.5 feet NGVD. To provide vehicular access to the deck that would have a similar level of flood protection as the bridge, the elevation of the north and south approaches would be raised. At the lowest point of the road, the elevation gain would be up to about 5 feet to 15.5 feet NGVD. The bridge would be free-span and would not need supporting piers.
- **Alternative BR2: 50 foot-long bridge with a low road.** Similar to Alternative 1, this short bridge spans the 35 foot-wide channel. The deck height, however, is lower at approximately 15 feet NGVD (similar to the existing bridge) and would not require extensive elevation changes for the approach. The bridge would be free-span and would not need supporting piers. The existing road on each side of the bridge would remain at its current elevation.
- **Alternative BR3: 150 foot-long bridge with raised road.** This bridge would be longer than Alternatives BR1 and BR2 and would span both the new 35 foot-wide channel and areas of riparian habitat and floodplain on either side of the channel. The bridge span would provide for approximately the same available floodplain passage as the existing condition, which is currently defined by the area between the Pelican Inn fill pad and a fill pad for AT&T utility boxes, which together eliminate about 200 feet of floodplain width. For purposes of analysis, it is assumed that 2 foot-wide piers, placed at approximately 40-foot intervals, would be used to support the span and allow for channel migration. The bridge height would be about 16.25 NGVD. The road approach north and south of the bridge would be raised to a maximum of about 14.5 NGVD to provide a similar level of flood protection as the bridge. The raised road approach would begin at Hwy 1 and be about 2 feet higher than the current entrance to the Pelican Inn.

- **Alternative BR4: ~~250-266 to 300~~ foot-long bridge with highest road.** This alternative would be the longest bridge, and would span the entire available riparian zone and floodplain from the Pelican Inn on the north to the existing bridge on the south. This bridge would have the highest deck of all the alternatives, between 16.25 feet and 18 feet NGVD, compared to the elevation of Hwy 1 at about 16.5 NGVD (i.e., the bridge would be between 0.25 feet lower and 1.5 feet higher than Hwy 1). For purposes of analysis, as in Alternative BR3, two foot-wide piers, placed at approximately 40-foot intervals, would be used to support the span and allow for channel migration. The BR4 Alternative is slightly reduced in length (from 266–300 feet to 250 feet) compared with the alternative described in the Draft EIS/EIR. This shortening is a minor technical change that, pursuant to CEQA Guidelines 15088.5, does not require recirculation of the Draft EIS/EIR prior to certification.

Fill Disposal Alternatives

The Restoration and Public Access Alternatives would generate various amounts of fill as a result of excavation during restoration and construction. Fill would be reused on site where possible to reduce the need for off-site use or disposal. The Fill Disposal Alternatives are as follows:

- **Unused Reservoir Pit.** An unused reservoir pit on NPS property north of the site, near Hwy 1 has a storage capacity of about 23,800 cubic yards of material. The pit is located on the hilltop adjacent to the portion of the Coastal Trail north of the Muir Beach overlook, and is not visible from Hwy 1. The surface layer would be capped with several inches of fine soil to promote native plant revegetation. The approximately 0.75 mile haul route to this site would follow Hwy 1 north of Pacific Way, past the Muir Beach Overlook. Trucks would turn off of Hwy 1 onto the Coastal Trail to reach the reservoir. An area would be cleared near the pit to allow for truck turnaround.
- **Upper Banducci Field.** The flat field on NPS property north of Hwy 1 and adjacent to Redwood Creek could accommodate approximately 4,000 cubic yards of material, with material placed at least 200 feet from the Redwood Creek in the only portion of the site that is not a jurisdictional wetland and is furthermore highly disconnected from the floodplain. In addition, the site could be used as a temporary stockpile location for material that must be removed from the project site quickly but would not be hauled out of the watershed until a later time. The 0.5 mile haul route to the site follows Hwy 1 north from Pacific Way to the gravel driveway adjacent to Redwood Creek and the Hwy 1 bridge. Trucks would travel down the driveway, cross an intermittent tributary that would be temporarily filled, and up the field for disposal of compost or stockpiling of fill in the upper portion of the site.
- **Hamilton Air Force Base Wetland Restoration.** The U.S. Army Corps of Engineers (USACE) and the California Coastal Conservancy (CCC) are jointly conducting an extensive wetland restoration project at the former Hamilton Air Force Base in Novato, California. Due to subsidence of the

former wetland, vast quantities of fill material are needed to restore the wetlands fringing San Francisco Bay. While most of the fill for the Hamilton project will be dredge material imported by barge, the project could accept large quantities of clean fill transported by truck. The largest quantity of fill that could be generated by any of the three Big Lagoon project alternatives, about 191,000 cubic yards of material, could be accepted for use at the Hamilton wetland restoration project. Potential environmental impacts or benefits of fill placement at the Hamilton wetland restoration site have been addressed by the Final EIS/EIR prepared for that project; hence, the analysis in the current Final EIS/EIR is restricted to an evaluation of hauling trips. The approximately 20-mile haul route to this fill site follows Hwy 1 south from the site to Tam Junction in Mill Valley for approximately 7 miles, and then north on U.S. Highway 101 (US-101) about 13 miles.

- **Dias Ridge Trail Recontouring.** The Dias Ridge Trail extends from Panoramic Highway through Tamalpais State Park lands to NPS lands to the south, and ends on Hwy 1 south of Muir Beach. It currently has numerous gullies, thru-cuts, and head-cuts. NPS and Tamalpais State Park are currently planning a project to recontour the trail, and up to about ~~24,000~~4,000 cubic yards of material of the appropriate consistency from the Big Lagoon project may be used to recontour the trail. The Dias Ridge Trail project is being addressed through separate NEPA documentation; hence, the analysis in the current Final EIS/EIR is restricted to an evaluation of hauling trips. The 2.5-mile haul route from the Muir Beach project site to Dias Ridge follows Hwy 1 south to the intersection with Panoramic Highway (aka Three Corners) and up Panoramic Highway to the turn-off onto the Dias Ridge Trail.
- **Coastal Trail Recontouring, South of Site.** The poor alignment of the Coastal Trail south of Muir Beach to Coyote Ridge promotes erosion. Approximately 2,500 to 4,000 cubic yards of material from the Big Lagoon project may be used to recontour the trail. The haul route to this site would not require travel on public roads. Trucks would travel over the levee road or new emergency access road to the Coastal Trail intersection, then up the hill to trail recontouring locations between Muir Beach and Coyote Ridge. The total distance from the project site to Coyote Ridge is 0.74 miles. Because the specific locations for trail recontouring have not been identified at this time, and because the Coastal Trail in this area will be the subject of a future Determination of Eligibility for listing in the National Register of Historic Places, the analysis of this site is limited and only addresses the effects of haul trips and the typical effects of trail recontouring. Should the recontouring project move forward, it would be the subject of a subsequent NEPA analysis.

Preferred Alternatives

The preferred alternative consists of Restoration Alternative 2 (Creek Restoration), Public Access Alternative ~~B4B3~~B4B3 (a 175-car parking lot at the beach ~~rotated parallel to Pacific Way that is pulled back from the creek more than the minimum 90 feet and builds into the adjacent riparian area~~), and Bridge Alternative ~~BR4BR3~~BR4BR3 (a ~~250~~150 foot-long bridge with a raised road at each end).

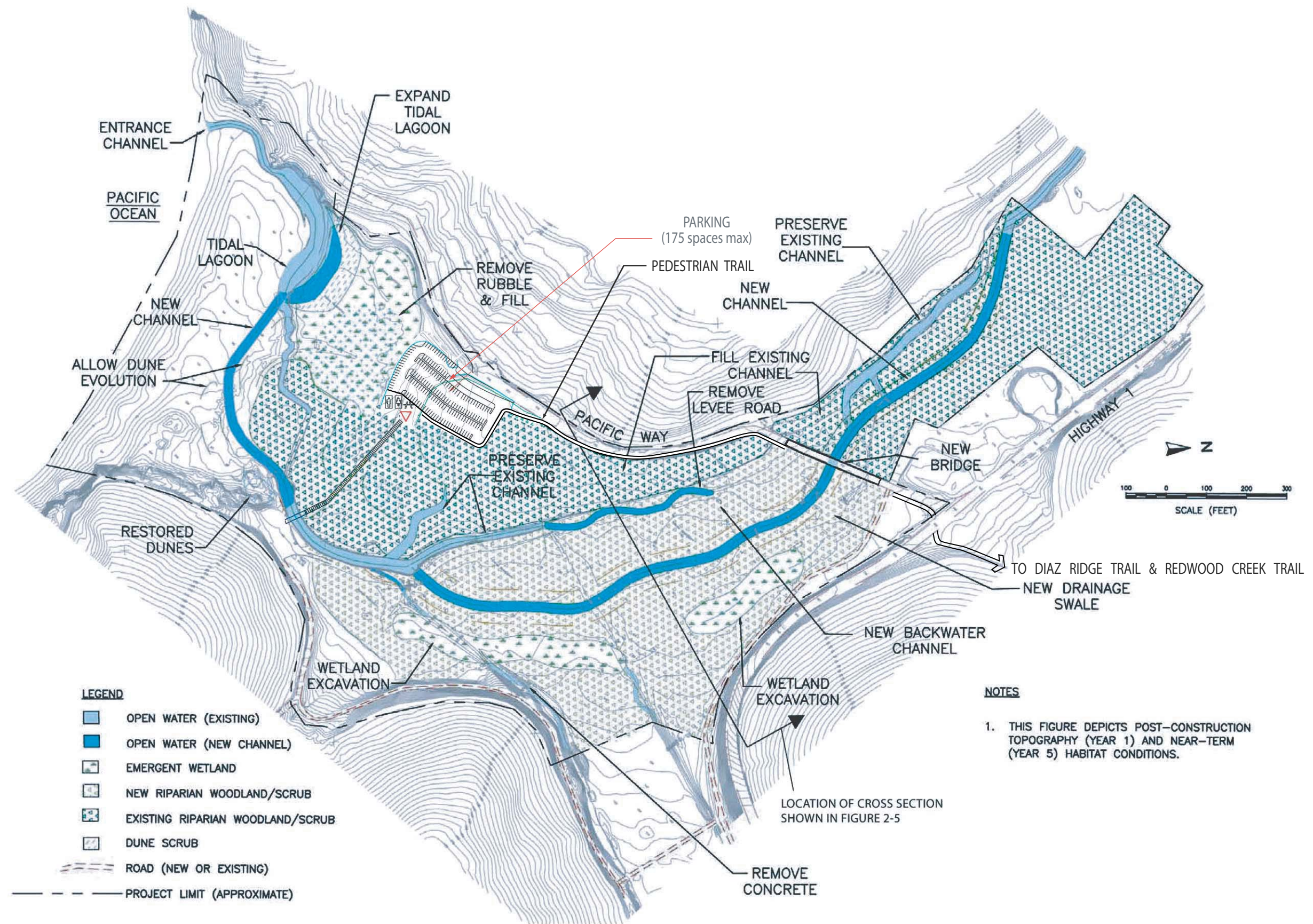
This set of preferred alternatives is shown in Figure ES-2. Fill material will be disposed of at the Unused Reservoir Pit about 2 miles north of the project site, and vegetative material removed for construction will be composted in piles on the Upper Banducci Fields. Some suitable fill material may also be used for the Dias Ridge recontouring, or possible Coastal Trail recontouring, if it is available, but all material would be used or safely deposited within the watershed. This combination of project features is consistent with the NPS mission, offers the best combination of project benefits, including factors related to both the project's purpose and need and its impacts, as follows:

