

**Mount Tamalpais State Park**  
**Golden Gate National Recreation Area**



# **Redwood Creek Trail Realignment and Dias Ridge Trail Extension Project**

*Environmental Assessment/Initial Study*

November 2015



Redwood Creek Trail between the Miwok Trail and Kent Canyon, looking southwest

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Golden Gate National Recreation Area**



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## Lead Agencies



**California Department of Parks and Recreation  
Bay Area District  
845 Casa Grande Road  
Petaluma, CA 94954**



**Golden Gate National Recreation Area  
Building 201, Fort Mason  
San Francisco, California 94123**

### Information about this document:

The National Park Service (NPS) and California Department of Parks and Recreation (CDPR) have prepared this Environmental Assessment/Initial Study (EA/IS) to examine the potential environmental impacts of the alternatives being considered for the proposed Redwood Creek Watershed Trail Realignment and Extension Project at Mount Tamalpais State Park and Golden Gate National Recreation Area in Marin County, California. The document describes why the project is being proposed, alternatives for the project, the existing environment that could be affected by the project, the potential impacts from the alternatives, and measures proposed to avoid, minimize and/or mitigate potential adverse effects on the environment.

### *What you should do:*

Please read this EA/IS. In addition to the lead agencies offices listed above, additional copies of this document are available for review at:

Mount Tamalpais State Park  
801 Panoramic Highway  
Mill Valley, CA 94941

Stinson Beach Library  
3521 Shoreline Highway  
Stinson Beach, CA 94970

Bay Area District Headquarters  
California Department of Parks and Recreation  
845 Casa Grande Road  
Petaluma, CA 94954

Mill Valley Library  
375 Throckmorton Ave  
Mill Valley, CA 94941

The EA/IS also is available for review online at these websites:

<http://parkplanning.nps.gov/redwooddias> (click on project title)  
[http://www.parks.ca.gov/?page\\_id=981](http://www.parks.ca.gov/?page_id=981) (posted under "Marin").

For individuals with sensory disabilities, this document can be made available in large print or on compact disk. To obtain a copy in one of these alternate formats, please contact the Environmental Coordinator listed below.

We welcome your comments. Submissions must be in writing and postmarked, or received by e-mail, no later than January 8, 2016. Please include your name, state, and postal code.

Comments regarding this EA/IS may be submitted as indicated below. NOTE: It is not necessary to send duplicate comments to each office or to submit comments by more than one means. All mailed, emailed, and online comments will be consolidated.

By **mail** to either of these addresses:

Environmental Coordinator  
California Department of Parks and Recreation  
Bay Area District  
Attn: Redwood Creek Trail  
845 Casa Grande Road  
Petaluma, CA 94954

< or > Superintendent  
Golden Gate National Recreation Area  
Attn: Redwood Creek Trail  
Bldg. 201, Fort Mason  
San Francisco, CA 94123

By **email** to: [Bree.Hardcastle@parks.ca.gov](mailto:Bree.Hardcastle@parks.ca.gov) (Include "Redwood Creek Trail" on the subject line)

**Online** at: <http://parkplanning.nps.gov/redwooddias>

### ***What happens next?***

After comments are received from the public and reviewing agencies, separate decisions specific to each agency would be made by NPS and CDPR. The individual agencies may: (1) give environmental approval to the proposed project, possibly including minor changes in response to comments (2) undertake additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is appropriated, NPS and/or CDPR could design and construct all or part of the project. Look for updates on the project at the web address above.

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# 1. Background

This is a joint Environmental Assessment (EA) and Initial Study (IS) for the proposed Redwood Creek Watershed Trail Realignment and Dias Ridge Trail Extension Project (proposed Project). It satisfies the requirements of both the National Environment Policy Act (NEPA) in preparing an EA and the California Environmental Quality Act (CEQA) in preparing an IS. Each lead agency will use this environmental review document in their separate decision processes regarding the proposed Project.

The National Park Service (NPS) is the federal lead agency under NEPA. The EA for the proposed Project has been developed in accordance with 2011 NPS Director's Order-12 (DO-12) and the 2015 NPS NEPA Handbook by assessing the potential environmental effects and issuing, if appropriate, a Finding of No Significant Impact (FONSI). This EA evaluates the No Action and Proposed Action Alternatives. The document also discusses alternatives that were considered but not analyzed, and provides justifications for their elimination.

The California Department of Parks and Recreation (CDPR) is the state lead agency under CEQA. Mandatory CEQA items not otherwise provided in the text are included in Appendix 1. Additional CEQA Required Material. The appendix includes a Notice of Intent to Adopt a Negative Declaration, Mandatory Findings of Significance, and an Environmental Determination.

Redwood Creek Watershed is an approximately 9-square-mile coastal watershed on the south slope of Mt. Tamalpais in Marin County, California. Nearly 95 percent of the watershed is in public ownership, with various lands being administered by the NPS, the CDPR, or Marin Municipal Water District (MMWD). Federal land includes Muir Woods National Monument (National Monument) and the Golden Gate National Recreation Area (GGNRA); State land includes Mount Tamalpais State Park (MTSP). The watershed is a popular visitor destination and is recognized as an area of significant biodiversity.

Figure 1 (Project Vicinity) shows the location of Redwood Creek Watershed in southern Marin County, the lands administered by public agencies, and the project area within the lower watershed. Redwood Creek (also called "the creek" in this document) drains MMWD and MTSP lands as well as the National Monument. After passing through the National Monument, Redwood Creek flows southwest through Frank Valley. Here the creek corridor includes nearby Muir Woods Road and the Redwood Creek Trail. Redwood Creek discharges to the Pacific Ocean through its floodplain at Muir Beach. Protected from development, the biologically rich watershed provides habitat to four special status species

- Coho salmon – endangered [federal and state listing]
- Steelhead – threatened [federal listing]
- California red-legged frog – threatened [federal listing]
- Northern spotted owl – threatened [federal listing] and species of concern [state listing]).

Bats detected in the nearby National Monument include four species of federal concern, one of which is also listed as being of state concern.

The geographic area evaluated for the proposed Project is a corridor extending from Muir Woods Road just south of the National Monument to the Golden Gate Dairy on Highway 1 (Shoreline Highway).





Figure 1. Project Vicinity



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## **2. Purpose and Need**

### **2.1 Introduction**

The southern section of the Redwood Creek Trail extends 2.1 miles from Muir Woods Road at Deer Park Fire Road, just south of the National Monument, to Muir Woods Road near Highway 1, close to Muir Beach and the ocean. Trail use is restricted to hikers and equestrians and the trail is part of a popular equestrian loop that includes parts of the Miwok and Dias Ridge trails. Between the trailhead at Deer Park Fire Road and Santos Meadow, the trail and creek are both east of Muir Woods Road. South of Santos Meadow, the creek crosses under Muir Woods Road, and the road separates this section of the trail from the creek. Users can access the Redwood Creek Trail from Muir Woods Road across from Deer Park Fire Road in the north or near its intersection with Highway 1 in the south. Visitors also can access the trail via a spur trail that connects to Muir Woods Road south of Santos Meadow or via a ford near Santos Meadow. Santos Meadow is the site of a horse camp, and many horse camp users cross onto the Redwood Creek Trail via the ford. There also are two informal or “social” trails connecting small vehicle pull-outs along Muir Woods Road with the Redwood Creek Trail.

Nearly all of the southern half of the Redwood Creek Trail is in MTSP, except for about 500 feet that traverses a parcel of GGNRA land near Highway 1. See Figures 1 and 2. Elevations along this part of the trail range from 110 feet above sea level at its northern end to 20 feet above sea level at its southern end.

As shown on Figure 1, the Miwok Trail intersects the Redwood Creek Trail 0.3 miles south of Muir Woods Road. The 1.7-mile section of the Miwok Trail between the Redwood Creek and Dias Ridge trails is restricted to hikers and equestrians, similar to restrictions on the Redwood Creek Trail. This connecting section of the Miwok Trail is on MTSP land as well. The Dias Ridge Trail runs along the ridge south of Redwood Creek, between Panoramic Highway and Highway 1 at the Golden Gate Dairy, near Muir Beach. The Dias Ridge Trail, part of the Bay Area Ridge Trail, is a multi-use trail, meaning that hikers, equestrians, and bicyclists use the trail. From its junction with the Miwok Trail, the Dias Ridge Trail extends south for approximately 0.9 mile on MTSP land then continues south across 1 mile of GGNRA land to the trail’s current southern terminus at the Golden Gate Dairy.

The southern ends of the Redwood Creek and Dias Ridge trails are about 0.25 mile (1,300 feet) apart. If these two trails were connected across the gap at the southern end, the combined Redwood Creek-Miwok-Dias Ridge trail segments would form an approximately 5.4-mile circuit. Elevations on this loop range from nearly 800 feet above sea level on the Dias Ridge Trail to approximately 20 feet above sea level at the southern trailhead of the Redwood Creek Trail.

### **2.2 Purpose and Need**

The purpose of the proposed action is three-fold:

- To create a safer and more sustainable trail for visitors;
- To reduce adverse effects of the Redwood Creek Trail on Redwood Creek and on the multiple drainages to the creek crossed by the trail; and
- To connect the southern ends of Redwood Creek Trail and Dias Ridge Trail by an extension of the Dias Ridge Trail.

The proposed Project would improve trail conditions and safety for visitors, reduce sediment loads and improve water quality in Redwood Creek, provide a trail interconnection, and reduce maintenance needs.

**Redwood Creek Trail Improvements and Realignment.** The Redwood Creek Trail is adjacent to or near Redwood Creek for most of the creek's reach in Frank Valley. Bridges and fords provide crossings of the main stem of the creek at various locations. The trail also crosses numerous drainages tributary to the creek. Many existing trail facilities do not meet current CDPR trail standards and need to be replaced. In addition, during wet weather portions of the current trail alignment in the Redwood Creek floodplain flood, resulting in standing and flowing water on the trail. This has resulted in an incised trail with poor drainage.

Several areas along the current Redwood Creek Trail contribute fine sediment to Redwood Creek. Increased fine sediment loads have a direct adverse effect on the viability of aquatic species, including listed special-status species. Equestrians using the trail must cross the creek via fords in 3 locations. The fords contribute fine sediment and nutrients to the waterway directly or through runoff, and the presence of horses in the creek in certain seasons has the potential to disturb spawning coho salmon and steelhead. One existing culvert (Culvert 2) is plugged, and the area beneath it is eroding, contributing fine sediment to the creek. Two headcuts along the existing trail contribute sediment as well. In addition, several crib walls and culverts along the trail are deteriorating and in danger of structural failure; if these features failed they would contribute large amounts of sediment to the creek.

These problems would be addressed by numerous actions proposed to be undertaken by the Project, including:

- Reconstructing approximately 0.28 miles of the existing Redwood Creek Trail from Deer Park Fire Road south to the Miwok Trail and replacing the existing bridge across Redwood Creek;
- Developing a 1.1 mile segment of new trail outside of the Redwood Creek floodplain between the Miwok Trail and Santos Meadow, while decommissioning and abandoning a corresponding 0.9 mile of existing trail currently located in the floodplain;
- Removing culverts and bridges in the abandoned trail section and restoring the land;
- Eliminating fords and replacing them with bridges;
- Removing various existing culverts and crib walls on channels draining to the creek and replacing them with bridges; and
- Repairing and rehabilitating the trail tread south of Santos Meadow to Muir Woods Road, beginning from the end of the new trail segment.

Overall, three bridges, four culverts, and three crib walls would be removed and 13 new bridges would be installed.

These improvements would create a safer, more sustainable trail with reduced maintenance needs while also benefiting water quality in Redwood Creek, promoting natural drainage, reducing fine sediment delivery to the creek, facilitating coarse sediment delivery, and protecting habitat for listed aquatic species. In addition, past actions have disrupted the connectivity of the creek and its floodplain; moving the trail out of the floodplain would allow for future projects to reconnect Redwood Creek to its floodplain. This would further improve hydrologic and geomorphic functions in the watershed.

**Dias Ridge Trail Extension.** The 1,300-foot gap between the southern ends of the Redwood Creek and Dias Ridge trails at Highway 1 results in visitors using the highway's narrow shoulder to go between the trails. There is little to no separation between motorists driving on this popular roadway and any pedestrians, equestrians, or bikers using the shoulder. To address this problem, an extension of the Dias Ridge Trail is proposed that would be parallel to, but separate from, the east side of Highway 1. The extension

would connect the Dias Ridge Trail at Golden Gate Dairy to the Redwood Creek Trail at Muir Woods Road, eliminating the need to use the highway shoulder. The Dias Ridge Trail Extension would enhance safety and would complete the 5.4-mile Redwood Creek-Miwok-Dias Ridge trail loop. This project is Phase 2 of a three phase project to improve trail connectivity for the Dias Ridge Trail, and this extension is an important step towards Phase 3. These projects are included in the 2014 GGNRA General Management Plan.

## 2.3 Agency Coordination and Scoping

During project planning, the CDPR and NPS have been coordinating with the Regional Water Quality Control Board (RWQCB), the California Department of Fish and Wildlife (CDFW), and the U.S. Army Corps of Engineers (USACE). An agency site visit occurred in 2014, and conceptual designs for bridges, Culvert Removal 2/cascade channel, and crib wall and culvert removals were reviewed by the agencies. In addition, the CDPR would be applying to the USACE for a permit under Section 404 of the Clean Water Act (CWA), to the State Water Resources Control Board for a Water Quality Certification under CWA Section 401, and to CDFW for a Lake and Streambed Alteration Agreement under the California Fish and Game Code, Section 1602. During coordination with USACE, coordination also will occur with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding special-status species.

Two events were held as part of public scoping of the Redwood Creek Trail Realignment and Dias Ridge Connector Trail Project (subsequently renamed the Redwood Creek Trail Realignment and Dias Ridge Trail Extension Project). An Open House was held at the Mill Valley Community Center on Wednesday, March 18, 2015 from 6 pm to 8 pm, and a Project Trails Walk was held on Saturday, March 21 from 10 am to 12 pm.

Information about the proposed Project and the public events was circulated in several ways. A newsletter was emailed to the NPS Golden Gate Project Planning Email List and to members of the public who had requested information on previous projects in the area (e.g., Dias Ridge Trail and Muir Beach Projects). Information from the newsletter was posted on websites maintained by NPS Golden Gate, CDPR Mt. Tamalpais State Park, and Golden Gate National Parks Conservancy (Parks Conservancy). Information was posted on the Tamalpais Valley and Muir Beach community blogs and also was included in an electronic newsletter from One Tam (a community information campaign of the Tamalpais Lands Collaborative — which is a partnership between the CDPR, the NPS, the Parks Conservancy, Marin County Parks, and MMWD).

Twenty-four members of the public attended the Mill Valley open house, including representatives of a number of user groups. Eleven members of the public attended the trails walk; there was some overlap in participants with those at the open house. Several individuals who did not participate in the walk stopped at the Golden Gate Dairy where the walk originated to ask questions, learn about the project, and provide comments.

Scoping comments are summarized below. Nearly all of the Redwood Creek Trail that would be affected by the Project is under the CDPR's jurisdiction; therefore, the CDPR has responded to the Redwood Creek Trail comments. The Dias Ridge Trail Extension between the Redwood Creek and Dias Ridge trails would be on land under the NPS's jurisdiction; therefore, the NPS has responded to these comments.

### **REDWOOD CREEK TRAIL (Primarily on CDPR land)**

**Mountain Bikers Use of Non-Bicycle Trails.** Eight comments were received regarding negative effects of mountain bikers using the Redwood Creek Trail, which is a hiker and equestrian only trail. Commenters

were concerned that an extension between the two trails would encourage mountain bikers to use the Redwood Creek Trail. Commenters suggested more enforcement, better “no bike” signage, and installing enforcement cameras to capture information about bike use on the Redwood Creek Trail.

*CDPR Response:* Larger no bike signs would be installed at all entrances to the Redwood Creek Trail and would be placed so as to be highly visible to all users.

**Equestrian Use.** One commenter noted that the current horse fords provide horses access to water and that equestrians would like access to water for horses if the fords are removed. Two commenters requested that pull-out or passing areas be included in the trail design to allow hikers to more easily pass equestrians and for safety at locations with limited visibility. One commenter noted that areas of trail tread with larger rock are challenging for horses.

*CDPR Response:* There is an existing water line at Santos Meadow. A lateral extension from the existing line would be provided to deliver water to a trough closer to the road. Equestrians would be able to access this water without needing to enter the group horse camp. Signs would be installed along the Redwood Creek Trail directing equestrians to this water source. A cross-walk would be added across Muir Woods Road and signed to make crossing at this location safer. During project implementation, CDPR staff would assess the trail alignment, looking for blind spots and sharp turns, and build in passing areas where appropriate. Trail base is composed of smaller-grained material mixed with 3/4" rock or 2" rock. The base is then topped with at least 3" of fine-grained tread material and compacted. Additional fine-grained material would be added to the section of trail currently exhibiting large rocks, and all the new section of the trail would be topped with at least 3" of finer material.

**Informal Trails from Muir Woods Road to Redwood Creek Trail.** Currently, there are two informal trails from Muir Woods Road to the Redwood Creek Trail, with small vehicle pull-outs on the road adjacent to the informal trails. One commenter suggested that these vehicle pull-outs and informal trails should be removed. Another commenter was concerned about visitors accessing the Redwood Creek Trail from Muir Woods Road if the trail is realigned, contributing to more pedestrian traffic on the road.

*CDPR Response:* The proposed Project would decommission the informal trails and block them with woody debris until they are revegetated. The realigned trail segment parallels the existing trail but is outside of the floodplain and more distant from the road, and does not create a new trail head on Muir Woods Road. Issues relating to traffic and parking on Muir Woods Road in general are being addressed through planning for the National Monument.

**Visitor Experience of Redwood Creek.** One commenter noted that it would help maintain a sense of connection to Redwood Creek if there were points of public access to the creek, if this could be accomplished without negative impacts to the creek and riparian area.

*CDPR Response:* Visual access to Redwood Creek along this stretch of the Redwood Creek Trail would be provided by the Santos Meadow Bridge and Bridge 1 crossing over the creek. The Santos Meadow Bridge is 110 feet long and Bridge 1 is 80 feet long, both would provide excellent views of the creek without visitors impacting the creek or floodplain directly.

**Short-Term Impacts from Construction.** One commenter had concerns about sediment entering the creek during construction work.

*CDPR Response:* The proposed Project is planned with sediment concerns in mind, and would include methods to prevent sediment movement into the creek. Methods include working in the dry season, installing silt fences, fiber rolls, and other materials along work areas for erosion

control, and revegetating areas both actively and through natural revegetation. In addition, the project would have requirements imposed by permitting agencies, including adoption of a Storm Water Pollution Prevention Plan (SWPPP) for the Construction General Permit, which would include sediment and other pollution controls.

**Restoration.** One commenter suggested that alluvial fan restoration be considered as part of the project. The same commenter had questions about whether Redwood Creek tributaries have been assessed for contributing sediment into Redwood Creek and suggested this be considered in planning this and future projects.

*CDPR Response:* As part of this project, tributaries and drainage channels have been assessed for sediment and this has been included in designs for the proposed Project. Alluvial fan restoration is being considered as a separate project, which also would consider stream restoration and groundwater recharge. A study to assess options would be the first step.

**Number of Bridges Crossing Redwood Creek.** One commenter noted that there should be as few bridges as possible crossing Redwood Creek.

*CDPR Response:* Currently, 3 bridges cross Redwood Creek along the length of the trail between Deer Park Fire Road and Highway 1. With the Project, this is reduced to 2 bridges, both of which would be new. Abutments for these two new bridges would be out of the floodplain and their decks would be above the 100-year water surface elevation, so they should have minimal impact to the creek.

#### ***DIAS RIDGE TRAIL EXTENSION (On NPS land)***

**Support for Connecting the Trails.** Five commenters strongly supported a trail extension for a variety of users groups, including bicyclists and equestrians. One commenter expressed support for the project and noted the importance of designing a trail extension wide enough to accommodate three user groups. The same commenter noted the importance of signage stating which user groups are permitted on the trail extension.

*NPS Response:* Signage on the trail extension would clearly indicate permitted use of the extension. At the southern Redwood Creek Trailhead on Muir Woods Road, signage would clearly indicate bicycles are not allowed on the Redwood Creek Trail. The final width of the Dias Ridge Trail Extension would be dictated by site conditions, including the proximity of Highway 1 and local topography.

**Life Estate.** On Highway 1, at its intersection with Muir Woods Road, is a property that was acquired by the NPS for inclusion in the GGNRA. The original owner maintains a life estate in the property, meaning he has exclusive use of the property during his lifetime. This precludes development of the northern portion of the Dias Ridge Trail Extension through the property at this time. One commenter encouraged NPS to plan for the whole length of the extension, and to include the life estate parcel in the plan. Another commenter noted that people may walk through the parcel and create a new social trail.

*NPS Response:* The portion of the trail extension proposed to cross the life estate property cannot be constructed at this time; however, the plan for the trail extension would allow for a connection to be constructed when it is no longer subject to the present use restrictions. Until that time, the NPS proposes to construct the segment of the trail extension between the Golden Gate Dairy and the last driveway from NPS residences on the east side of Highway 1, stopping before the life estate boundary. This is a logical temporary end of the trail extension because it allows people to return to the highway shoulder by way of an existing driveway serving NPS housing at



this location. From here trail users would continue to the Redwood Creek Trail via the road shoulder, as is presently the case. The southern end of the Redwood Creek Trail also ends well short of the life estate boundary and would not be extended closer until the life estate no longer limits public use. By not extending the extension to the edge of the life estate, which has been fenced for many years, trail users would not be encouraged to cross the property.

**Work with California Department of Transportation (Caltrans).** Two commenters suggested that the NPS work with Caltrans and request Caltrans funding to develop a temporary solution along the road shoulder at the life estate property, where trail installation would be delayed. One commenter from the Bay Area Ridge Trail Council (BARTC) would like to work with NPS and Caltrans to consider temporary ways to improve visitor access along the edge of Highway 1 until the trail connection through the life estate property can be installed.

*NPS Response:* The constraints of the narrow roadway in this area do not allow sufficient space to implement an improvement that will meet Caltrans standards. The current interim design uses a natural break and a safer area for shared road use of vehicles and bicyclists. Signage would be installed to direct users and warn them of the transition to the roadway, until the NPS can construct the full project scope. NPS would also work with the bike community to outreach to their membership to improve safety in the area.

**Concern about Bicycle Transition from Trail to Road.** One commenter noted there would be a challenging transition from the Extension onto Highway 1 north of two NPS residences on Highway 1 near Muir Woods Road; bikes would likely travel down the driveway of the northern-most residence and onto the road quickly and this could create a dangerous situation.

*NPS Response:* Signage would be installed to direct users and warn them of the transition to the roadway. NPS would also work with the bike community to outreach to their membership to improve safety in the area.

**Trail Alignment behind Housing.** Commenters had questions about the feasibility of placing the connecting trail behind the existing housing and farther from Highway 1. One commenter asked the design team to explore the former trail behind the houses. A second commenter asked that the trail be placed far from the road, saying it would be more peaceful and safer. A third commenter noted that a trail behind the houses would be longer and some people might opt to use the road rather than take a longer trail. This commenter suggested that a narrow hiker-only trail behind the houses be considered in addition to a multi-use trail closer to the road. A fourth commenter was concerned that the trail behind the houses would cause greater impact to habitat.

*NPS Response:* An alternative trail alignment behind the existing housing fronting on Highway 1 was considered but rejected, as explained in Section 3.6 below.

**Trees along Highway 1.** Two commenters stressed the importance of maintaining the trees along Highway 1. One of these commenters suggested planting trees as part of the project, as existing trees might be at the end of their life span.

*NPS Response:* Several trees along the highway have reached the end of their life and are in poor condition. These would be removed. New vegetation would be planted between the highway and the trail to buffer and screen the highway from trail users.

**Concern about section of trail near willows.** One commenter expressed concerns about how the trail would perform in wet areas, such as locations where willows indicate a high level of soil moisture.

*NPS Response:* The tread of the proposed extension is not in any wetland areas. Where damp soils are encountered they would be addressed by appropriate trail design to promote drainage and prevent ponding or deterioration of the tread.