- It will restore a functional, self-sustaining ecosystem to the maximum extent of any of the alternatives.
- It will support sustainable populations of existing special status species and improve their habitats.
- It will provide for vehicle access for the Muir Beach community and reduced flooding on Pacific Way.
- It will provide a visitor experience that is compatible with ecosystem restoration and historic preservation.
- It will have a relatively small construction footprint, relatively short construction duration, and will minimize construction-related impacts such as dust, noise, and the need to haul and dispose of fill.
- ~~■ It will be substantially less costly than other alternatives, which could have provided only marginally greater environmental benefits.~~

Identifying the Preferred Alternative

As required by NPS policy, a Value Analysis process was used to inform the selection of the preferred alternatives. The Value Analysis process identifies and ranks the relative advantages of each of the alternatives in meeting project-specific evaluation factors. When completed, the results show which alternative provides the greatest benefit to meet project goals and the NPS mission. Evaluators do not consider costs when evaluating advantages, but costs are compared to overall advantages to derive a cost-benefit ratio for each alternative. Costs are used to determine whether substantially added costs provide substantially added benefits. Under this method, a more costly alternative might be preferred if its substantially greater costs produced substantially greater benefits. Costs are also used in this method to refine alternatives to either increase benefits or reduce costs that do not produce benefits.

Separate Value Analysis evaluations were used to evaluate the preferred restoration alternative, the preferred public access alternative, and the preferred Pacific Way Bridge alternative. A neutral, experienced facilitator guided each of the three Value Analysis processes, with participants from NPS, SFZC, and Marin County. Each set of alternatives was evaluated for specific objectives within the categories of natural resource protection, cultural resource protection, public and worker health and safety, visitor enjoyment, operational efficiency,



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Source: PWA 2004, NPS 2005

and minimization of construction impacts. More details related to the Value Analysis can be found in Chapter 2.

Benefits of the Preferred Alternative

The combined benefits of the preferred alternatives selected for this project—Restoration Alternative 2, Public Access Alternative ~~B3~~B4, and Bridge Alternative ~~BR3~~BR4—will bring to life a long-term vision for restoring ecological integrity to the mouth of one of the San Francisco Bay Area’s most treasured and natural watersheds. Redwood Creek flows from Mt. Tamalpais to the coast in a largely protected watershed, but it is at its most confined, dysfunctional, and fragmented condition at the project site. When this project is implemented, the dynamic interaction of natural processes will once again return to virtually the full landscape for the first time in almost 100 years. Modern anthropogenic influences on this scenic Marin County coastal lowland will not be fully erased, but the project will nevertheless enable the forces of a natural stream to retake their place as the centerpiece of the landscape.

The combined set of preferred alternatives will allow a natural and dynamic evolution of the creek, floodplain and wetland system; remove as many obstacles as reasonably possible to natural processes; minimize the need for maintenance; and reconcile conflicts with desirable human activities to the extent possible. Water, waves, and wind will create landforms, aquatic niches, and naturally sustained habitat without undue human interference or landscape relicts.

While benefits and impacts of the Restoration, Public Access, and Bridge Alternatives are analyzed separately in this Final EIS/EIR, the greatest benefits will occur due to the combination of these three project components. Each component addresses a particular obstruction to natural creek processes that have contributed to a downward trajectory in salmonid habitat quality and increased flooding. The combined benefit of creek realignment under Restoration Alternative 2, parking lot reconfiguration under Public Access Alternative ~~B3~~B4, and Bridge Alternative ~~BR3~~BR4 will create the most unobstructed creek and floodplain in the project area since about the 1920s. All of the components function together to improve flow conveyance, sediment transport, floodplain function, and habitat value, while also improving vehicular access, and maintaining visitor and residential access. Sediment will be transported more effectively because the creek channel will be relocated to its natural topographic low point and will slope at a more natural gradient. Sediment transport will no longer be obstructed by an undersized Pacific Way Bridge or an undersized floodplain next to the lower end of the parking lot. With the preferred parking lot alternative, the floodplain next to the parking lot will expand from its current 50 feet of width to a minimum of ~~180~~350 feet wide, with an unobstructed floodplain on the opposite side of the creek as well.

The project will enhance the essential habitat qualities needed by the resident coho salmon and steelhead during winter and spring flow conditions. When the creek is reconnected with contiguous floodplain habitat throughout the entire 38-

acre project site, salmon using the floodplain habitat will no longer be obstructed from returning to the creek by a levee or a road. The floodplain will meet one of the most important winter-time needs of juvenile coho—a good feeding ground for fattening up before migrating to the ocean, thereby enhancing their chances of survival and return. New backwater habitat both upstream and downstream of Pacific Way, together with the expanded floodplain connection, will also provide steelhead and coho with areas where they can take refuge during the force of high velocity flows, a habitat quality that is currently deficient in Redwood Creek. With these improvements, the survival of young steelhead and coho over winter months is expected to improve.

The new, longer Pacific Way Bridge proposed as part of this project offers an ecological benefit that has rarely been used in typical road engineering. It will not only improve vehicular access during the winter, but will be long enough to span an additional ~~215~~⁴⁴⁵ feet of floodplain width, thereby retaining the important upstream-downstream floodplain connection for both fish habitat and natural creek meander. Whereas residents currently experience restricted road access under routine winter events, the new bridge and raised road will allow vehicular access in all but very large storm events, and even then, access will only be limited for a short duration. Although this project cannot prevent flooding in a natural floodplain, road access will be available even if there are long-term changes in flood elevations, because both the road and the bridge will be higher and constructed to allow for long-term channel changes. With good road access to residences during winter events, the current demand for creek dredging to reduce flooding will subside.

Visitors will experience multiple benefits of this project. They will have the opportunity to witness the restoration process, which takes on new meaning as public awareness of human interference with ecological functions grows. People seek out national parks across the United States to restore their personal sense of aliveness in places where nature unquestionably thrives. The project will allow the estimated ~~260,000~~^{440,000} annual visitors to the site to witness an ecosystem regaining its natural function. Even in the project's infancy after construction, when trees are immature and native wetland species have not yet colonized their likely niches, NPS expects that visitors will appreciate and enjoy the new integrity of the site as a whole, with the reconfigured parking lot acting as a less imposing central feature of the coastal landscape. Stewardship volunteers will reap a personalized enjoyment from their hands-on participation in revegetating native plant communities after construction. Visitor facilities will also be enhanced, with the parking lot blending more pleasantly with its surroundings through vegetated wetland swales, installation of new vault toilets, and, in particular, through a new trail along Pacific Way from Hwy 1 to the parking lot. The trail will meet Americans with Disabilities Act (ADA) standards, and it will provide pedestrians with an access route to the beach where conflicts with vehicles can be avoided. The new roadside trail will expand area trail connections by joining a new proposed trail alignment up Dias Ridge from the Golden Gate Dairy, making a trail available for the first time from Panoramic Highway to the beach. There is also a connection from the beach to the Coastal Trail.

The benefits of removing the channel confinements are expected to also enhance the natural range of fluctuation at the intermittent tidal lagoon on the north end of the beach. Creek flows will be able to scour the lagoon more effectively with the improved force of winter flows from an unobstructed upstream channel. The lagoon areal extent and depth will therefore have more natural variability. With added log structures, reminiscent of natural large woody debris washed downstream to the beach in the period before watershed development, coho and steelhead will have improved cover in the intermittent lagoon.

One of the least-seen beneficiaries of this project may be the California red-legged frog, a federally threatened species whose numbers at the site are so low that their very persistence there is in jeopardy. Because its current habitat is provided by the same features that obstruct creek processes and promote ponding, this project takes the long view toward providing a more hydrologically sustainable habitat for the frog. This project will remove the channel confinements, but will retain the cattail habitat at the south end of the Green Gulch pasture. It will also excavate new ponds that will be fed by groundwater and will support emergent vegetation where frogs lay their eggs. Should augmentation of the existing red-legged frog population be required, the improved habitat conditions should support any added frogs. With these changes and with an additional new breeding population on NPS lands at the Banducci Site (0.5 mile upstream) as part of separate actions, California red-legged frog populations within the Redwood Creek watershed will be sustainable for the long term.

The benefits of this project extend well below ground to the buried archaeological resources at the site. It is the mission of NPS to protect cultural resources, and this project will succeed in not only protecting them, but in learning more about the site's Coast Miwok history than had this project never been conducted. Coast Miwok who once lived in this region have left good evidence of their hunting and fishing activities at Muir Beach. As part of the project planning, NPS has conducted subsurface explorations to learn more about the dates and types of Coast Miwok use. New information about the Coast Miwok activities here will be used in a new cultural resources interpretation of the site that will add depth to the public understanding of earlier human use as well as earlier landscapes.

Beyond enhanced protection and interpretation of archaeological sites, the project will also help re-establish the connection of a living indigenous tribe, the Federated Indians of Graton Rancheria, with parts of our parklands. An ecological restoration that includes a cultural-ecological component derived from the traditions and land uses of indigenous people will create a visible and tangible fabric with deep interpretive potential to visitors and respect to the original occupants of these lands.

One asset of the project approach is that its benefits can be achieved without hauling hundreds or thousands of truckloads of excavated fill long distances down Hwy 1 and through the commercial area of Mill Valley. The project alternatives can be constructed with all fill either reused in the local watershed or

placed safely and sustainably in the Unused Reservoir Pit on NPS property, only about 2 miles north of the site.

Impacts and Mitigation Measures

A list of specific resource topics was developed to focus on and compare environmental impacts of the various alternatives. The list was drafted based on applicable laws, regulations and policies, as well as comments from park staff and the interested and affected public, including other agencies that were contacted during scoping. Chapter 3 of the Final EIS/EIR describes, for each resource topic, the existing environment that could be affected by the proposed actions. These existing conditions establish the baseline for the analysis of effects. Chapter 4 provides a detailed analysis and discussion of the probable environmental consequences, or impacts, of implementing the alternatives.

NPS management policies require analysis of whether an alternative might impair NPS values or resources. None of the alternatives considered in this document would impair park resources.

Tables ES-1a–ES-1d summarize the environmental impacts (including cumulative impacts) of the alternatives, the level of significance before mitigation, mitigation measures, and the level of significance after mitigation. Impacts are summarized for each alternative by resource topic. Impacts are classified as beneficial or adverse; and negligible, minor, moderate or major, as described below. These four designations apply to beneficial as well as adverse impacts.

- **Negligible**—The impact is at the lower level of detection; there would be no measurable change.
- **Minor**—The impact is slight but detectable; there would be a small change.
- **Moderate**—The impact is apparent and appreciable; there would be a noticeable change, but it may be short term or not permanent.
- **Major**—The impact is severe; there would be a highly noticeable, long-term, and/or permanent measurable change.

In addition to the designations given above, CEQA requires the determination of whether an adverse impact is considered significant. Significant adverse impacts are denoted in the table in **bold** type. For the purposes of CEQA, all adverse impacts that are characterized as major are considered significant and require mitigation. Moderate adverse impacts may be considered significant depending upon context, intensity, and duration. Impacts resulting from temporary construction-related activities and operational activities are indicated as such.

Significant Unavoidable Impacts

The alternatives evaluated would result in 29 significant unavoidable environmental impacts; of these, 13-11 are construction-related impacts. The preferred alternative (Restoration Alternative 2, Public Access Alternative B3B4, Bridge Alternative BR3BR4, and fill disposal within the watershed) would result in only 9 of these significant unavoidable environmental impacts, of which all are construction related. The significant and unavoidable impacts of the preferred alternative are summarized below.

Preferred Alternative

- **VEG-R2: Construction-Related Impacts on Vegetation Communities.** During construction, disturbance to vegetation communities at the site would be unavoidable.
- **REC-R1: Reduced Recreational Opportunities and Visual and Noise Disturbance During Construction.** Although efforts would be made to reduce impacts of restoration construction on recreation, some impacts would be unavoidable.
- **REC-P1: Reduced Resident and Visitor Access, Visitor Amenities, and Recreational Opportunities During Construction.** Reductions in available parking and other site amenities during construction of the Public Access Alternatives would have significant effects.
- **AES-R1: Alteration of Scenic Views and Existing Visual Character During Construction Activities.** Construction activities would have unavoidable adverse effects on views and character at the site, which would cease once construction was complete.
- **AES-P1: Alteration of Scenic Views and Existing Visual Character During Construction Activities.** Construction activities would have unavoidable adverse effects on views and character at the site, which would cease once construction was complete.
- **AES-B1: Alteration of Scenic Views and Existing Visual Character During Construction Activities.** Construction activities would have unavoidable adverse effects on views and character at the site, which would cease once construction is complete.
- **TC-P1: Changes in Parking Availability During Construction.** Reductions in available parking during construction of the Public Access Alternatives would be considered significant from the standpoint of parking adequacy.
- **NZ-R1: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Construction Activities.** Construction noise would be minimized to the extent possible but would still be considered a significant impact.

- **NZ-B2: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Pile Driving.** Despite the implementation of mitigation, the extreme level of noise generated by pile driving is considered a significant and unavoidable impact.

Cumulative Impacts

The Final EIS/EIR considered a list of ~~35~~34 projects that could potentially combine with the Big Lagoon project to create cumulative impacts. It also considered the projections associated with the Marin Countywide Plan and the traffic projections in the Comprehensive Transportation Management Plan for Parklands in Southwestern Marin (a now inactive effort). The majority of the projects considered are projects within the Redwood Creek watershed that involve sediment control, improved aquatic and upland habitat, invasive species removal, trail and roadway improvements, and flood reduction actions. As such, the majority of these projects have primarily beneficial impacts, and would combine with the Big Lagoon project to create cumulatively beneficial impacts.

Resource areas with cumulatively beneficial impacts included watershed processes (including hydrology, flooding, geology/soils/geohazards, and geomorphology), water quality (by helping to address existing water quality problems), vegetation communities and wetlands (by improving site function), wildlife and fisheries (including benefits to CRLF and listed salmonids), recreation, traffic, and aesthetics. Resource areas with no potential for contribution to cumulative effects include water supply, cultural resources, land use, agriculture, human health and safety, and noise.

No significant adverse cumulative impacts were identified. Less-than-significant cumulative impacts include construction-related effects on air quality, recreation, and public services and utilities.

For a detailed discussion of cumulative impacts, please refer to Chapter 5.

Growth Inducing Impacts

Implementation of the project would not induce major or significant development or economic growth in the vicinity. Construction of the project would not generate a substantial number of new jobs that could cause economic growth in the area. Public access improvements would be expected to benefit visitors to the area; however, the improvements would not be expected to substantially increase the number of visitors to the project area. Similarly, the project would improve year-round access for local residents from replacement of the Pacific Way Bridge, but would not stimulate development at Muir Beach, which is guided instead by the Marin County Local Coastal Plan, the Muir Beach Community Plan, the Marin Countywide Plan, and the Marin County Code, as well as decisions made by the County's Community Development Department and Board of Supervisors under the auspices of these plans and policies.

Significant Irreversible Environmental Changes

The restoration of the site is not considered an irreversible environmental change because the landscape could again be converted to other land uses in the future. The proposed project does not involve converting the land to urban land uses, which tend to be irreversible for all practical purposes. None of the impacts of the alternatives are expected to result in significant irreversible environmental changes.

Environmentally Preferable Alternative

NEPA requires identification of the environmentally preferable alternative. CEQA similarly requires identification of the environmentally superior alternative. For the purposes of this document, the term “environmentally preferable alternative” is used in place of “environmentally superior alternative.”

The environmentally preferable alternative is the combination of Restoration Alternative 2, Public Access Alternative ~~B3~~-B4, Bridge Alternative BR4, and the Unused Reservoir. Each of the components of the environmentally preferred alternatives is discussed in more detail below.

Restoration Alternatives

Restoration Alternative 2 is considered the environmentally preferable Restoration Alternative. This is due to the fact that it achieves similar long-term benefits with respect to ecological value and visitor/resident experience; however, construction would have a smaller footprint, would be of shorter duration than either Restoration Alternatives 3 or 4, and would require less haulage of fill off-site. This would result in reduced impacts related to:

- the physical environment in terms of air quality (fewer construction-related dust and exhaust emissions);
- biological resources in terms of disturbance to on-site vegetation and wildlife communities;
- cultural resources in terms of potential disturbance of previously undiscovered cultural resources; and
- social resources in terms of reduced effects on recreation and visitor/resident experience during construction, including effects related to construction-related vehicle trips, aesthetics, and noise.

While this alternative would not reduce flooding to the same extent as the other alternatives, the benefits identified above related to construction are determined to outweigh this shortcoming.

Public Access Alternatives

Public Access Alternative B4 is considered the environmentally preferable Public Access Alternative. This is due to the fact that this alternative does not reduce visitor experience due to reduced parking lot capacity. In addition, it avoids the adverse effects to aesthetics and biological resources of the larger lot and the remote lot.

Bridge Alternatives

Bridge Alternative BR4 is considered the environmentally preferable Bridge Alternative. Construction-related effects are anticipated to be similar among all the Bridge Alternatives. However, Bridge Alternative BR4 would allow for the greatest level of all-weather access: this bridge would provide access during a very large magnitude event (i.e., much larger than a 10-year event and probably as close as possible to a 100-year event). Its ultimate capacity would be determined during project design, when other design constraints can be fully considered simultaneously by bridge engineers ~~by being entirely located above the 100-year flood elevation.~~ Because Alternative BR4 would span the entire floodplain, it would allow for improved natural function at the site by allowing for channel migration and floodplain connectivity. Its long span would have marginally greater benefits for reducing upstream flooding during moderate events, but not during very large events.

Fill Disposal Alternatives

The Unused Reservoir Pit is considered the environmentally preferable Fill Disposal Alternative. This is because it would have a relatively short haul distance, would not involve extensive site upgrades to allow for fill disposal, and would restore an existing man-made feature to a more natural configuration. While other alternatives may have shorter haul distances (e.g., Upper Banducci Field), or provide for similar if not greater ecological benefits (Hamilton Wetlands Restoration), they do not offer the same combination of minimizing adverse impacts while maximizing beneficial impacts.

Plans and Plan Consistency

An evaluation of the alternatives' consistency with the Marin Countywide Plan and various other planning and policy documents is contained in Section 4.3.4.6, *Land Use, Planning and Agricultural Resources*, of this Final EIS/EIR and elsewhere in the document as appropriate. The determination of policy consistency discussed in this Final EIS/EIR represents the Final EIS/EIR authors' best judgment (in consultation with County staff) based on strict interpretation of policies. However, policy consistency must ultimately be determined by the Marin County Board of Supervisors and not in this Final EIS/EIR. The Board of

Supervisors may reach a different conclusion than the Draft EIS /EIR, as a result of its review of the entire record.

Note that the EIS/EIR evaluates consistency using a 2006 draft version of the Countywide Plan, since the plan had not been adopted at the time of Draft EIS/EIR circulation. While the adopted 2007 Countywide Plan has minor changes from the draft 2006 plan, these changes do not alter the conclusions of the impact analysis. The details of new or changed pertinent policies will be addressed in the staff report used for consideration of the merits of the project, and the Final EIS/EIR amendment will discuss the main relevant policies that have changed.

The Final EIS/EIR finds that all of the Restoration, Public Access, Bridge, and Fill Disposal Alternatives presented in the Final EIS/EIR are consistent with relevant plans and policies of the County. All of the Restoration Alternatives involve reduction in the size of Green Gulch Field 7. This field is currently used to pasture horses, and its capacity would be reduced by one horse. Because this is a relatively small change, and it would not obstruct attainment of Countywide Plan policies, it was not considered inconsistent with the following policies from the 1994 Countywide Plan:

- ~~EQ4.7b:~~ This policy encourages use of contracts to preserve and maintain portions of the open space corridor in their present dairying and ranching uses.
- ~~CD-8.9:~~ This policy requires designations of land for agriculture and conservation where it has resource value for both agricultural production and for wetland and wildlife habitat.
- ~~CD-15.1:~~ This policy requires that the County designate and maintain lands for agriculture at low densities in the Coastal Recreation Corridor.
- ~~A-1.1:~~ This policy requires that agricultural lands be preserved by maintaining agricultural parcels in sizes large enough to sustain agricultural production, avoiding conversion of agricultural land to non-agricultural uses, discouraging uses that are not compatible with long-term agricultural productivity, and encouraging programs that assist agricultural operators and owners in maintaining the agricultural productivity of their land and marketing their products.
- ~~A-1.5:~~ This policy requires the County to encourage the acquisition or dedication of perpetual agricultural conservation easements.
- ~~A-1.9:~~ This policy requires the County to support the continued agricultural operations and agricultural land uses within the “pastoral zones” of the Golden Gate National Recreation Area.