## 2.4 Impact Topics Retained for Analysis

The suite of impact topics considered in this document is based on existing conditions in the project area and the nature of the Project itself. Specific impact topics were developed to focus discussion and to allow comparison of the environmental consequences of alternatives. These impact topics were identified based on federal and state law, regulations, executive orders, NPS policies, CDPR policies, and staff knowledge of special or vulnerable resources in the project area.

Impact topics that are carried forward for further analysis in this EA/IS are listed below and are addressed in Chapter 4. Affected Environment and Environmental Consequences.

- |                      |                                |                              |
|----------------------|--------------------------------|------------------------------|
| ■ Vegetation         | ■ Noise/Soundscape             | ■ Water Resources            |
| ■ Wildlife           | ■ Park Operations              | ■ Traffic and Transportation |
| ■ Cultural Resources | ■ Visitor Experience           | ■ Visual Resources           |
| ■ Air Quality        | ■ Geologic Resources and Soils |                              |

## 2.5 Impact Topics Not Considered in Environmental Analysis

Potential impact topics were not considered for further evaluation if

- They do not exist in the analysis area
- They would not be affected by the proposal, or the likelihood of impacts are not reasonably expected, and due to there being no effect or negligible effects, there would either be no or a low contribution toward cumulative effects.

Topics not considered further include:

**Lightscape Management.** The proposed Project would not use exterior lighting during construction or operation and therefore would have no effects on the existing outside lighting or natural night sky of the area. This topic is not considered further in this document.

**Prime and Unique Farmlands.** The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland are classifications of U.S. Department of Agriculture's Natural Resources Conservation Service, and are defined as soil that produces general crops such as common foods, forage, fiber, and oil seed or specialty crops such as fruits, vegetables, and nuts. The project area does not contain prime or unique farmland. Because there would be no effects on prime and unique farmlands, this topic is not considered further in this document.

**Indian Trust Resources.** Secretarial Order 3175 requires that any anticipated impacts to Indian Trust Assets from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. There are no known Indian trust resources in the Project area. The lands comprising the parks are not held in trust by the Secretary of the Interior for the benefit of Indians. Because there are no Indian trust resources located in the area and there would be no impacts on Indian Trust Resources, this topic is not considered further in this document. However, effects on cultural resources are considered and consultation with tribal governments has occurred.

**Environmental Justice.** Executive Order 12898 requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Only a few residences are in the project area, in the vicinity of Highway 1. Neither alternative under consideration would have disproportionately high and adverse health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996). Therefore, environmental justice is not considered in this document.

**Climate Change and Sustainability.** Climatologists are sure about the long-term results of global climate change, and it is clear the planet is experiencing a warming trend that affects ocean currents, sea levels, polar sea ice, and global weather patterns. A limited amount of gas or diesel fueled equipment and vehicles would be required for construction of the proposed Project; however, much of the work would be manual labor. Vehicles and equipment would comply with manufacturer and State requirements regarding emissions. When not in use, they would be turned off rather than left idling. The emissions would represent a negligible contribution to greenhouse gases. Climate change would not alter future use of this trail or cause any cumulative climate change impacts to park resources specifically as a result of implementing the proposed Project. The effects of future climate change are not discussed further.

**Socioeconomics.** The proposed action would neither change local and regional land uses nor appreciably impact local businesses or agencies. Any increase in workforce and revenue would be temporary and negligible, lasting only as long as construction. Because the impacts to the socioeconomic environment would be negligible and short-term, this topic is not discussed further.

### 3. Alternatives

This chapter describes the two alternatives analyzed in this document: Alternative A – No Action/Current Management and Alternative B – Proposed Action/Preferred Alternative. These alternatives were developed through evaluation of comments provided by individuals, organizations, governmental agencies, and the parks' interdisciplinary management staffs.

#### 3.1 Alternative A – No Action/Current Management

The No Action Alternative is to not undertake the Project, but to continue current management practices. This alternative would not result in construction of the Redwood Creek Trail Realignment and Dias Ridge Trail Extension Project. Identified adverse impacts would continue, including existing trail use issues and environmental conditions and trends. The objectives of creating a more sustainable trail alignment, reducing impacts to Redwood Creek and the habitat it provides for listed species, and of enhancing visitor safety by extending the Dias Ridge Trail to the Redwood Creek Trail would not be met. Sub-standard and deteriorated conditions would continue, and deterioration would increase over time, requiring additional resources to maintain current conditions. The No Action alternative also serves as a baseline for evaluating the environmental effects of the proposed action alternative.

#### 3.2 Alternative B – Proposed Action/Preferred Alternative

Figure 2 illustrates the key aspects of the Proposed Action/Preferred Alternative, indicating the type of changes proposed and the size and location of project elements. Table 1 (Project Features) describes the components of the proposed Project, summarizing what would be installed or refurbished and what features would be removed. Figure 3 (Bridge Types Proposed on the Redwood Creek Trail) illustrates the truss bridge planned across Redwood Creek near Santos Meadow and the stringer bridges planned for another crossing of the creek and crossings of drainages leading to the creek. Figure 4 (Armored Drain Swale) shows a typical use of rock to create an armored swale at wet areas along the trail, this would protect the trail and minimize erosion. Where existing crib walls are removed, rock armoring would be installed to protect the drainage channel. Bridges would be installed at these locations to elevate the trail out of the drainage. Swales may be installed elsewhere on the trail tread at minor drainages not requiring bridging.

From north to south, the Proposed Project would: reconstruct the existing Redwood Creek Trail segment between Muir Woods Road and the Miwok Trail, including a bridge replacement; decommission the existing segment of the Redwood Creek Trail from the Miwok Trail to the vicinity of Santos Meadow and replace the decommissioned segment with a new trail to the east, out of the floodplain; improve the trail tread from Santos Meadow south to the southern trailhead; and construct an extension of the Dias Ridge Trail from the Golden Gate Dairy on Highway 1 to the Redwood Creek Trail's southern trailhead.

On the Redwood Creek Trail, the decommissioned trail segment would be abandoned and existing culverts, bridges, and other trail features removed. Headcuts and channels would be repaired and access to the decommissioned trail blocked. Brush and logs salvaged from vegetation cutting required elsewhere on the project would be spread on the trail as needed. On the newly constructed trail segment outside of the floodplain, bridges would be installed to cross the multiple drainages leading to Redwood Creek, with retaining walls and swales installed as needed. Some trees would be removed to accommodate the new trail. On the trail segment south of Santos Meadow, crib walls and culverts across drainages leading to Redwood Creek would be removed and replaced with bridges.

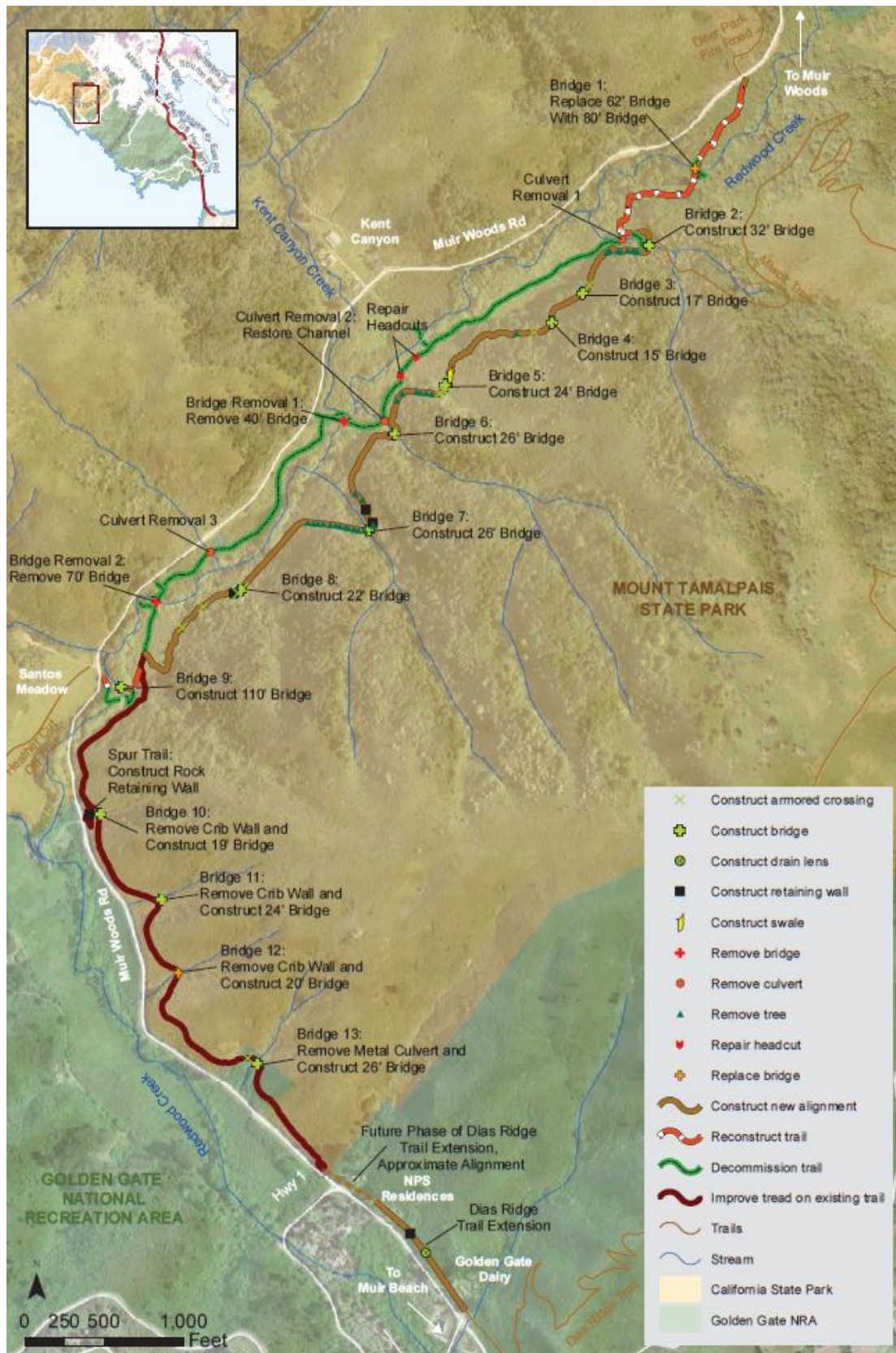


Figure 2. Project Features and Locations



On the Dias Ridge Extension Trail, 13 at-risk trees in the historic wind row along the east side of Highway 1 at the Golden Gate Dairy would be removed. Five trees would be retained and 8 Monterey Cypress trees would be planted. A Bishop pine north of the historic wind row may be removed, if required for trail development. North of Golden Gate Dairy is approximately 200 feet of loose and saturated alluvial soil along the proposed trail tread that would require installation of rock drainage lenses below the trail tread surface to aid drainage and maintain a drier trail surface

Some of the existing conditions are illustrated in Figure 5 (Selected Photographs of Existing Conditions – Redwood Creek Trail).