Several of the Public Access Alternatives (B1, B2, and C) would reduce parking capacity at Muir Beach. The 1994 Countywide Plan contains Policy TR-3.5, which requires that parking needs be addressed at trailheads. Because the Muir Beach parking lot serves as a trailhead for the Coastal Trail and other regional trails, a reduction in parking capacity is inconsistent with this policy. However,

~~the preferred alternative (Public Access Alternative B3) would maintain existing parking lot capacity and would be consistent with the Marin Countywide Plan.~~

In summary, the preferred alternative is considered consistent with the Marin Countywide Plan.

Areas of Controversy

Between December 2002 and December 2004, 17 public meetings were held, as well as a variety of site visits and meetings with representatives of various agencies. In support of the release of the NOI, public scoping meetings were held on October 22, October 29, and November 2, 2002, with a site visit for the public held on November 9, 2002, to solicit input on the project and its potential impacts. Following these meetings, a Big Lagoon Working Group consisting of interested individuals, agencies, and organizations was formed to help develop project alternatives. The working group convened regularly in meetings that were open to the public. In addition, two alternatives workshops were held for the public on September 30 and October 4, 2003. Marin County circulated a Notice of Preparation of an Environmental Impact Report on April 27, 2004, soliciting comments on the specific issues to be included in the scope of CEQA environmental review.

Key issues of public concern regarding the project that were identified during the various meetings, workshops and the scoping process have included the following:

- Restoration approach and alternative design approach and assumptions
- Project sustainability and resiliency
- Project funding sources
- Project sponsors, inter-relationships and decision-making processes
- Effects of prior flood control actions
- Mitigation for the Caltrans repair on Hwy 1
- Existing conditions with respect to CRLF
- Comprehensive Transportation Management Plan and relationship to Big Lagoon Project
- Baseline conditions for Final EIS/EIR analysis
- Visitor use carrying capacity
- Water resources: flood protection; water rights and water supply; water quality and beneficial uses, including off-site inputs; streamside buffers
- Biological resources: invasive species; wetland impacts; listed species (CRLF, salmonids); cultural resources

- Social resources: Effects on Muir Beach residents; site character; equestrian operations and availability of facilities/opportunities.
- Potential impacts from truck traffic on Hwy 1 and in Mill Valley.

Of the public issues raised to date, several may be identified as controversial by certain parties. Some areas of controversy are not within the purview of NEPA and CEQA, because those statutes focus on evaluation of significant effects to the human and physical environment.

Issues to be Addressed or Resolved

The following issues need to be addressed or resolved prior to project implementation:

- **Pacific Way Bridge design.** At this time, the Pacific Way Bridge has only been conceptually described, although hydraulic models have provided specific analyses of its function. A specific construction design, and related plans and specification will need to be prepared for the bridge.
- **Final design of restoration and public access project components.** While conceptual designs have been better developed for the Restoration and Public Access Alternatives, a specific design, and related plans and specifications, will also need to be prepared for the restoration and public access features of the project.
- **Location of pedestrian boardwalk/bridge to beach.** As part of design of the public access component of the project, the pedestrian boardwalk and bridge will need to be sited. The impact analysis in the Final EIS/EIR covers a range of possible locations and establishes performance criteria for the new bridge.
- **Timing of Pacific Way Bridge construction.** The Final EIS/EIR includes, as part of the project, the possibility of delaying the construction of the Pacific Way Bridge until after completion of the larger restoration project downstream of the bridge. If the bridge construction is delayed, construction of the new channel upstream of Pacific Way would also be delayed. This scenario would entail constructing a temporary channel alignment from the existing bridge to the new channel alignment in the pasture. The timing of bridge construction will depend upon the timing/extent of funding for the bridge, as well as the design and decision-making process and contracting by Marin County.

Changes Between the Draft and Final EIS/EIR

The following changes were made between the Draft and Final EIS/EIR:

- The maximum width of the Bridge Alternatives has been reduced from 36 to 32 feet. This change applies to all Bridge Alternatives;

- Based on conceptual design conducted as part of this Final EIS/EIR, Bridge Alternative BR4 has been slightly reduced in length from 266–300 feet to 250 feet;
- The tavern retaining wall would be removed, but the chimney would not;
- The Preferred Bridge Alternative has been changed from BR3 to BR4. This change is based on an agreement that the longer bridge will provide better vehicular access and opportunity for natural hydrologic processes to reestablish. The longer bridge will also accommodate greater flows, minimizing potential backwater flows that could increase flood elevations upstream;
- The Preferred Public Access Alternative has been changed from B3 to B4 for its superior geophysical and ecological benefits related to improved flood protection and improved sediment transport to the beach and near-shore environment; and
- The lower 400 linear feet of the relocated channel in Green Gulch Pasture will have either discontinuous or no berms on the banks to allow floodplain connection during annual winter events.

These are considered minor technical changes that, pursuant to CEQA guidelines 15088.5, do not require recirculation of the Draft EIS/EIR prior to its certification.

Public Comments and Responses

The Final EIS/EIR includes all of the comments received on the Draft EIS/EIR, responses to those comments, and changes to the impact analysis as needed to respond to comments. NPS received 25 comment letters, including e-mails and response forms, on the Draft EIS/EIR. NPS also received comments from attendees at the public hearing held for the Draft EIS/EIR. A total of 155 individual comments were received on the Draft EIS/EIR.

Major issues raised in letters, e-mails, and public hearing comments were related to the preferred Bridge Alternative, the preferred Public Access Alternative, salmonid rearing habitat, sea level rise, and public transportation. Three Master Responses were developed to address comments relating to the preferred Bridge Alternative, salmonid rearing habitat, and sea level rise. Each comment is responded to individually as well.

Major Conclusions

1. With respect to the preferred alternative, the Final EIS/EIR evaluated a total of ~~246~~235 environmental impacts, of which ~~124~~125 are construction-related impacts. Of the total number of impacts, ~~36~~37 were identified as significant or potentially significant impacts, including ~~34~~35 construction-related

impacts. Feasible mitigation is available to reduce all but ~~44~~ nine of the project's significant effects to a less-than-significant level, ~~including 10~~ all of which are construction-related impacts.

2. Project construction would have several construction-related significant and unavoidable impacts, including short-term adverse effects on vegetation communities and functions and values of water bodies, reduced visual character, reductions in parking capacity at Muir Beach, reduced resident and visitor access, visitor amenities, and recreational opportunities, and noise impacts, particularly due to potential pile driving for the new bridge on Pacific Way.
3. The project site would be returned to a more natural ecological and hydrologic function as a result of realignment of the creek channel and relocation of the parking lot at Muir Beach. The restoration design is considered to be more sustainable than the site's existing degraded condition.
4. The habitat at the site currently used by CRLF would not be removed by the proposed project; additional habitat would also be created. Additional CRLF habitat would also be provided upstream at the Banducci site.
5. Conditions for special-status salmonids (coho salmon and steelhead trout) would be improved at the site through provision of summer and winter rearing habitat. Fish passage conditions would be maintained or improved throughout the site.
6. The project would not have adverse effects on cultural resources at the site. No historic structures are located on the site (although Golden Gate Dairy is located adjacent to the site), and measures would be taken to avoid adverse effects on archaeological sites.
7. The project would substantially improve all-weather access on Pacific Way through relocation of the Redwood Creek channel, and construction of a higher bridge and raised roadway approach. Hydraulic modeling shows that under the preferred alternative, the bridge and associated roadway would remain passable during a very large magnitude event of greater than the 10-year and as close as possible to a 100-year storm event at least the 10-year and smaller design storm events.
8. The project would reduce flooding in the project area overall through improved flood conveyance. Under the preferred alternative, all flows during the 1.5–2 year design storm event would be contained in the channel upstream of Pacific Way, providing relief from the frequent flooding that occurs under the existing conditions. Hydraulic modeling indicates that during the 5-year design storm event, flooding would be reduced by as much as 2 feet. During the 50-year and 100-year design storm events, flood elevations would be similar to existing conditions. By year 50, sea level rise and sediment deposition in the project area would make flooding conditions similar to existing conditions, but the new bridge would substantially improve vehicular access compared to existing conditions.
9. Interim flood control actions would have minor, short-term adverse effects related to work in the stream channel, but would provide minor flood

reduction benefits in the interim period while the restoration and bridge actions are completed.

10. The project would not diminish views of the project site or the landscape beyond the project site from off-site areas, such as the Muir Beach overlook or residences within the Muir Beach community. The new parking lot would be of improved aesthetic quality by adding vegetated swales in between parking rows, and would not protrude into the floodplain to the same extent as current conditions. The new bridge would be designed to be consistent with site character and be as unobtrusive as possible. The restoration would not substantially change scenic values of the site.
11. Parking capacity at Muir Beach would be maintained at current levels.
12. The new bridge would improve traffic safety and emergency access by providing for 2-way traffic. At present, the existing bridge is too narrow for 2-way traffic.
13. Pedestrian safety, ADA accessibility, and trail connections to other locations in the watershed would be improved by provision of a new trail from Hwy 1 to the Muir Beach parking lot. At present, most pedestrians compete with vehicles on Pacific Way. The new trail would be adjacent to Pacific Way.

Public Review Process

A Notice of Availability of the Final EIS/EIR has been published in the Federal Register, sent to the Governor's Office of Planning and Research, CEQA Clearinghouse, and posted at the Office of the County Clerk. Under CEQA guidelines the document is being made available for a 45-day public review and comment period. This period will begin on the date of the Environmental Protection Agency's notice of filing published in the Federal Register. At the completion of this process, a Record of Decision (ROD) will be issued by NPS that will specify all elements of the selected plan which will be implemented. Following confirmation of available funding, the Final EIS/EIR will be certified by Marin County and the County will make a determination regarding improvements to Pacific Way and the Pacific Way Bridge and issue a Notice of Determination (NOD) pursuant to CEQA.

Impact Summary Table ES-1a

Table ES-1a. Restoration Alternatives—Impact Summary

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4		
4.3.1.1 Watershed Processes					
WP-R1: Changes in Groundwater Levels	Negligible	Negligible	Negligible	Negligible	
WP-R2: Potential for Reduced Flows and Increased Frequency of Dry Periods in Redwood Creek	Minor Adverse	Minor Beneficial	Minor Adverse	Minor Adverse	
WP-R3: Temporary Dewatering Effects	Negligible	Negligible	Negligible	Negligible	
WP-R4: Reductions in Flood Elevations in the Near-Term	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	
WP-R5: Reductions in Flood Elevations Over the Long-Term	Moderate Adverse Annual flooding, risk of channel avulsion, and resulting risk to life and property would continue	Negligible	Minor Beneficial	Minor Beneficial	No Action Alternative: no mitigation available
WP-R6: Effects on Site Soils	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
WP-R7: Geohazards	Negligible	Negligible	Negligible	Negligible	
WP-R8: Ability to Accommodate Sediment Loads and Maintain Equilibrium Channel Form During Average Sediment Delivery Conditions	Moderate Adverse Existing conditions encourage channel aggradation	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	No Action Alternative: no mitigation available

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
WP-R9: Ability to Accommodate Sediment Loads and Maintain Equilibrium Channel Form During Episodic Events	Moderate Adverse Channel aggradation would increase the risk of channel avulsion and overbank flows	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	No Action Alternative: no mitigation available
WP-R10: Persistence of Backwater Features and Potential for Channel Avulsion	Moderate Adverse Aggradation and the risk of channel avulsion would increase over time	Moderate Beneficial	Moderate Beneficial	Major Beneficial	No Action Alternative: no mitigation available
WP-R11: Potential for Channel Incision	Negligible	Negligible	Negligible	Negligible	
WP-R12: Effects of Sediment Delivery on Nearshore Coastal Habitat, Beach Replenishment, and Dune Formation	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	
WP-R13: Effects on Tidal Lagoon Opening and Closure, and Overall Tidal Lagoon Function	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
WP-R14: Effects of Sea Level Rise	See other impact discussions				
4.3.1.2 Water Quality Impacts					
WQ-R1: Release of Construction-Related Sediment from Access Roads, Staging Areas, Ground-Disturbing Activities and Stockpiles	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-1: Obtain Coverage under General Construction Permit and Implement BMPs
WQ-R2: Release of Construction-Related Hazardous Materials	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-2: Implement Spill Prevention and Control Plan
WQ-R3: Increased Turbidity in Redwood Creek Following Construction	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-3: Implement Turbidity Monitoring and Response Plan
WQ-R4: Increased Nutrients in Redwood Creek Following Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-4: Implement Water Quality Monitoring and Response Plan

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4		
WQ-R5: Increased Water Temperatures in Redwood Creek Following Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-4
WQ-R6: Effects on Nutrients, Dissolved-Oxygen Levels, and Nuisance Plant Growth	Negligible	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	
WQ-R7: Effects on Water Contact Recreation	Negligible	Negligible	Minor Beneficial	Minor Beneficial	
WQ-R8: Salinity Changes in Redwood Creek	Negligible	Negligible	Negligible	Negligible	
WQ-R9: Salinity Changes to groundwater	Negligible	Negligible	Negligible	Negligible	
WQ-R10: Potential for Nuisance Conditions Associated with Mosquito Breeding	Negligible	Moderate Beneficial	Minor Beneficial	Minor Beneficial	
4.3.1.3. Water Supply Impacts					
WS-R1: Potential Reductions in Groundwater Levels at the MBCSD Well near Redwood Creek	Negligible	Negligible	Negligible	Negligible	
WS-R2: Potential Reductions in Groundwater Levels at the Green Gulch Farm Well near Green Gulch Creek	Negligible	Negligible	Negligible	Negligible	
WS-R3: Potential Effects on SFZC Appropriative Water Right	Negligible	Negligible	Negligible	Negligible	
4.3.1.4 Air Quality Impacts					
AIR-R1: Generation of Construction-Related Pollutant Emissions	Negligible	Minor adverse	Minor adverse	Moderate adverse Construction activities would produce NOx emissions that would exceed thresholds	AIR-MM-1: Implement All Applicable BAAQMD Dust Control Measures. AIR-MM-2: Reduce NOx Emissions from Off-Road Diesel-Powered Equipment.

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
4.3.2.1 Vegetation Communities and Wetlands Impacts					
VEG-R1: Construction-Related Impacts on Wetland Functioning	See Impacts WQ-R1 through WQ-R6.	See Impacts WQ-R1 through WQ-R6.	See Impacts WQ-R1 through WQ-R6.	See Impacts WQ-R1 through WQ-R6.	
VEG-R2: Construction-Related Impacts on Vegetation Communities	Minor Adverse	Moderate Adverse Disturbance to vegetation communities would be unavoidable during construction.	Major Adverse Disturbance to vegetation communities would occur over a longer duration and aeral extent.	Major Adverse Disturbance to vegetation communities would occur over a longer duration and aeral extent.	BMPs and avoidance/minimization will be implemented as part of action alternatives; residual impacts unavoidable.
VEG-R3: Increase in and Enhancement of Open Water Habitat	Negligible	Moderate Beneficial	Major Beneficial (Year 5); Moderate beneficial (Year 50)	Major Beneficial	
VEG-R4: Change in Extent and Quality of Emergent Wetland Habitat	Minor Adverse (Year 5); Minor Beneficial (Year 50)	Minor Adverse	Moderate Adverse (Year 5) /Minor Adverse (Year 50) Initial reduction in emergent wetland habitat is part of alternative design.	Moderate Adverse Reduced emergent wetland habitat is part of alternative design.	
VEG-R5: Change in Extent and Quality of Riparian Wetland Habitat	Minor Beneficial	Minor Adverse (Year 5); Major Beneficial (Year 50)	Minor Adverse (Year 5); Moderate Beneficial (Year 50)	Moderate Adverse (Year 5) ; Minor Beneficial (Year 50) Reduction in riparian habitat is part of alternative design.	
VEG-R6: Increase in Dune Habitat	Negligible	Major Beneficial	Major Beneficial	Major Beneficial	
VEG-R7: Tree Removal	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
VEG-R8: Decreases in Noxious Weed Populations Due to Removal Activities	Negligible	Major Beneficial	Major Beneficial	Major Beneficial	
VEG-R9: Potential Increase in Noxious Weed Populations Due to Site Disturbance and Changed Groundwater Levels	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	
VEG-R10: Increased Lateral and Longitudinal Connectivity Among Channel, Floodplain, Riparian, and Upland Habitats	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
VEG-R11: Changes in Areal Extent and Functions and Values of USACE-Jurisdictional Waters	Negligible	Minor Adverse (Year 0), Negligible (Year 5), Major Beneficial (Year 50)	Minor Adverse (Year 0), Negligible (Year 5), Major Beneficial (Year 50)	Minor Adverse (Year 0), Negligible (Year 5), Major Beneficial (Year 50)	
VEG-R12: Change in Habitat for Special-Status Plant Species	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	
4.3.2.2 Wildlife Impacts					
WLD-R1: Effects of the Short-Term Loss of Mature Riparian Habitat on Riparian-Associated and Cavity-Nesting Avian Species	Negligible	Negligible	Negligible	Negligible	WLD-MM-1: Preconstruction Surveys and Possible Installation of Nest Boxes
WLD-R2: Long-Term Effects of Riparian Enhancement on Riparian-Associated and Cavity-Nesting Species	Negligible	Moderate Beneficial	Minor Beneficial	Minor Beneficial	
WLD-R3: Construction-Related Disturbance to Nesting Birds	Negligible	Negligible	Negligible	Negligible	WLD-MM-2: Conduct Preconstruction Bird Surveys
WLD-R4: Operations And Maintenance Disturbance to Nesting Birds	Negligible	Negligible	Negligible	Negligible	
WLD-R5: Removal and/or Degradation of Emergent Wetland Habitat Used as Breeding, Foraging, and Roosting Habitat by Marsh Birds	Negligible	Moderate Adverse	Moderate Adverse (Year 5); Minor Adverse (Year 50)	Moderate Adverse	
WLD-R6: Effects on Waterfowl from Changes in Open Water Habitat	Negligible	Minor Beneficial	Minor Beneficial	Moderate Beneficial	

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4		
WLD-R7: Construction-Related Mortality of California Red-Legged Frogs (CRLF)	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	WLD-MM-3: Limit Construction Access Routes and Equipment Staging Areas and Conduct Preconstruction Surveys for CRLF in All Suitable Habitat That Will Be Disturbed by Construction
WLD-R8: Changes in Extent of CRLF Habitat	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial	WLD-MM-4: Augment CRLF Breeding Habitat WLD-MM-5: Implement Monitoring and Contingency Measures for CRLF WLD-MM-6: Reintroduce CRLF to Supplement Existing Population On Site
WLD-R9: Operations and Maintenance Effects on CRLF	Negligible	Negligible	Negligible	Negligible	
WLD-R10: Temporary Loss of CRLF Breeding Habitat During Construction	Negligible	Negligible	Negligible	Negligible	
WLD-R11: CRLF Habitat Fragmentation	Negligible	Moderate Beneficial	Minor Beneficial	Minor Beneficial	
WLD-R12: Increased Salinity Levels and Effects on CRLF	Negligible	Negligible	Minor Adverse	Minor Adverse	WLD-MM-7: Implement Measures to Protect CRLF from Temporary Saltwater Intrusion.
WLD-R13: Increased Predation on CRLF from Fish	Negligible	Minor Adverse	Minor Adverse	Moderate Adverse	All Alternatives: WLD-MM-5 Alternatives 3 and 4: WLD-MM-4: Augment CRLF Breeding Habitat
WLD-R14: Overall Effects on CRLF	Minor Adverse	Negligible	Minor Adverse	Minor Adverse	See above

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
WLD-R15: Effects on Special-Status Bird Species	Negligible	See Impacts WLD-R1 through WLD-R6	See Impacts WLD-R1 through WLD-R6	See Impacts WLD-R1 through WLD-R6	WLD-MM-1 WLD-MM-2
WLD-R16: Effects on Known Northern Spotted Owl Breeding Territories	Negligible	Negligible	Negligible	Negligible	
WLD-R17: Effects of Restoration on Transitional Monarch Butterfly Populations	Negligible	Negligible	Negligible	Negligible	
WLD-R18: Effects on Other Common Species of Wildlife	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
WLD-R19: Effects on Bats	Negligible	Negligible	Negligible	Negligible	WLD-MM-8: Implement Measures to Protect Bat Populations
4.3.2.3 Fisheries Impacts					
FISH-R1: Increased Turbidity in Redwood Creek During Construction	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Water Quality Mitigation Measures WQ-MM-1, WQ-MM-2, WQ-MM-3 and WQ-MM-4
FISH-R2: Accidental Release of Construction-Related Hazardous Materials	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Water Quality Mitigation Measure WQ-MM-2
FISH-R3: Increased Water Temperatures in Redwood Creek Following Construction	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	FISH-MM-1: Riparian Shade Mitigation and Monitoring
FISH-R4: Increase in Nutrients and Decrease in Dissolved Oxygen Levels Immediately Following Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
FISH-R5: Increased Turbidity and Sedimentation in Redwood Creek Following Construction	Minor Adverse	Negligible	Negligible	Negligible	