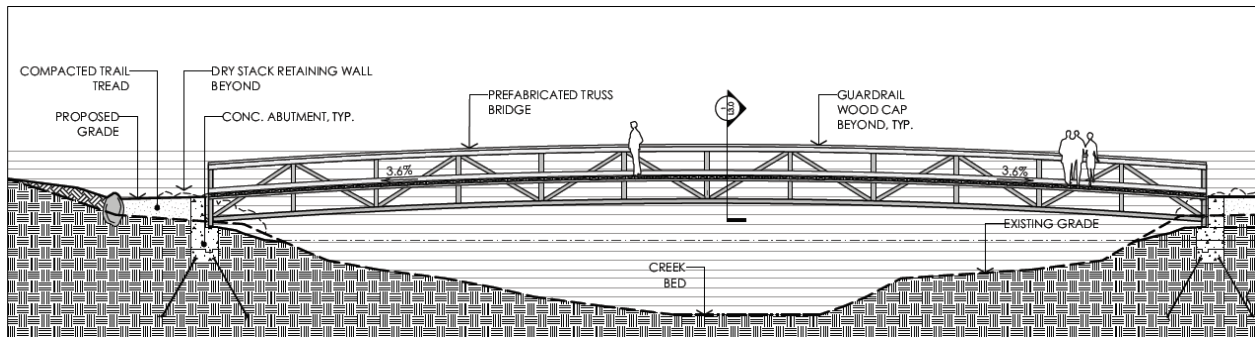
**Table 1. Project Features** [See Figure 2 for Locations]

<b>REDWOOD CREEK TRAIL REALIGNMENT</b>				
<b>Feature Name</b>	<b>Feature Description</b>	<b>Location</b>	<b>New Materials</b>	<b>Materials Removed</b>
Bridge 1	Replace pedestrian bridge with equestrian bridge	On existing trail alignment, crosses Redwood Creek between Miwok Trail and Muir Woods Rd.	80 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	62 ft bridge, wooden trestle, concrete abutments
Bridge 2	Construct bridge on new trail alignment	On new trail alignment, crosses a seasonal tributary of Redwood Creek near the intersection with Miwok Trail	32 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	
Bridge 3	Construct bridge on new trail alignment	On new trail alignment, crosses an ephemeral tributary of Redwood Creek	17 ft long x 5 ft wide aluminum stringer bridge with redwood decking and handrails	
Bridge 4	Construct bridge on new trail alignment	On new trail alignment, crosses an ephemeral tributary of Redwood Creek	15 ft long x 5 ft wide aluminum stringer bridge with redwood decking and handrails	
Bridge 5	Construct bridge on new trail alignment	On new trail alignment, crosses an ephemeral tributary of Redwood Creek	24 ft long x 5 ft wide aluminum stringer bridge with redwood decking and handrails	
Bridge 6	Construct bridge on new trail alignment	On new trail alignment, crosses a perennial tributary of Redwood Creek	26 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	
Bridge 7	Construct bridge on new trail alignment	On new trail alignment, crosses an ephemeral tributary of Redwood Creek	26 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	
Bridge 8	Construct bridge on new trail alignment	On new trail alignment, crosses an ephemeral tributary of Redwood Creek	22 ft long x 5 ft wide aluminum stringer bridge with redwood decking and handrails	
Culvert Removal 1	Remove culvert and retaining walls, restore banks to natural grade, install erosion control material and plant native vegetation	Trail to be decommissioned crossing ephemeral tributary near intersection with Miwok Trail	Erosion control materials, cobble if needed for channel bed	4 ft diameter corrugated metal culvert and rock walls

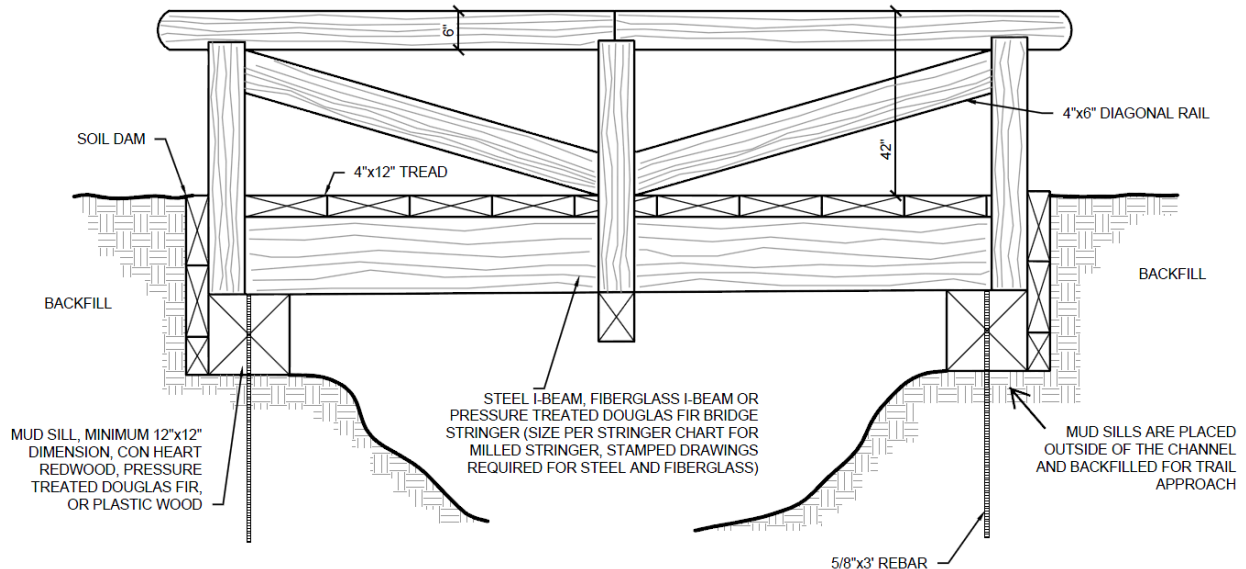
<b>Feature Name</b>	<b>Feature Description</b>	<b>Location</b>	<b>New Materials</b>	<b>Materials Removed</b>
Headcut Repairs	Decommission trail near headcuts such that water is not concentrated into headcut area. Fill the top of the headcut with soil, cover with erosion control material and plant native vegetation.	On trail to be decommissioned across from Kent Canyon	Native soil, erosion control materials	
Culvert Removal 2	Remove culvert, regrade channel, install erosion control material, install large rocks to form cascade channel, plant native vegetation.	Where trail to be decommissioned crosses perennial tributary (downstream from Bridge 6)	1/4 ton rock and smaller rock to fill voids	2 ft diameter concrete culvert and accumulated sediment
Culvert Removal 3	Remove culvert and retaining walls, restore banks to natural grade, install erosion control material and plant native vegetation	Trail to be decommissioned crossing ephemeral tributary flowing from the west	Erosion control materials, cobble if needed for channel bed	4 ft corrugated metal culvert and wood retaining walls
Bridge 9; Santos Meadow Bridge	Construct bridge over Redwood Creek and connecting trails, decommission ford through creek	Connecting Santos Meadow Horse Camp to Redwood Creek Trail	110 ft long x 6 ft wide galvanized steel truss bridge with redwood decking and handrails	
Bridge 10	Remove crib wall, install rock armoring in channel, install bridge	On existing trail alignment, near Spur Trail	19 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	Wood and rock crib wall in channel
Bridge 11	Remove crib wall, install rock armoring in channel, install bridge	On existing trail alignment	24 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	Wood and rock crib wall in channel and channel banks
Bridge 12	Remove crib wall and bridge, install rock armoring in channel, install longer bridge	On existing trail alignment	20 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	Wood and rock crib wall in channel and channel banks; 15 ft wood bridge
Bridge 13/ Culvert Removal 4	Remove culvert 4, install rock armoring in channel, install bridge	On existing trail alignment, near southern end of trail	26 ft long x 5 ft wide galvanized steel stringer bridge with redwood decking and handrails	4 ft diameter corrugated metal culvert, wood and rock crib wall in channel and wood hand rails
Bridge Removal 1	Remove bridge and abutments, decommission horse fords	On trail to be decommissioned, Redwood Creek crossing		40 ft long x 4 ft wide aluminum stringer bridge, concrete abutments, wooden trestle, and wood retaining wall
Bridge Removal 2	Remove bridge and abutments, decommission horse fords	On trail to be decommissioned, Redwood Creek crossing		70 ft long x 4 ft wide aluminum stringer bridge, concrete abutments, and metal trestle
Spur Trail Rock Wall	Install rock retaining wall and rock armored swale crossing, where trail is being undercut	Spur Trail is south of Santos Meadow, connecting Muir Woods Rd to Redwood Creek Trail	1/4 ton rock and smaller rock to fill voids	

**DIAS RIDGE TRAIL EXTENSION**

Feature Name	Feature Description	Location	New Materials	Materials Removed
Drain Lenses	Rock installed below the trail tread surface to aid drainage and maintain drier trail surface	As needed	Rock	
Retaining Wall	Install Sutter-type retaining wall (vertical steel and horizontal wood members) where needed to maintain accessible grade	1-2 locations as needed	Steel beams and wood	
Tree window	Trees in poor condition	Existing window	New trees	Trees in poor condition

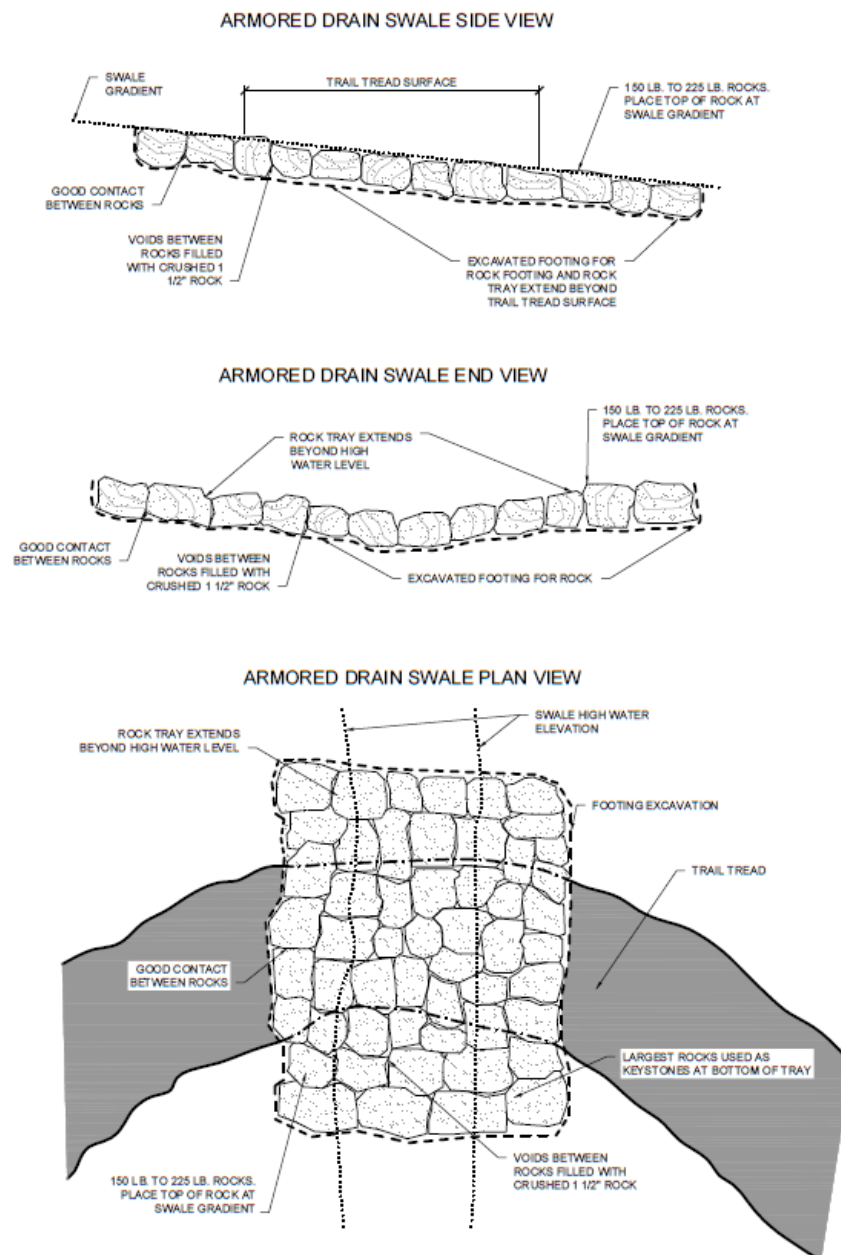


**A. Typical Truss Bridge** (plan is for galvanized steel truss with redwood decking and handrails)



**B. Typical Stringer Bridge** (plan is for galvanized or aluminum steel stringer with redwood decking & handrails)

**Figure 3. Bridge Types Proposed on the Redwood Creek Trail**  
(Final design and lengths would vary)



**Figure 4. Armored Drain Swale**  
(installed at small drainages or wet areas crossing the trail)





Drainage flowing along and across the trail



Ponding on the trail



Erosion and sediment transport across trail at Culvert 2



Bridge 1, to be replaced



Failing crib wall at Bridge 12 site



Eroded soil being carried to creek at horse ford.

**Figure 5. Selected Photographs of Existing Conditions – Redwood Creek Trail**



### 3.3 Schedule

The Project would be executed in phases, over 4 or 5 construction seasons. The Redwood Creek Trail Realignment would be completed in 4 consecutive construction seasons and the Dias Ridge Trail Extension could be completed in 1 construction season, either before, concurrent with, or after the Redwood Creek Trail work.