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Bold denotes a significant adverse impact				
	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	
FISH-R6: Fish Passage Barriers Due to Channel Design and Aggradation During the Project’s Lifetime	Moderate Adverse The existing barriers to fish passage would persist and potentially worsen	Minor Beneficial	Minor Beneficial	Minor Beneficial	No Action alternative: no mitigation available
FISH-R7: Fish Entrapment Due to Out-of-Bank Flows and/or Channel Avulsion During the Project’s Lifetime	Major Adverse The existing potential for fish entrapment would persist and potentially worsen	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	No Action alternative: no mitigation available
FISH-R8: Effects on Summer-Fall Juvenile Salmonid-Rearing Habitat Immediately Following Construction	Minor Adverse	Minor Adverse	Minor Beneficial	Minor Beneficial	
FISH-R9: Effects on Summer-Fall Juvenile Salmonid-Rearing Habitat During Early Phases of Ecosystem Establishment	Minor Adverse	Minor Beneficial	Minor Beneficial	Moderate Beneficial	
FISH-R10: Effects on Juvenile Summer-Fall Salmonid–Rearing Habitat During Later Phases of Ecosystem Establishment	Minor Adverse	Negligible	Negligible	Moderate Beneficial	
FISH-R11: Effects on Juvenile Winter-Spring Salmonid– Rearing Habitat Immediately Following Construction	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial	FISH-MM-2: Optimizing of Winter Rearing Habitat
FISH-R12: Effects on Juvenile Winter-Spring Salmonid– Rearing Habitat During Early Phases of Ecosystem Establishment	Minor Adverse	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	FISH-MM-2
FISH-R13: Effects on Juvenile Winter Salmonid– Rearing Habitat During Later Phases of Ecosystem Establishment	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial	FISH-MM-2

Table ES-1a, *Restoration Alternatives*, Continued

Impact	Impact Level (after Mitigation)				Mitigation Measure
	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	
4.3.3 Cultural Resources Impacts					
CR-R1: Disturbance to Archaeological Site CA-MRN-333	Negligible	Negligible	Negligible	Negligible	CR-MM-1: Cultural Resources Education, Archaeological Monitoring, and Discovery Measures.
CR-R2: Disturbance to the “Fan Site”	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	CR-MM-1 CR-MM-2: Educate the Workers Conducting the Harding Grass Removal and Have an Archaeological Monitor in the Vicinity of the Fan Site.
CR-R3: Disturbance to CA-MRN-674	Negligible	Negligible	Negligible	Negligible	CR-MM-1
CR-R4: Disturbance to the Golden Gate Dairy	Negligible	Negligible	Negligible	Negligible	
CR-R5: Disturbance to Previously Unidentified Cultural Resources During Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	CR-MM-1 CR-MM-2
CR-R6: Disturbance to Previously Identified or Unidentified Cultural Resources During Site Evolution	Negligible	Negligible	Negligible	Negligible	

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
4.3.4.1 Recreational and Visitor Experience Impacts					
REC-R1: Reduced Recreational Opportunities and Visual and Noise Disturbance During Construction	Negligible	Moderate Adverse Existing recreational opportunities would be reduced for three consecutive years.	Moderate Adverse Existing recreational opportunities would be reduced for four consecutive years.	Moderate Adverse Existing recreational opportunities would be reduced for four consecutive years.	NPS’s public information outreach commitments would reduce this impact to the extent feasible. No additional mitigation has been identified as feasible and effective.
REC-R2: Visual and Noise Disturbance as a Result of Interim Flood Reduction Measures	Negligible	Negligible	Negligible	Negligible	
REC-R3: Altered Visitor Perception and Use of Site During Early Years of Site Recovery	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	
REC-R4: Effects of Restoration on Visitor Experience During the Life of the Project—Birding, Nature-Watching, and Other General Site Uses	Negligible	Major Beneficial	Major Beneficial	Major Beneficial	
REC-R5: Effects of Restoration on Visitor Experience During the Life of the Project—Equestrian Uses	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
REC-R6: Effects on Visitor Profile and Number of Visitors to the Site	Negligible	Negligible	Negligible	Negligible	REC-MM-1: Construction Exclusion Areas REC-MM-2: Horse and Equestrian Safety Measures
REC-R7: Short-Term Effects on Visitor Safety During Restoration Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
REC-R8: Effects of Restoration Alternatives on Resident/Visitor Interaction	Negligible	Negligible	Negligible	Negligible	

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
4.3.4.2 Traffic					
TC-R1: Effects of Construction Mobilization and Materials Deliveries	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	TC-MM-1: Construction Traffic Management Plan
TC-R2: Effects of Construction Worker Trips to and from Site	Negligible	Negligible	Negligible	Negligible	
TC-R3: Effects of Construction Worker Parking	Negligible	Negligible	Negligible	Negligible	
TC-R4: Effects of Truck Trips Associated with Fill Disposal	Negligible	Minor Adverse	Moderate Adverse Small lagoon excavation would require a significant number of days for hauling.	Moderate Adverse Large lagoon excavation would require a significant number of days for hauling.	TC-MM-1
4.3.4.3 Aesthetics Impacts					
AES-R1: Alteration of Scenic Views and Existing Visual Character during Construction Activities	Minor Adverse	Moderate Adverse Construction activities would alter scenic views	Moderate Adverse Construction activities would alter scenic views	Moderate Adverse Construction activities would alter scenic views	Impacts unavoidable as part of alternative implementation
AES-R2: Decreased Visual Quality During Site Recovery and Plant Recolonization	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
AES-R3: Creation of New Visual Features on the Site	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
AES-R4: Changes in the Broader Viewshed from Hwy 1 and Other Distant Vantage Points	Negligible	Minor Beneficial	Moderate Beneficial	Moderate Beneficial	
AES-R5: Replacement of Nonnative Vegetation with Native Plant Communities	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
4.3.4.4 Energy, Public Services, Utilities, and Service Systems Impacts					
PS-R1: Increased Demand for Existing Energy Sources or Conflict with Adopted Policies or Standards for Energy Use	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
PS-R2: Use of Non-Renewable Resources in a Wasteful or Inefficient Manner	Negligible	Negligible	Negligible	Negligible	PS-MM-1: Employ Sustainable Building Practices
PS-R3: Increased Demand for or Conflicts with Fire or Police Protection, Public Facilities Maintenance, or Other Governmental Services	Negligible	Negligible	Negligible	Negligible	
PS-R4: Increased Demand for or Conflict with Utility Lines or Service Systems	Negligible	Negligible	Negligible	Negligible	PS-MM-2: Maintain Utility Services
PS-R5: Increased Solid Waste Demands	Negligible	Negligible	Negligible	Negligible	PS-MM-1
4.3.4.5 Human Health and Safety Impacts					
HS-R1: Risk of Accidental Explosion or Release of Hazardous Substances During Construction	Minor Adverse	Negligible	Negligible	Negligible	WQ-MM-2: Implement Spill Prevention and Control Plan
HS-R2: Risk of Exposure to Hazardous Substances During Project Operations	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
HS-R3: Creation of Mosquito Breeding Habitat	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	HS-MM-1: Stop Work and Implement Hazardous Materials Investigation/Remediation
HS-R4: Exposure of People to Undiscovered or Undocumented Sources of Contamination	Negligible	Negligible	Negligible	Negligible	
HS-R5: Increased Fire Hazard in Areas with Flammable Brush, Grass, or Trees	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	

Table ES-1a, *Restoration Alternatives*, Continued

Impact Level (after Mitigation)					
Bold denotes a significant adverse impact					
Impact	Rest Alt 1	Rest Alt 2	Rest Alt 3	Rest Alt 4	Mitigation Measure
4.3.4.6 Land Use, Planning, and Agricultural Resources Impacts					
LU-R1: Conversion of Agricultural Land to Non-Agricultural Use.	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	
LU-R2: Consistency with Land Use Policies Related to Agriculture	Negligible	Negligible	Negligible	Negligible	
4.3.4.7 Noise Impacts					
NZ-R1: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Construction Activities	Negligible	Moderate Adverse Construction noise would adversely impact residents, visitors, and wildlife	Moderate Adverse Construction noise would adversely impact residents, visitors, and wildlife	Moderate Adverse Construction noise would adversely impact residents, visitors, and wildlife	NZ-MM-1: Employ Noise-Reducing Construction Practices NZ-MM-2: Prepare a Noise Control Plan NZ-MM-3: Disseminate Essential Information to Residences and Implement a Complaint/Response Tracking Program
NZ-R2: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise During the Lifetime of the Restoration	Minor Adverse	Negligible	Negligible	Negligible	

Impact Summary Table ES-1b

Table ES-1b. Public Access Alternatives—Impact Summary

[illegible]

[illegible]

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
VEG-P7: Increase in Noxious Weed Populations from Visitors	Negligible	Minor Beneficial	Minor Beneficial	Negligible	Negligible	Minor Adverse	Minor Beneficial	
VEG-P8: Changes in Areal Extent and Functions and Values of USACE-Jurisdictional Waters	Negligible	Minor Beneficial	Minor Beneficial	Minor Adverse	Minor Adverse	Moderate Adverse	Minor Adverse	
VEG-P9: Change in Habitat for Special-Status Plant Species	Negligible	See Impact VEG-P3.	See Impact VEG-P3.	See Impact VEG-P3.	See Impact VEG-P3.	See Impact VEG-P3.	See Impact VEG-P3.	
4.3.2.2 Wildlife Impacts								
WLD-P1: Construction-Related Disturbance to Nesting Birds, Including Special Status Species	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	WLD-MM-2: Conduct Preconstruction Bird Surveys when necessary
WLD-P2: Changes in Mature Riparian Habitat for Riparian-Associated And Cavity-Nesting Birds, Including Special Status Species	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	WLD-MM-1: Preconstruction Surveys and Possible Installation of Nest Boxes
WLD-P3: Changes in Monarch Butterfly Overwintering Habitat	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	
WLD-P4: Effects on Songbird Nesting Success Due to an Increase in Corvid Populations Facilitated by a Change in Public Access	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	WLD-MM-9: Implement Measures to Prevent Increases in Corvid Populations
WLD-P5: Effects on Bats	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	WLD-MM-8: Implement Measures to Protect Bat Populations
4.3.2.3 Fisheries Impacts								
None								