The planned Redwood Creek Trail construction seasons are during the dry season of each year, beginning as early as June 1 and extending through October 31. However, the start of construction may be delayed based on bird nesting activity or other concerns. The duration of the construction season takes into account seasonal restrictions on disturbances to wildlife resources and the availability of California Conservation Corps (CCC) crews. In particular, the construction season is limited by seasonal biological activity: northern spotted owl nesting; landbird nesting; California red-legged frog mating; bat maternity season; and salmonid spawning. Construction would be outside of mating and spawning seasons to the extent possible. Prior to construction, protocol-level owl nesting surveys and landbird nesting surveys would be conducted to identify any locations potentially affected by nests and to allow construction to begin earlier in the summer (e.g., June rather than August), if possible. Post-construction vegetation and hydrologic monitoring would occur for 5 years on the Redwood Creek Trail portion of the proposed Project. The Dias Ridge Trail Extension would not require post-construction monitoring.

CCC crews under the supervision of CDPR staff would provide much of the labor. For each construction season, the crews would camp at Kent Canyon, located west of Muir Woods Road approximately midway along the Redwood Creek Trail alignment. Major features, such as the Bridge 9 installation and the Culvert 2 removal and cascade channel installation, would be constructed by qualified contractors. By extending the construction over 4 or 5 seasons, the Project in effect becomes the equivalent of 4 or 5 smaller projects separated by extended periods during which little or no activity would occur. This limits impacts both spatially and temporally. The modularity of many construction activities, such as removal of individual crib walls or culverts, would limit the extent of most impacts to the immediate area around specific work sites. The planned construction and monitoring phases are detailed in Appendix 2. Proposed Phasing and Construction Schedule. In general, the phases for the Redwood Creek Trail Realignment are:

- Pre-construction year: Spotted owl survey. Vegetation removal in fall or winter before owl nesting season; cut and maintain vegetation to less than 12 inches until construction season begins along work corridor (15-20 feet wide by 1.1 mile long) for relocated trail segment.
- Year 1: Spotted owl and landbird surveys. Clear vegetation for new Redwood Creek Trail segment between the Miwok Trail and Santos Meadow. Prepare soil and rock stockpile areas. Cut new trail and finish trail tread. Install 7 bridges over drainages on the realigned segment.
- Year 2: Landbird nesting survey. Bat roosting survey. Install armored crossings of drainages on new alignment; install the Santos Meadow Bridge and trail; decommission some fords and old trail; open new trail at end of construction year.
- Year 3: Landbird nesting survey. Reconstruct existing Redwood Creek Trail segment from Deer Park Fire Road to the Miwok Trail; decommission the old trail alignment and social trails and block access with woody debris; replace various bridges and fords; revegetate.
- Year 4: Landbird nesting survey. Remove various crib walls and culverts on the remainder of the trail; install bridges and armored crossings; add tread to trail sections where large rock is exposed; revegetate.
- Years 5 through 9: maintain trail, monitor revegetation, monitor installed features.

The Dias Ridge Trail Extension construction is independent of the Redwood Creek Trail Realignment construction. It would be completed in 1 season and could occur before, during, or after phases of the Redwood Creek Trail construction schedule. Consequently, the overall Project Schedule could be 4 or 5 years, depending on when the Extension was constructed.

### 3.4 Staging and Access

Four primary staging areas would be established: one each at Kent Canyon and Santos Meadow, near existing State Parks facilities; one in front of the Golden Gate Dairy Ranch House; and one at a flat area adjacent to Muir Woods Road near Bridge Removal 1 (just south of Kent Canyon). At the Bridge Removal 1 site (see Figure 2), a 60-foot by 60-foot area would be cleared of vegetation to create the staging area. At project completion, this area would be graded, covered with erosion control material, and planted with native species. Materials excavated during project construction would be temporarily stockpiled at three locations along the existing trail alignment. These stockpiles may remain in place between project phases for use on a later project phase. All stockpiled material would be covered to prevent pollution as described in the Best Management Practices (BMPs) in section 3.5 (Impact Reduction Measures). Excess soils removed from the trail and not used elsewhere on this project would be stockpiled at Kent Canyon for use on other future park projects. No excess materials would be left on site at the conclusion of the project.

There would be multiple project access points for personnel and equipment. Tools, materials, and equipment would be delivered by way of the access points off of Highway 1 or Muir Woods Road. The access closest to the work area that allows access without creek disturbance would be used. The main access points would be by way of the following:

- a temporary bridge at the Bridge Removal 1 location,
- the north end of the Redwood Creek Trail across from Deer Park Fire Road (northern trailhead),
- the Spur Trail south of Santos Meadow,
- the south end of Redwood Creek Trail near Highway 1 (southern trailhead),
- Highway 1 at NPS housing or the Golden Gate Dairy.

On the new trail alignment, tracked equipment would cross the dry drainage channels and any soil disturbance would be repaired by hand. The Culvert 2 tributary has year-round water flow. In order to cross this channel two 6-foot wide, 50-foot long paths would be cut through the vegetation from the new trail alignment to Culvert 2 on each side of the culvert. Metal I-beams would be placed over the culvert to allow small equipment to cross without crossing in water that flows over the top of Culvert 2.

The construction of Bridge 9, the new 110-foot bridge near Santos Meadow, and removal of Culvert 2 require special attention as described below.

**Bridge 9 Construction.** Santos Meadow, the large field across Muir Woods Road from the Bridge 9 site (See Figure 1), would be used for staging. A crane would be placed on Muir Woods Road during use. The outriggers for the crane would require significant grading to set the crane up off the road and closer to the bridge. Setting up on Muir Woods Road would require an encroachment permit from Marin County, which has jurisdiction over the road. An overhead power line along the west edge of the road would be temporarily re-routed (for about 12 hours) in coordination with PG&E. The road would be closed during crane operation, about 10 to 12 hours. Because of the size of the bridge and crane, a permit, pilot cars and police escorts are needed on Highway 1 and Muir Woods Road to get the bridge pieces and crane to the site.

In order to install piers on the left bank to support the bridge it would be necessary to cross the creek channel with small equipment. To accomplish this, a short section of Redwood Creek would be dewatered during the duration of this work using a coffer dam and re-routing the water downstream of the work area. Before dewatering, the area would be blocked off with turbidity curtains and fish and amphibians would be removed from the section of creek and taken to a safe location up or downstream as determined by biologists.

**Culvert Removal 2/Cascade Channel.** A large excavator is needed to regrade the channel and dump trucks are needed to remove the soil and deliver any required rock. To do this, a 15-foot-wide corridor would be cleared for access from Muir Woods Road to Culvert 2 and a 60-foot-long temporary bridge would be installed at the Bridge 1 Removal site. (The current bridge would have been removed at the initiation of the project.). No creek channel access is needed to set the temporary bridge; a 265-ton crane would set the temporary bridge in place. A 20-foot-wide, 20-foot-long temporary soil ramp would be constructed from Muir Woods Road down to the flat terrace adjacent to the creek to allow the crane to enter the site. The temporary bridge would be in place for 3 years to allow for easier project access with minimal creek channel disturbance. When the area is not closed for construction, the bridge would be used for visitor access along the trail and railings would be added for visitor safety. At project completion, the temporary bridge would be removed and the banks graded to a sustainable angle, covered with rolled erosion control material and fiber rolls, and planted with native plants and willow stakes. The access pathway would be graded and decompacted and fiber rolls installed. Cut vegetation would be retained on site and would be spread along the access path and large branches would be used to block the former trail.

The Culvert Removal 2 project would require access to the tributary channel. The project would remove the culvert, regrade impacted areas of the channel, and install rolled erosion control mats and native vegetation over all graded banks. Large  $\frac{1}{4}$  ton rocks would be installed in the bed and banks of the channel to recreate the cascade channel structure common to this type of stream. This channel has summer water flows and would be dewatered during the duration of this work using a coffer dam and re-routing the water downstream of the work area. Before dewatering, the area would be blocked off with turbidity curtains and amphibians would be removed from the section of creek and taken to a safe location up or downstream as determined by biologists.

### 3.5 Impact Reduction Measures

Best management practices (BMPs) would be employed during construction and are integral to the project design. The Project also would comply with all required permits and approvals, such as a SWPPP and a Lake and Streambed Alteration Agreement, if required. The following measures were identified to eliminate or minimize the degree of adverse effects that could otherwise result from project implementation. These measures would be implemented during construction, as appropriate for specific activities being conducted. They are considered part of the proposed Project and, therefore, are not identified as separate mitigation measures.

#### Vegetation

- All tools and equipment used on the Project would be required to be thoroughly cleaned of soil and plant material prior to entering the project area. If equipment temporarily leaves the project area, it would be cleaned prior to re-entering the project area.
- Soil disturbance during grading activities would be minimized to the extent possible to reduce habitat loss, potential for introduction or spread of invasive non-native plant species, to protect topsoil resources, and to reduce potential habitat for non-native invasive plant species.

- Vegetation disturbance would be limited and restricted to project areas. Riparian vegetation within and adjacent to project areas would be protected to the greatest extent possible and serve as a sediment buffer.
- Native plants would be salvaged during trail cutting and excavation as needed for revegetation. Additional plants would be grown in native plant nurseries. Revegetation with native species would occur on all disturbed areas adjacent to channels.
- Riparian trees would be protected to the greatest extent possible. Where removal of riparian trees cannot be avoided, species which resprout would be cut as high on the bole as possible to retain the structure of the tree, allow for sucker development, and retain roots for bank stability.
- After tree felling, roots would be left in place to prevent erosion where possible.
- All cut native vegetation would be retained on site and used to cover disturbed areas or block off decommissioned trails. At Culvert 2 Removal, the project hydrologist would direct placement of some wood debris within the channel.
- Vegetation would be cut or removed outside of bird nesting and bat maternity season or following bird nest and bat roosting surveys that demonstrate no nesting birds or roosting bats would be disturbed.
- Rock used for armoring, retaining walls, or other features would be imported from quarries that certify their material as weed seed free.

### **Erosion and Sediment Controls**

The project would include BMP strategies to minimize erosion and sediment discharges to Redwood Creek and its tributaries. Erosion and sediment control practices would include:

- Construction of the Redwood Creek Trail Realignment and all work adjacent to Redwood Creek or its tributaries would occur between June 1 and October 31. No soil disturbance within 100 ft of Redwood Creek would occur after October 31 and all disturbed soils would be stabilized by October 31. The Dias Ridge Trail Extension would not be limited to a June-October timeframe and would be completed in one construction period.
- Disturbance would be limited to project areas and pre-defined staging areas. All project limits would be clearly marked prior to the beginning of ground disturbing activities. No disturbance would occur beyond these limits. If incidental off trail temporary storage is needed, it would be limited to disturbed areas, would be confined to a clear location, would be monitored for wildlife prior to use, and be underlain with geo-textile fabric.
- Workers would receive an erosion, sediment control and pollution prevention training and would be instructed to avoid conducting activities beyond the construction zone (including storage of tools, materials, soil, etc.).
- Prior to construction, erosion and sediment control measures such as silt fences, gravel bag dikes and fiber rolls (wattles) would be installed as needed to eliminate the potential for sediment discharge in storm water into Redwood Creek and into any intermittently active drainages that empty into Redwood Creek. This would include installing a sediment barrier (wattles and/or silt fence) between the work area and Redwood Creek (or any active drainages) and covering disturbed soil with mulch and/or geofabrics. Sediment would be removed from sediment control devices, such as silt fences, when sediment has reached 1/3 height of the exposed portion of the device and the sediment added to soil stockpiles. Erosion and sediment control materials would be completely biodegradable. Erosion control measures would not contain plastic netting or monofilament that could trap small animals. Only rice straw-filled

fiber rolls and certified weed-seed free rice straw mulch would be permitted, to prevent inadvertent introduction of wheat and barley species.

- Staging and stockpiling areas would be in previously disturbed sites to minimize the amount of ground disturbance. These areas would be located away from sensitive habitat areas. Stockpiles would be outside of drainages, contained with appropriate sediment controls, and covered with geo-fabrics or plastic sheeting. All sediment control devices would be maintained regularly for the entire lifetime of the stockpile. All staging and stockpiling areas would be returned to pre-construction conditions following construction completion.
- Sites where activities result in exposed soil would be stabilized to prevent erosion as soon as feasible after project activities are complete.
- Following construction disturbed or bare soil adjacent to channels or drainages would have sediment controls installed along contours and would be covered with rolled erosion control material such as coir blankets. Passive (placing cut native vegetation) and active (planting) revegetation would be practiced.
- After completing construction, exposed soil outside the trail footprint would be covered with local leaf litter and native vegetation cut within project area as soon as possible. This mulch would provide a source of seeds to reestablish native vegetation and reduce the risk of non-native seeds germinating. Ideally, the litter and duff should be collected from surrounding areas, but not denude the collection area. At least 50 percent of the material would be left in place and vegetation would not be disturbed. In the absence of native vegetation, certified weed free rice straw may be used.
- Soils excavated during ground-disturbing activities would be reused to the extent that these locally-derived materials are found to be clean and weed-free. Any such reuse is subject to applicable NPS and CDPR policies and guidance.

### **Water Resource Protection and Pollution Prevention**

The project would include BMP strategies to prevent pollution from sediment, petroleum products, hydraulic fluid and other fluids related to equipment and power tool use. Proper storage, use, and disposal of chemicals, fuels, and other toxic materials would be required. Soil, silt, bark, rubbish, raw cement, concrete (including washings), oil or other petroleum products, or other substances that could affect water quality and be harmful to aquatic biota would be prevented from entering the soil and/or waters of the State/US. Fueling and maintenance of tools would not occur adjacent to sensitive resources (e.g., the creek).

- A Stormwater Pollution Prevention Plan (SWPPP) would be developed which would include BMPs and inspection procedures.
- All equipment and power tools would be:
  - inspected for fuel or other leaks before being brought on site. Tools showing signs of leaking would not be brought on site. Tools would be inspected for oil and gas leaks regularly and would be repaired or removed immediately if leaks are found,
  - stored in staging areas with perimeter controls (wattles or sandbags) to contain potential spills, and would be staged over impermeable materials to ensure that no spilled material can enter the soil, and



- refueled only in upland areas to prevent fuel spills near sensitive habitats. Fueling would occur over a non-permeable surface, such as a drip pan or tarp, and with a perimeter protection, such as an absorbent wattle, on the downhill side of the fueling area.
- For all vehicles and equipment operated in or near the creek:
  - All vehicles and equipment would be kept clean. Excessive build-up of oil or grease would be avoided.
  - All equipment used in the creek channel would be inspected for leaks each day prior to initiation of work. Action would be taken to prevent or repair leaks, if necessary.
  - No fueling or maintenance actions would occur in the creek. Vehicle and equipment maintenance activities would be conducted off-site or in a designated, protected area away from the channel where vehicle fluids and spills can be handled with reduced risk to water quality and the creek bed. Equipment would not be staged in the creek channel overnight.
- Any chemicals stored on site (for fueling or equipment maintenance) would be stored in a locked container with secondary containment in case of leaks.
  - If maintenance must occur on-site, it would occur in designated areas located at least 100 ft from drainages and channels, and protected with perimeter controls and non-permeable surfaces placed under the equipment. Secondary containment, such as a drain pan or drop cloth, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers, and properly recycled or disposed of off-site.
  - Emergency spill containment and clean-up materials would be kept on the project site.
- During environmental awareness training, all workers would receive training on the importance of pollution prevention, preventing spills and appropriate spill clean-up actions.
- Only clean rock/ aggregate from near the project area or imported specifically for this trail project would be used for trail stabilization or trail tread. No concrete rubble or other construction waste would be used.
- All trash and construction debris would be removed daily from the project site and disposed of appropriately offsite.
- During bridge decking and railing installation a sheet of Visqueen<sup>®</sup> or similar material would be attached under the bridge to catch wood dust, metal dust, loose hardware, etc., to avoid pollutants entering channels. These materials would be bagged and removed from the site.

## Wildlife

The measures described below may be augmented or modified based on consultation for Section 7 of the Endangered Species Act with the United States Fish and Wildlife Service and National Marine Fisheries Service, or in the requirements of the Lake and Streambed Alteration Agreement with the California Department of Fish and Wildlife.

- Prior to engaging in construction activities, all personnel would participate in an environmental awareness training session conducted by a qualified biologist. The biological monitor would train all workers on sensitive species potentially in the area, and conservation measures in place for the project. Training sessions would identify NPS and CDPR staff resource contacts and provide information on special-status species or other sensitive resources in the work area; markings for the limit line of disturbance; thresholds that would trigger a change in implementation techniques or require a halt in project implementation; prohibitions on feeding resident wildlife; and proper disposal of food

waste and garbage to discourage feeding by wildlife. Personnel would also receive training on pollution prevention, prevention of spills, and spill clean-up actions. Upon completion of training, employees or contracting crews would be required to sign a form stating that they attended the training and understand all the conservation and protection measures.

- Prior to construction, a qualified biological monitor would survey work areas for wildlife, including aquatic amphibians and reptiles. In addition, a qualified biological monitor would be present onsite or available on-call during work activities to relocate wildlife to an offsite location. The biological monitor would:
  - have experience in the identification and behavior of special-status wildlife species that could be affected by the proposed action, habitat assessment experience, knowledge of the natural resources within the action area, and experience with trail projects,
  - be responsible for ensuring that best management practices are being properly implemented, resource avoidance measures and housekeeping practices are upheld, and work is conducted in accordance with all required permits, policies, regulations, and plans,
  - have the authority to stop work if necessary to protect biological resources. If the monitor requests that work be stopped due to take of any listed species, the US Fish and Wildlife Service (Service) and the California Department of Fish and Wildlife would be notified within one working day via email or telephone, and
  - be the contact source for any employee or contractor who might inadvertently kill or injure a federally or state listed species or who finds a dead, injured or entrapped individual. The representative would be identified during the crew training program. The representative's name and telephone number would be provided to the Service prior to the initiation of ground disturbance activities.
- At the end of each workday, an escape ramp would be placed at each end of any construction-related open trenches or holes to allow trapped animals to climb out. The ramp may be constructed of soil, wood or another suitable material placed at an angle no greater than 30 degrees.
- To reduce daytime noise and potential disturbance to wildlife species due to construction, crews would muffle or control noise from power tools through implementation of the following measures:
  - Equipment and power tools would use the best available noise control techniques (e.g., improved mufflers, use of intake silencers, etc.).
  - Northern spotted owl surveys would be conducted to determine where northern spotted owl nests are located. Noise-inducing work with ¼ mile of northern spotted owl nests would occur outside of northern spotted owl (February 1- July 31) core breeding season.

*Nesting Bird and Raptor Protection:*

- To the greatest extent possible, activities would be planned and conducted outside the bird-nesting season (January 1 to July 31 for raptors, and March 1 to July 31 for landbirds).
- Northern spotted owls are known to occur in Muir Woods National Monument and Mount Tamalpais State Park and may be present in the project vicinity, particularly the northern end. Prior to construction a survey would be conducted to determine if nesting owls are present in the area and would be at risk of being disturbed by planned construction activities. (See noise reduction requirements above.)
- In the area of the realigned trail segment, vegetation would be maintained at a height of less than 12 inches throughout the landbird nesting season to discourage the nesting of such bird species where the trail is to be installed. Any vegetation (i.e., trees, shrub, grasses) taller than 12 inches that is not

removed within the timing window specified for vegetation cutting and removal would be subject to the additional measure, below.

- If work is conducted within the nesting season, prior to the onset of construction involving the cutting of vegetation or ground disturbing activities using heavy machinery, a qualified wildlife biologist would be retained to conduct pre-construction surveys for raptors and nesting birds within suitable nesting habitat in a 300-foot radius of the construction area. If no active nests are detected during surveys, activities may proceed. If active nests are detected within the construction area, a biologist would establish a suitable nest buffer in coordination with NPS and CDPR where no work can occur until the young have successfully fledged or the nests have been otherwise abandoned.

*Aquatic Species and Amphibians:*

- Construction would not occur in or near the creek during migration and spawning seasons of protected species, including coho salmon and steelhead. No in-water construction activities or creek dewatering would occur prior to July.
- Prior to working in wetted channels, channels would be dewatered. Prior to dewatering, native fish, tadpoles, and other vertebrates would be excluded or removed and relocated outside of the project area by a qualified biologist. Fish would be netted or chased from each individual area where in-channel work would occur. Electrofishing would be used to capture any remaining individuals. Captured fish would be placed in aerated holding containers and transferred to pool habitats outside of the project area. A qualified biologist shall monitor the construction site during placement and removal of channel diversions and coffer dams to ensure any effects to ESA-listed salmonids are minimized. All materials placed for creation of coffer dams would be removed upon completion of activities.
- In California red-legged frog habitat (as determined by qualified biologists), a biological monitor would search all work localities for the presence of California red-legged frogs prior to and during ground-disturbing activities. The search area would encompass a 50-foot radius around the work sites. All rodent burrows, leaf litter deeper than 2 inches, or other obvious refugia would be surveyed for the presence of the species. To prevent direct injury to California red-legged frogs, removal of vegetation within suitable frog habitat would be accomplished by a progressive cutting of vegetation from the overstory level to ground level to allow frogs to move out of the work area. Should any frogs be observed, activities would cease until the animal moves out of the work area or is removed and relocated by a permitted biologist. Captured frogs would be relocated to suitable habitat outside of the construction zone, either upstream or downstream of the construction zone.

*Protected Bat Populations:*

- The project activity with a potential to impact breeding bats would be tree removal; therefore trees would be removed between September 1 and January 31, outside of bat maternity season. If trees cannot be removed during this time period, then a bat habitat assessment would be conducted by a qualified biologist for those trees; and tree removal would proceed based on recommendations from the biologist.

*Woodrat Nests:*

- Any woodrat nests encountered during construction activities would be avoided, if possible, by establishing a minimum protection buffer of 50 feet around each nest. If nests are identified in areas where heavy equipment operation or excavation is integral to the project design, then the nests would be dismantled prior to grading or vegetation removal activities in a careful, gradual process that would allow any woodrats in the nest to escape into adjacent undisturbed habitat. Surveys would be con-

ducted to determine the likelihood that nests are inhabited, such as a cleared entrance, for example, or recently placed twigs on the nest. A clearly unoccupied nest in an area integral for construction would be dismantled during the routine construction period; however, if the nest appears to be occupied, it would not be dismantled until the non-breeding season of October-November. If young are encountered during nest dismantling, the dismantling activity should be stopped and the material replaced back on the nest and the nest should be left alone and rechecked in 2-3 weeks to see if the young are out of the nest or capable of being out on their own (as determined by a qualified biologist); once the young can fend for themselves, the nest dismantling would continue. Due to the possibility of exposure to hanta virus known to be carried by woodrats, any dismantling or observations of the woodrat nests would be conducted only in a manner that fully protects the health of crews, equipment operators, or surveyors.

### **Phytophthora Protections**

- All project activities that could spread Phytophthora species (plant-damaging Oomycetes [water molds]) to new locations would be subject to BMPs developed by the California Oak Mortality Task Force and available online at [http://www.suddenoakdeath.org/html/best\\_management\\_practices.html](http://www.suddenoakdeath.org/html/best_management_practices.html).

Phytophthora BMPs include but are not limited to:

- informing personnel that they are working in a phytophthora-infested area, unauthorized movement of soil material is prohibited, and the intent of these prevention measures is to prevent spread of phytophthora.
- removing or washing-off accumulations of plant debris, soil, and mud from shoes, boots, vehicles, and heavy equipment, etc. before leaving project area, and cleaning with denatured alcohol or similar materials as needed.

### **Cultural Resources**

- A cultural resource monitoring plan would be prepared to ensure that ground-disturbing activities within the project area result in no adverse effects to buried resources. The monitoring program would include oversight of project schedules and excavation areas to ensure that important opportunities for archaeological discovery are realized, and that potentially buried archaeological deposits are recognized in the course of active excavation and restoration.

#### *Ponte Ranch:*

The Ponte Ranch Site is a former dairy ranch south of Kent Canyon. The site contains features considered eligible for listing in the National Register of Historic Places, including intact subsurface domestic refuse deposits. Several of these feature are in the vicinity of the proposed Culvert 2 removal and Bridge 6 installation, and associated restoration and trail work. Feature 5 at the Ponte Ranch Site is a foundation remnant that would be removed. However, it was determined that the removal of this feature would not have an adverse effect on the Ponte Ranch Site. Construction of the new trail alignment would require the removal of a fencing remnant, identified as Feature 16. Removal of this small scale feature would have no adverse effect on the Ponte Ranch Site, because other fencing segments delineating the historic parcel boundary will remain visible and intact.