[illegible]

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Bold denotes a significant adverse impact							
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
4.3.4.1 Recreational and Visitor Experience Impacts								
REC-P1: Reduced Resident and Visitor Access, Visitor Amenities, and Recreational Opportunities During Construction	Negligible	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	Moderate Adverse Construction activities would discourage visitors from using Muir Beach	No feasible mitigation identified.
REC-P2: Effects of Parking Lot Configuration and Siting on Recreational Opportunities and Visitor Experience	Negligible	Major Adverse Parking availability would be substantially reduced during all seasons, except off-season weekdays	Minor Adverse	Negligible	Minor Beneficial	Minor Beneficial	Moderate Adverse Parking availability would be reduced during the peak season and on shoulder and off-season weekends	No feasible mitigation identified.
REC-P3: Effects of Visitor Amenities on Recreational Opportunities and Visitor Experience	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	
REC-P4: Short-Term Effects on Visitor Safety During Public Access Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	REC-MM-1: Construction Exclusion Areas REC-MM-2: Horse and Equestrian Safety Measures

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
REC-P5: Effects of Parking Lot Configuration and Siting on Community Relationships	Negligible	Major Adverse Visitors would seek alternative parking opportunities in the Muir Beach community, Pelican Inn, or along Pacific Way	Moderate Adverse Visitors would seek alternative parking opportunities in the Muir Beach community, Pelican Inn, or along Pacific Way	Negligible	Minor Beneficial	Moderate Beneficial	Minor Beneficial	No feasible mitigation has been identified.
4.3.4.2 Traffic								
TC-P1: Changes in Parking Availability During Construction	Negligible	Moderate Adverse Parking would be reduced or unavailable at times during construction.	Moderate Adverse Parking would be reduced or unavailable at times during construction.	Moderate Adverse Parking would be reduced or unavailable at times during construction.	Moderate Adverse Parking would be reduced or unavailable at times during construction.	Moderate Adverse Parking would be reduced or unavailable at times during construction.	Moderate Adverse Parking would be reduced or unavailable at times during construction.	TC-MM-1: Construction Traffic Management Plan
TC-P2: Effects of Construction Mobilization and Materials Deliveries	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	TC-MM-1
TC-P3: Effects of Construction Worker Trips to and from Site	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	
TC-P4: Effects of Construction Worker Parking	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	
TC-P5: Effects of Truck Trips Associated with Fill Disposal	Negligible	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	TC-MM-1

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
TC-P6: Long-Term Changes in Parking Availability	Negligible	Major Adverse Parking capacity would be inadequate for demands during peak and shoulder seasons.	Minor Adverse	Negligible	Negligible	Minor Beneficial	Moderate Adverse Parking capacity would be inadequate for demands during the peak season and on shoulder and off-peak season weekends.	No feasible mitigation has been identified
TC-P7: Effects of Parking Lot Size on Vehicle Queuing	Negligible	Major Adverse Vehicular queuing would occur in all seasons except off-peak season weekdays.	Minor Adverse	Negligible	Minor Beneficial	Negligible	Moderate Adverse Vehicular queuing would occur during the peak season and on shoulder and off-season weekends.	No feasible mitigation has been identified
TC-P8: Effects of Parking Lot Size on LOS and Intersection Delay	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Negligible	Minor Adverse	

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
TC-P9: Long-Term Effects on Pedestrian, Equestrian, and Bicyclist Safety	Negligible	Minor Adverse	Minor Adverse	Minor Beneficial	Minor Beneficial	Moderate Beneficial	Moderate Adverse Safety hazards on Hwy 1 would arise when vehicles queue in the area.	No feasible mitigation has been identified
TC-P10: Long-Term Changes in Elderly and Disabled Accessibility	Negligible	Negligible	Negligible	Negligible	Minor Adverse	Negligible	Negligible	
TC-P11: Long-Term Effects on Emergency Access to Site	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
TC-P12: Consistency with NPS Policies Related to Parking	Negligible	Major Adverse	Moderate Adverse Parking capacity would be reduced during some seasons	Negligible	Negligible	Negligible	Moderate Adverse Parking capacity would be reduced during some seasons	
4.3.4.3 Aesthetics Impacts								
AES-P1: Alteration of Scenic Views and Existing Visual Character During Construction Activities	Negligible	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Impacts are unavoidable as part of project construction

Table ES-1b, *Public Access Alternatives*, Continued

Impact	Impact Level (after Mitigation)							Mitigation Measure
	Pub Access Alt A	Pub Access Alt B1	Pub Access Alt B2	Pub Access Alt B3	Pub Access Alt B4	Pub Access Alt B5	Pub Access Alt C	
AES-P2: Creation of New Visual Features at Parking Lot Site and Change in Views from Hwy 1 and Other Distant Scenic Vantage Points	Negligible	Moderate Beneficial	Minor Beneficial	Negligible	Minor Beneficial	Minor Adverse	Minor Adverse	
AES-P3: Maintenance of Rustic Character of the Site	Negligible	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	Minor Beneficial	
AES-P4: Change in Light and Glare	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor Adverse	
4.3.4.4 Energy, Public Services, Utilities, and Service Systems Impacts								
PS-P1: Increased Demand for Existing Energy Sources or Conflict with Adopted Policies or Standards for Energy Use	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
PS-P2: Use of Non-Renewable Resources in a Wasteful or Inefficient Manner	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1: Employ Sustainable Construction Practices
PS-P3: Conflict with Emergency Response	Negligible	Moderate Adverse	Minor Adverse	Negligible	Negligible	Minor Beneficial	Minor Adverse	Emergency response would be similar to existing conditions. No mitigation is necessary.
PS-P4: Increased Solid Waste Demands	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1
4.3.4.5 Human Health and Safety Impacts								
HS-P1: Risk of Accidental Explosion or Release of Hazardous Substances During Construction	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	WQ-MM-2: Implement Spill Prevention and Control Plan
HS-P2: Exposure of People to Undiscovered or Undocumented Sources of Contamination	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	HS-MM-1: Stop Work and Implement Hazardous Materials Investigation/Remediation

[illegible]

Impact Summary Table ES-1c

Table ES-1c. *Bridge Alternatives—Impact Summary*

Impact	Impact Level (after Mitigation)					Mitigation Measure
	Bold denotes a significant adverse impact					
	Bridge Alt BR0	Bridge Alt BR1	Bridge Alt BR2	Bridge Alt BR3	Bridge Alt BR4	
4.3.1.1 Watershed Processes—Restoration Alternative Impacts						
WP-B1: Effects of Bridge Configuration on Flooding	Negligible	Moderate Adverse Alternative would impede flood flows	Moderate Beneficial	Minor Beneficial	Moderate Beneficial	BR1: No mitigation available
WP-B2: Geohazards	Negligible	Negligible	Negligible	Negligible	Negligible	
WP-B3: Alteration of Stream Channel Function and Geomorphic Evolution as a Result of Bridge Configuration	Negligible	Minor Beneficial	Negligible	Moderate Beneficial	Major Beneficial	
4.3.1.2 Water Quality Impacts						
WQ-B1: Release of Construction-Related Sediment from Construction of Bridge Alternatives	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-1: Obtain Coverage Under General Construction Permit and Implement BMPs
WQ-B2: Release of Construction-Related Hazardous Materials	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-2: Implement Spill Prevention and Control Plan
4.3.1.3. Water Supply Impacts						
None						
4.3.1.4 Air Quality Impacts						
AIR-B1: Generation of Construction-Related Pollutant Emissions	Negligible	Negligible	Negligible	Negligible	Negligible	AIR-MM-1: Implement All Applicable BAAQMD Dust Control Measures. AIR-MM-2: Reduce NO _x Emissions from Off-Road Diesel-Powered Equipment.

Table ES-1c, *Bridge Alternatives*, Continued

4.3.2.1 Vegetation Communities and Wetlands Impacts						
VEG-B1: Construction-Related Impacts on Wetland Functioning	See Impacts WQ-F1 and WQ-F2.	See Impacts WQ-F1 and WQ-F2.	See Impacts WQ-F1 and WQ-F2.	See Impacts WQ-F1 and WQ-F2.	See Impacts WQ-F1 and WQ-F2.	
VEG-B2: Construction-Related Impacts on Vegetation Communities	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
VEG-B3: Change in Extent and Quality of Riparian Habitat	Negligible	Negligible	Minor Beneficial	Moderate Beneficial	Major Beneficial	
VEG-B4: Tree Removal	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
VEG-B5: Changes in Areal Extent and Functions and Values of USACE-Jurisdictional Waters	Negligible	Negligible	Minor Beneficial	Moderate Beneficial	Major Beneficial	
VEG-B6: Change in Habitat for Special-Status Plant Species	Negligible	See Impact VEG-B3.	See Impact VEG-B3.	See Impact VEG-B3.	See Impact VEG-B3.	
4.3.2.2 Wildlife Impacts						
WLD-B1: Construction-Related Disturbance to Nesting Birds	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WLD-MM-2: Conduct Preconstruction Bird Surveys When Necessary
WLD-B2: Changes in Monarch Butterfly Habitat	Negligible	Negligible	Negligible	Negligible	Negligible	
WLD-B3: Effects on Bats	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WLD-MM-8: Implement Measures to Protect Bat Populations
4.3.2.3 Fisheries Impacts						
FISH-B1: Fish Passage Impediments Due to Flow Alterations Resulting from Pacific Way Bridge During the Project's Lifetime	Negligible	Minor Adverse	Minor Adverse	Minor Beneficial	Minor Beneficial	
<u>FISH-B2: Direct or Indirect Mortality and Increased Stress to Fish Due to Pile Driving and Increased Sound Pressure Levels</u>	<u>Negligible</u>	<u>Minor Adverse</u>	<u>Minor Adverse</u>	<u>Minor Adverse</u>	<u>Minor Adverse</u>	<u>FISH-MM-3: Avoidance and Monitoring of High Sound Pressure Levels during Pile Driving Activities</u>