- Protection measures would consist of temporary construction fencing or flagging placed around Ponte Ranch Site features, installed so that they would not cause physical damage to the features and can be safely removed after completion of the Project.
- A qualified archaeologist would monitor grading activities within 200 feet of Feature 1 (refuse deposit) and other features at the Ponte Ranch Site to ensure avoidance of the archaeological features and to

identify and record any previously unexposed subsurface components and/or artifacts associated with the Ponte Ranch Site. They would be present during removal activities for Feature 5 (foundation remnant) to record any previously obscured and/or remaining portions of the feature. Feature 16 (fencing remnant) would be salvaged and stored by CDPR according to its policies and procedures.

*Inadvertent Discoveries:*

- If buried cultural resources are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within a 100-foot radius of the find until a qualified archaeologist can assess the significance of the find. Alternatively, an archaeologist and Native American monitor may monitor ground disturbances in vicinity of the site to ensure that such discoveries are protected until they can be properly recorded and assessed, and management decisions can be made about their treatment. Avoidance in place or no adverse effect from project actions are the preferred approaches to all discoveries that are potentially eligible for listing on the National Register of Historic Places (NRHP). Inadvertent discoveries would be treated in accordance with 36 CFR 800.13 (Protection of Historic Properties: Post-review discoveries). The archaeological resource would be assessed for its eligibility for listing on the NRHP in consultation with the State Historic Preservation Office (SHPO) (and a Native American monitor from the Federated Indians of Graton Rancheria if it is an indigenous archaeological site) and a determination of the project effects on the property would be made. If the site would be adversely affected, a treatment plan would also be prepared as needed during the assessment of the site's significance. Assessment of inadvertent discoveries may require archaeological excavations or archival research to determine resource significance. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.

*Discovery of Human Remains:*

- If human skeletal remains are encountered, all work shall stop in the vicinity of the discovery, and the find would be secured and protected in place. The Marin County coroner and Park Archaeologist would both be notified immediately. If a determination finds that the remains are Native American, and that no further coroner investigation of the cause of death is required, they would be treated in accordance with the Native American Graves Protection and Repatriation Regulations at 43 CFR 10.4 (Inadvertent discoveries). The coroner would also contact the Native American Heritage Commission (NAHC; pursuant to Section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs.

**Visitor Experience, Park Operations, and Safety:**

- Trail construction zones would be identified and signs or fencing would be placed to prevent visitors from entering the construction area or using closed sections of trail.
- Visitor information regarding Project activities (e.g., construction-related activity that could affect visitors—noise, trail closures or detours, etc.) would be provided via the park website, signage, field staff, or a park newsletter to enhance the public's understanding of the issues and to help them better plan their visits.
- For each phase of work, the NPS and CDPR would develop a construction management plan to sequence construction activities to minimize disruption to existing facilities and services. The plan would include information on days/hours of operation, trail closures, times in which particularly loud or noisy operations could occur, safety protocols, etc.
- During construction, contractors and CCC crews would ensure that all active construction, staging, and stockpile areas are fenced so as to exclude the public. Signs would be conspicuously posted to inform the public about the need for caution and to safely route visitors around construction areas.

- Residents or businesses located in proximity to project elements (e.g., residences on Highway 1) would be provided with at least 30 days advance notification of any planned construction activity in the vicinity. A contact telephone number for a construction representative would be conspicuously posted on construction site fences and would be included in the written notification of the construction schedule sent to nearby residents and posted on the website.

**Noise/Soundscape:**

- All equipment would be operated and maintained to minimize noise generation. Contractors would ensure that power equipment (vehicles, heavy equipment, and hand equipment such as chainsaws) is equipped with original manufacturer's sound-control devices, or alternate sound control that is no less effective than that provided as original equipment. Equipment would be operated and maintained to meet applicable standards for construction noise generation. No equipment would be operated with an unmuffled exhaust.
- Contractors would limit the idling of motors except as necessary for safe operations.
- Project-related activities could occur seven days per week and would generally be limited to the hours of 7:00 a.m. to 6:00 p.m. On the Dias Ridge Trail Extension, project activities requiring heavy equipment use would be limited to weekdays from 8:00 a.m. to 6:00 p.m. Work within ¼-mile of a northern spotted owl nest would be consistent with the noise restrictions identified under Wildlife.
- Internal combustion engines used for any purpose in the project areas would be equipped with a muffler of a type recommended by the manufacturer. Equipment and trucks used for project-related activities would utilize CDPR-approved noise control techniques (e.g., engine enclosures, acoustically attenuating shields or shrouds, intake silencers, ducts, etc.) whenever feasible and necessary.
- Stationary noise sources and staging areas would be located as far from visitors as possible. If they must be located near visitors, stationary noise sources would be muffled to the extent feasible, and/or where practicable, enclosed within temporary sheds.

### 3.6 Alternatives Considered and Dismissed

Alternatives to a project are considered if they reduce environmental impacts while achieving the Project purpose and need. The following alternatives were considered for project implementation, but were dismissed from further analysis. Reasons for their dismissal are provided. No alternatives to the Redwood Creek Trail Realignment or the Dias Ridge Trail Extension were suggested during scoping.

**Not Relocate Northern Section of Redwood Creek Trail.** Consideration was given to retaining the northern portion of Redwood Creek Trail in its current location, while improving trail features and creek and drainage crossings. However, this would not achieve the project objectives of creating a sustainable trail alignment, moving the trail out of the floodplain to allow for future floodplain restoration, or reducing impacts on the aquatic habitat for listed species to the same degree as a realignment of the trail section out of the floodplain.

**Alternative Trail Extension Alignments.** Alternatives were considered for the Dias Ridge Trail Extension between the existing Dias Ridge Trail and the Redwood Creek Trail along Highway 1. These included:

- (1) A trail alignment that would run behind (east of) the NPS residences and the life estate tenancy property located on the east side of Highway 1 and
- (2) Expansion of the Highway 1 shoulder to allow room for a multi-use trail immediately adjacent to the highway.

The first of these alternatives would create a steeper, less direct, and longer trail than one in front of the residences. It also would require retaining walls be installed due to the slope of the hillside and its length and construction requirements would cause more extensive damage to existing native vegetation than the proposed Project. As well, compliance with the Architectural Barriers Act Accessibility Standard would be difficult. If the first alternative were built, rather than use this alternative route, many trail users likely would continue to traverse from one trail to the other along the highway shoulder, as is current practice.

The alternative to expand the highway shoulder to accommodate a trail would require removal of trees within an historic wind row and still leave trail users vulnerable to passing vehicles. Users of this shoulder expansion alternative would still be adjacent to the highway rather than separated from the roadway by topography and landscaping; and the alternative would be within Caltrans right of way and would require some realignment of the road. NPS has no control over the road and would need Caltrans' agreement for any encroachment. For these reasons, both alternatives to the trail extension as proposed were not considered further.

### 3.7 Environmentally Preferred Alternative

Under NEPA, the environmentally preferred alternative is determined by applying the criteria suggested in the NEPA's implementing regulations (40 Code of Federal Regulations 1500-1508). Direction by the Council on Environmental Quality (CEQ) provides direction that the environmentally preferable alternative is the alternative that would promote national environmental policy, as expressed by Congress in NEPA Section 101. That policy is for Federal agencies to improve and coordinate plans, programs, and resources so that the Nation may

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
- assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative A, the No Action Alternative, is not the environmentally preferred alternative because it does not provide a means for improving conditions for visitors using the Redwood Creek Trail, reducing direct and indirect adverse impacts to listed species resident in Redwood Creek, or alleviate the safety risks associated with use of the Highway 1 shoulder to travel between the southern ends of the Redwood Creek Trail and Dias Ridge Trail.

Alternative B, the Proposed Project, is the environmentally preferred alternative because it best addresses the purpose and need and is environmentally beneficial as compared to existing conditions. Alternative B would provide a trail that would better allow the public to enjoy the recreational and natural amenities in the creek corridor, reduce adverse impacts on the creek and its resident species, and reduce the risk



to park visitors traversing along Highway 1 between two components of the existing trail system. The realigned and extended trails also would connect with other existing trails in the parks, allowing visitors choices of routes and destinations, thereby enhancing their experience.

## 4. Affected Environment and Environmental Consequences

### 4.1 Methodology

The Affected Environment section for each resource topic describes existing conditions as they pertain to that resource. This description is followed by an Environmental Consequences section, which describes potential impacts from the two alternatives considered. For each alternative, the Environmental Consequences section describes the direct, indirect, and cumulative impacts to the resource from the actions proposed under the alternatives and reaches conclusions regarding impacts.

Topics analyzed in this chapter include: Vegetation, Wildlife, Cultural Resources, Air Quality, Noise/Soundscape, Park Operations, Visitor Experience, Geologic Resources and Soils, and Water Resources.

Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Potential impacts are described in terms of type, context, duration, and intensity.

General definitions are as follows, while more specific impact thresholds are given for each resource topic in the resource section.

**Type** describes the classification of the impact as beneficial or adverse and direct or indirect, which are defined as:

- **Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resource towards a desired condition.
- **Adverse:** A change that moves the resources away from a desired condition or detracts from its appearance or condition.
- **Direct:** An effect that is caused by an action and occurs in the same time and place. All impacts identified in this document are “direct” unless otherwise stated.
- **Indirect:** An effect that is caused by an action but is later in time and farther removed from project activities, but is still reasonably foreseeable.

**Context** describes the area or location in which the impact would occur. Are the effects site-specific, local, regional, or broader?

**Duration** describes the length of time an effect would occur, and is either short-term or long-term. Because definitions of duration can differ by resource topic, definitions are provided separately for each impact topic.

**Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major.

Under NEPA there is no requirement that federal agencies determine “significance” when analyzing each impact in an EA; however, CEQA requires specific disclosure of the “significance” of each potential impact. Therefore, any determination of significance in this document is a determination under CEQA, not NEPA. The standards for determining significant impacts under CEQA are unique to each resource topic; however, the classification of the impacts was uniformly applied in accordance with the following definitions. Adverse impacts are considered to fall within one of three classes, as indicated:

- Significant impacts that cannot be mitigated to a level that is less than significant (Class I)
- Significant impacts that can be mitigated to a level that is less than significant (Class II)

- Adverse impacts that are less than significant (Class III)
- Beneficial impacts (Class IV)

Following the discussion of impacts is a Conclusion, where a determination of impact significance is provided for each resource topic, in compliance with CEQA.

## 4.2 Cumulative Impacts

The CEQ regulations that implement the National Environmental Policy Act of 1969 (42 USC 4321 et seq.) require assessment of cumulative impacts in the decision-making process for federal projects. A cumulative effect is described in the CEQ regulations (40 CFR 1508.7) as: *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action.* Cumulative impacts can result from individually less than significant, but collectively significant, actions taking place over a period of time. To determine potential cumulative impacts, projects within and near the project area were identified. Potential projects identified as cumulative actions included any planning or development activity that has been completed, that is currently being implemented, or that is anticipated to be implemented in the reasonably foreseeable future.

The Project would realign a portion of an existing trail and provide a new link between two trails. The Project would result in fewer impacts than occur under existing conditions. This would be achieved by relocating a part of the Redwood Creek Trail out of the floodplain, addressing features on the existing trail that contribute sediment and nutrients to the creek, and taking visitors off the highway shoulder between the Redwood Creek Trail and the Dias Ridge Trail. The Project is not anticipated to increase the use of the trails, thereby increasing parking demand, traffic, and wear and tear on facilities. Any adverse impacts of implementing the Project would be limited to construction periods spaced over four to five years. The existing Redwood Creek Trail is part of existing conditions. Therefore, the only projects that would contribute to a cumulative impact in conjunction with the Redwood Creek Trail Realignment and the Dias Ridge Trail Extension would be projects occurring in the project area during the same construction periods.

Cumulative impacts are evaluated in the cumulative impact analysis provide in conjunction with the impacts of each alternative to determine if they would have any additive effects on a particular natural resource, cultural resource, visitor use and experience, or the socioeconomic environment.