4.3.3 Cultural Resources Impacts						
CR-B1: Disturbance to CA-MRN-674	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	CR-MM-3: Limit Compaction Methods Above the Recorded Deposit; Consult with NPS, the County, and FIGR; and Clarify Site Disposition During the Design Process.
CR-B2: Disturbance to Previously Unidentified Cultural Resources During Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	CR-MM-1: Cultural Resources Education, Archaeological Monitoring, and Discovery Measures.
CR-B3: Disturbance to Previously Identified or Unidentified Cultural Resources During Site Evolution	Negligible	Negligible	Negligible	Negligible	Negligible	
4.3.4.1 Recreational and Visitor Experience Impacts						
REC-B1: Effects on Visitor Experience from the Bridge Alternatives	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	
4.3.4.2 Traffic						
TC-B1: Effects of Construction Mobilization and Materials Deliveries	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	TC-MM-1: Construction Traffic Management Plan
TC-B2: Effects of Construction Worker Trips to and from Site	Negligible	Negligible	Negligible	Negligible	Negligible	
TC-B3: Effects of Construction Worker Parking	Negligible	Negligible	Negligible	Negligible	Negligible	
TC-B4: Effects of Truck Trips Associated with Fill Hauling	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	TC-MM-1
TC-B5: Effects on Access and Safety on Pacific Way During Bridge Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	TC-MM-1
TC-B6: Improvements to Circulation from New Bridge	Negligible	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	

Table ES-1c, *Bridge Alternatives*, Continued

4.3.4.3 Aesthetics Impacts						
AES-B1: Alteration of Scenic Views and Existing Visual Character During Construction Activities	Negligible	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Moderate Adverse Visitors and residents would have temporarily altered views during construction	Impacts unavoidable as part of alternative implementation
AES-B2: Creation of New Visual Features on the Site	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Moderate Adverse	
AES-B3 Change in Light and Glare	Negligible	Negligible	Negligible	Negligible	Negligible	
4.3.4.4 Energy, Public Services, Utilities, and Service Systems Impacts						
PS-B1: Increased Demand for Existing Energy Sources or Conflict with Adopted Policies or Standards for Energy Use	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
PS-B2: Use of Non-Renewable Resources in a Wasteful or Inefficient Manner	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1: Employ Sustainable Construction Practices
PS-B3: Conflict with Emergency Response During Project Construction	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
PS-B4: Conflict with Emergency Response Throughout the Lifetime of the Project	Moderate Adverse Reduced access during flooding events and parking constraints reduce emergency access and response time	Moderate Beneficial	Minor Beneficial	Moderate Beneficial	Major Beneficial	BR0: No mitigation available
PS-B5: Increased Demand for or Conflict with Utility Lines or Service Systems	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-2: Maintain Utility Services
PS-B6: Increased Solid Waste Demands	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1

Table ES-1c, *Bridge Alternatives*, Continued

4.3.4.5 Human Health and Safety Impacts						
HS-B1: Risk of Accidental Explosion or Release of Hazardous Substances During Construction	Negligible	Negligible	Negligible	Negligible	Negligible	WQ-MM-2: Implement Spill Prevention and Control Plan
HS-B2: Exposure of People to Undiscovered or Undocumented Sources of Contamination	Negligible	Negligible	Negligible	Negligible	Negligible	HS-MM-1: Stop Work and Implement Hazardous Materials Investigation/Remediation
4.3.4.6 Land Use, Planning, and Agricultural Resources Impacts						
None						
4.3.4.7 Noise Impacts						
NZ-B1: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Typical Construction Activities	Negligible	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	NZ-MM-1: Employ Noise-Reducing Construction Practices NZ-MM-2: Prepare a Noise Control Plan NZ-MM-3: Disseminate Essential Information to Residences and Implement a Complaint/Response Tracking Program
NZ-B2: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Pile Driving	Negligible	Moderate Adverse Residents, visitors, and wildlife would experience adverse noise levels during construction	Moderate Adverse Residents, visitors, and wildlife would experience adverse noise levels during construction	Moderate Adverse Residents, visitors, and wildlife would experience adverse noise levels during construction	Moderate Adverse Residents, visitors, and wildlife would experience adverse noise levels during construction	NZ-MM-1 NZ-MM-2 NZ-MM-3
NZ-B3: Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise During Operation of the Bridge	Negligible	Negligible	Negligible	Negligible	Negligible	

Impact Summary Table ES-1d

Table ES-1d. Fill Disposal Alternatives—Impact Summary

Impact	Impact Level (after Mitigation)					Mitigation Measure
	Bold denotes a significant adverse impact					
	Unused Reservoir Pit	Upper Banducci Field	Hamilton	Dias Ridge Trail*	Coastal Trail*	
4.3.1.1 Watershed Processes Impacts						
None						
4.3.1.2 Water Quality Impacts						
WQ-F1: Release of Construction-Related Sediment During Fill Disposal Activities	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-1: Obtain Coverage Under General Construction Permit and Implement BMPs
WQ-F2: Release of Construction-Related Hazardous Materials During Fill Disposal Activities	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	WQ-MM-2: Implement Spill Prevention and Control Plan
4.3.1.3. Water Supply Impacts						
None						
4.3.1.4 Air Quality Impacts						
AIR-F1: Generation of Construction-Related Pollutant Emissions	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	AIR-MM-1: Implement All Applicable BAAQMD Dust Control Measures. AIR-MM-2: Reduce NO _x Emissions from Off-Road Diesel-Powered Equipment. AIR-MM-3: Limit the Daily Number of Fill Disposal Trips

Table ES-1d, *Fill Disposal Alternatives*, Continued

Impact	Impact Level (after Mitigation)					Mitigation Measure
	Bold denotes a significant adverse impact					
	Unused Reservoir Pit	Upper Banducci Field	Hamilton	Dias Ridge Trail*	Coastal Trail*	
4.3.2.1 Vegetation Communities and Wetlands Impacts						
VEG-F1: Construction-Related Impacts on Vegetation Communities	Minor Adverse	Negligible	NA	NA	Minor Adverse	VEG-MM-1: Conduct Follow-Up Weed Control and Revegetation Activities to Establish Appropriate Native Plant Species
VEG-F2: Increase in Noxious Weed Populations	Minor Adverse	Minor Adverse	NA	NA	Minor Adverse	VEG-MM-1
VEG-F3: Change in Habitat for Special-Status Plant Species	Negligible	Negligible	NA	NA	Minor Adverse	
VEG-F4: Changes in Areal Extent and Functions and Values of Wetlands	Negligible	Negligible	NA	NA	Minor Beneficial	
4.3.2.2 Wildlife Impacts						
WLD-F1: Construction-Related Disturbance to Nesting Birds	Minor Adverse	Minor Adverse	NA	NA	Minor Adverse	WLD-MM-2 when necessary
4.3.2.3 Fisheries Impacts						
None						
4.3.3 Cultural Resources Impacts						
CR-F1: Disturbance to Previously Unidentified Cultural Resources During Construction	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	CR-MM-1: Cultural Resources Education, Archaeological Monitoring, and Discovery Measures.
CR-F2: Disturbance to Previously Unidentified Cultural Resources During Site Evolution	Negligible	Negligible	Negligible	Negligible	Negligible	
CR-F3: Disturbance to the “Fan Site”	Negligible	Negligible	Negligible	Negligible	Minor Adverse	CR-MM-1 CR-MM-4: Fence Off the Fan Site Fill Hauling So That Trucks Cannot Inadvertently Damage the Site

Table ES-1d, *Fill Disposal Alternatives*, Continued

Impact	Impact Level (after Mitigation)					Mitigation Measure
	Bold denotes a significant adverse impact					
	Unused Reservoir Pit	Upper Banducci Field	Hamilton	Dias Ridge Trail*	Coastal Trail*	
4.3.4.1 Recreational and Visitor Experience Impacts						
REC-F1: Changes in Visitor Experience from Truck Trips and Fill Disposal Activities	Negligible	Negligible	Negligible	Negligible	Negligible	
REC-F2: Changes in Visitor Experience from Altered Fill Disposal Site Characteristics	Moderate Beneficial	Negligible	Moderate Beneficial	Negligible	Negligible	
4.3.4.2 Traffic						
TC-F1: Effects of Fill Disposal Site Preparation	Minor Adverse	Minor Adverse	Negligible	Minor Adverse	Minor Adverse	TC-MM-1: Construction Traffic Management Plan
TC-F2: Effects of Truck Trips Associated with Fill Hauling	Minor Adverse	Minor Adverse	Major Adverse The amount of truck trips required for hauling and additional traffic constraints would be significant.	Minor Adverse	Minor Adverse	TC-MM-1
4.3.4.3 Aesthetics Impacts						
AES-F1: Alteration of Scenic Views and Existing Visual Character During Hauling Trips and Fill Disposal Activities	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
AES-F2: Creation of New Visual Features on the Site	Moderate Beneficial	Negligible	NA	Minor Beneficial	Minor Beneficial	

Impact	Impact Level (after Mitigation)					Mitigation Measure
	Unused Reservoir Pit	Upper Banducci Field	Hamilton	Dias Ridge Trail*	Coastal Trail*	
4.3.4.4 Energy, Public Services, Utilities, and Service Systems Impacts						
PS-F1: Increased Demand for Existing Energy Sources or Conflict with Adopted Policies or Standards for Energy Use	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1: Employ Sustainable Building Practices
PS-F2: Use of Non-Renewable Resources in a Wasteful or Inefficient Manner	Negligible	Negligible	Negligible	Negligible	Negligible	
PS-F3: Conflict with Emergency Response	Negligible	Negligible	Negligible	Negligible	Negligible	
PS-F4: Increased Demand for or Conflict with Utility Lines or Service Systems	Negligible	Negligible	Negligible	Negligible	Negligible	
PS-F5: Increased Solid Waste Demands	Negligible	Negligible	Negligible	Negligible	Negligible	PS-MM-1
4.3.4.5 Human Health and Safety Impacts						
HS-F1: Risk of Accidental Explosion or Release of Hazardous Substances	Negligible	Negligible	Negligible	Negligible	Negligible	WQ-MM-2: Implement Spill Prevention and Control Plan
HS-F2: Exposure of People to Undiscovered or Undocumented Sources of Contamination	Negligible	Negligible	Negligible	Negligible	Negligible	HS-MM-1: Stop Work and Implement Hazardous Materials Investigation/Remediation
4.3.4.6 Land Use, Planning, and Agricultural Resources Impacts						
None						
4.3.4.7 Noise Impacts						
NZ-F1: Exposure of Exposure of Noise-Sensitive Land Uses (Residents and Visitors) to Elevated Levels of Noise from Fill Hauling and Disposal Activities	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse	
Note:						
* The analysis of the two trail alternatives only considers the effects of hauling the fill to the sites. For the coastal trail, impacts of using the fill to recontour the trail are also considered.						