Examples of projects that have been completed or are in the process of being planned or implemented that are relevant to the cumulative impact discussion include:

- Dias Ridge Trail Restoration and Trail Improvement Program
- Marin Equestrian Stables Plan
- Deer Park Fire Road and Dipsea Trail Rehabilitation and Drainage Improvements
- Bootjack Trail Repair
- GGNRA Fire Management Plan

Cumulative impacts were addressed by considering the effects of the project alternatives, combined with the effects of past, present, and reasonably foreseeable future actions that were identified in and around the project area. Cumulative impacts are considered for each alternative and are presented as part of each resource impact analysis.

## 4.3 Affected Environment and Environmental Consequences.

### Vegetation

#### Affected Environment

Redwood Creek watershed contains a variety of habitat types including coastal chaparral, grassland, old growth redwood forest, mixed hardwood forest, seasonal wetlands, and riparian woodlands. Riparian, or streamside, forests and shrublands are dominated by broad-leaved deciduous trees or shrubs, most commonly willows (*Salix lasiolepis* or *S. lucida ssp. lasiandra*) and occasionally red alder (*Alnus rubra*) (GGNRA 2005). The understory is typically dense, with a variety of shrubs including native salmonberry (*Rubus spectabilis*), thimbleberry (*R. parviflorus*), and California blackberry (*R. ursinus*), as well as non-native Himalayan blackberry (*R. discolor*) and Cape-ivy (*Delairea odorata*). Numerous herbaceous species including ferns, rushes, and sedges dominate the shrub understory. Non-native trees including eucalypts (*Eucalyptus* spp.) and Monterey cypress (*Cupressus macrocarpa*) have become successfully established within riparian forest strands in the Project area.

Vegetation surveys were conducted for both the Redwood Creek Trail Realignment and the Dias Ridge Trail Extension. No special-status plant species or special-status natural communities were identified during the surveys.

#### Environmental Consequences

##### **Impact of Alternative A (No Action Alternative)**

Under the No Action Alternative the Proposed Project activities would not occur. Since there would be no cutting or clearing of vegetation for the realigned trail, there would be no impacts to the vegetation communities present in the Project area. The current maintenance regimen conducted by State Parks and NPS staff would continue to be conducted as needed.

**Cumulative effects.** Under the No Action Alternative, the Redwood Creek Trail would not be realigned or extended and there would be no additional impacts to vegetation and thus no cumulative impacts on vegetation when considered with other past, present, and reasonably foreseeable future actions.

**Conclusions.** The No Action alternative would not result in additional impacts to vegetation in the Project area. Under CEQA, this alternative would have no impacts on vegetation.

##### **Impact of Alternative B (Proposed Project)**

Under the Action Alternative, trail realignment and trail extension activities would result in direct adverse impacts to vegetation. These impacts are a result of the direct removal of vegetation with chainsaws and hand tools. The realignment would avoid large trees to greatest extent possible. However, smaller trees will need to be removed and a series of downed trees would need to be cut for the trail to pass through the area. Cut material will be left on site. Any limbs that need to be removed from large trees would be cut at the limb collar whenever possible to promote healing and reduce the long-term impacts to the trees. The Dias Ridge Trail Extension would involve removing 13 trees for reasons of safety. These are primarily Monterey cypress (*Cupressus macrocarpa*) and are considered at-risk trees because they are diseased or otherwise in poor condition. In the historic wind row between Highway 1 and the Golden Gate Dairy, 5 healthy trees would be pruned and retained, and 8 new Monterey cypress trees planted. Impact Reduction Measures (see Section 3.5) implemented as part of the Proposed Project would minimize impacts to vegetation. Where the trail segment is abandoned, the tread would be obliterated

and allowed to revegetate. Several impact reduction measures would be employed to avoid the spread of invasive species.

**Cumulative effects.** Under the Proposed Project Alternative, cumulative impacts to vegetation and plant communities are likely to be adverse, but less than significant and short-term, when combined with other past, present, and future projects. However, the impact of vegetation removal for the new Redwood Creek Trail segment and the Dias Ridge Trail Extension would be offset by the restoration and revegetation of the abandoned Redwood Creek Trail segment and the planting of the buffer between the Dias Ridge Trail Extension and Highway 1, including tree planting.

**Conclusions.** Impacts to vegetation would be adverse, but less than significant and short-term in intensity due to the limited extent of the vegetation that would need to be removed to establish the new and realigned trail tread and corridor and the restoration of the abandoned trail segment. Under CEQA, this alternative would result in less than significant (Class III) impacts to vegetation.

## Wildlife

### Affected Environment

Redwood Creek watershed contains a variety of habitat types including coastal chaparral, grassland, old growth redwood forest, mixed hardwood forest, seasonal wetlands, and riparian woodlands. Prior to the land use changes that followed European occupation of the watershed, a large intermittently tidal lagoon occurred at the mouth of Redwood Creek. The watershed provides habitat for several listed species, including northern spotted owl, California red-legged frog, coho salmon, and steelhead.

The northern spotted owl (*Strix occidentalis caurina*) is a federally-listed threatened species. Marin County supports a northern spotted owl population of possibly 75 pairs, the highest known density of northern spotted owls rangewide (GGNRA 2005). Spotted owls in Marin inhabit coniferous forest, including second growth and remnant stands of Douglas fir, bishop pine, coast redwood, and mixed evergreen-hardwood habitats comprised of tanbark oak, coast live oak, and California bay (Fehring et al. 2002 as cited in GGNRA 2005). Spotted owls are known from Kent Canyon and Camino del Canyon (nesting) as well as in Muir Woods (B. Merkle 2010 as cited in Marin Equestrian EA 2011).

California red-legged frog (*Rana draytonii*) is listed by the US Fish and Wildlife Service (USFWS) as a threatened species, and is a California Species of Special Concern (CNDDDB 2015). California red-legged frogs aestivate (enter a dormant state during summer or dry weather) in small mammal burrows and moist leaf litter. Lower Redwood Creek Pond was constructed in 2007 in this watershed to provide red-legged frog habitat. It is located in the floodplain above the Highway 1 Bridge, between the Golden Gate Dairy and Santos Meadow. In 2010, the NPS introduced red-legged frog egg masses into the Lower Redwood Creek pond. Subsequent to the action, juvenile frogs have dispersed into adjacent Redwood Creek. They have also been breeding in off-channel habitat created during recent projects in the in the Muir Beach area.

The coho (*Oncorhynchus kisutch*) is a federally and state listed endangered species, with critical habitat in Redwood Creek (64FR24049). Redwood Creek supports a genetically distinct sub-group of coho salmon (Garza and Gilbert-Horvath 2003) within the Central California Coast Evolutionarily Significant Unit ((ESU), a population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species). Coho salmon are particularly susceptible due to their spawning only a single time prior to death in their three-year life cycle, which requires an entire year of residence in freshwater prior to smolting and migrating to the ocean. (NPS 2012)

Steelhead (*Oncorhynchus mykiss*) is federally listed as a threatened species with critical habitat in Redwood Creek (70FR170 54288-52627). Steelhead is also a California Species of Special Concern. Like coho, steelhead also require year-round high quality water; however, their ability to spawn more than once and to reside in either freshwater or marine systems for variable lengths of time allows the species far greater ability to adjust to changing watershed conditions (NPS 2012).

Table 2 (Coho and Steelhead Data 2005–2012) shows 8 years of data from monitoring in Redwood Creek, reported in the NPS 2012 Annual Report on monitoring of coho and steelhead.

**Table 2. Coho and Steelhead Data 2005–2012**

Summary of coho and steelhead captured during Redwood Creek trap operations, 2005-2012. A coho smolt production estimate for 2009 was not calculated due to recapture pattern anomalies.

Year	Trap			Steelhead				Coho			
	Operation Dates		Days in Operation <sup>b</sup>	Juvenile			Adult	Coho		Production Estimate	
	From	To		Smolt	Parr	Fry	Ocean-run	Smolt	Fry	Estimate	Standard Error
2005	27-Mar	31-May	35	1	1	344	0	301	535	1,977	430
2006	18-Apr	9-Jun	49	18	0	24	0	1,048	27	2,502	257
2007	16-Mar	27-May	66	17	5	585	1	330	97	1,353	307
2008	19-Mar	30-May	70	18	3	151	0	890	3	2,046	163
2009	11-Mar	29-May	65	69 <sup>a</sup>	16	199	2	163 <sup>a</sup>	4	N/A	N/A
2010	19-Mar	28-May	59	51 <sup>a</sup>	62	53	0	120 <sup>a</sup>	98	389	409
2011	6-Apr	3-Jun	57	9 <sup>a</sup>	21	10	2	1,122 <sup>a</sup>	1	3,459	276
2012	4-Apr	31-May	53	43 <sup>c</sup>	25	434	0	203 <sup>a</sup>	1	1,021	164

Smolt, parr, and fry refer to life stages within the salmonid life cycle. Ocean-run refers to spawned adults returning to the ocean. Coho and steelhead presmolts are included in the coho and steelhead smolt totals.

<sup>a</sup> Includes total from lower mainstem site and new tagged fish from upper site.

<sup>b</sup> Does not include days when trap was partially functional.

<sup>c</sup> Total from upper trap in order to avoid double counting fish

Source: NPS 2012, Table 14

Based on historic regional accounts, numbers of coho salmon and steelhead trout have been severely depleted. Coastal Marin County streams and their associated watersheds currently containing populations of coho salmon and steelhead trout include Olema and Lagunitas Creeks, Redwood Creek, and Pine Gulch Creek. Some of the factors believed to have contributed to the declines in anadromous fish runs within the parks include:

- dam construction and loss of hydrologic connectivity;
- historic logging and sediment delivery to the channel;
- removal of large woody debris and limited riparian areas;
- stream channel and habitat alteration;
- loss of spawning and rearing habitat;
- water withdrawals, extreme hydrologic and climatic events;
- marine over-harvesting;
- changes to ocean food webs, including reduced primary production (NPS 2012).

In 2004, Muir Woods National Monument was inventoried for bat species (Heady and Frick 2004). Ten distinct species were detected, including former Federal Species of Concern Yuma myotis (*Myotis yumanensis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), and Townsend's big eared bat (*Corynorhinus townsendii*). The old growth redwood forest at the National Monument pro-



vides both foraging and roosting habitat for these bats, some of which over winter there. Given the proximity of the Project to Muir Woods National Monument, these and other bat species may occur in trees within the project area.

## **Environmental Consequences**

### ***Impact of Alternative A (No Action Alternative)***

Under the No Action Alternative, trail removal and realignment and bridge, culvert, and ford replacements would not occur. The current condition and location of the Redwood Creek Trail have resulted in impacts to habitat for listed aquatic species through increased sedimentation and erosion and the presence of horses in and near Redwood Creek. The impacts have also affected wildlife habitat in the Redwood Creek floodplain and the multiple drainages to the creek crossed by the trail.

**Cumulative effects.** Under the No Action Alternative, cumulative impacts to water quality and sedimentation, which affect wildlife, would be negligible because there is no additional trail construction. However, the impacts from the continued fine sediment build-up in the Redwood Creek could combine with other past, present, and future projects to have an added net long-term negligible effect as increased sediment is transported during construction and from trail use.

**Conclusions.** The No Action Alternative would have long term, less than significant adverse effects on water quality and sedimentation within the Redwood Creek watershed, which affects wildlife. Under CEQA, this alternative would result in a less than significant (Class III) impacts to wildlife in the Project area.

### ***Impact of Alternative B (Proposed Project)***

Under the Proposed Project Alternative, a segment of the Redwood Creek Trail would be realigned and culverts and bridges removed from the Redwood Creek floodplain and drainages to the creek. The existing fords crossing the creek, which have been contributing to the build-up of fine sediment and impacts to aquatic species habitat, would be removed. In addition, the current trail alignment limits projects which could improve creek and floodplain connectivity; the realignment would allow for future projects to reconnect Redwood Creek to its floodplain and enhance habitat in the watershed.

During trail construction activities, there would be adverse, less than significant, short-term impacts due to the localized temporary effects resulting from noise during removal and installation of project features and vegetation clearing. Bare earth may result in erosion and sediment release. If encountered, woodrat nests may be disturbed or removed. Longer-term effects would be associated with the removal of trees and other vegetation to accommodate the new realigned trail segment and from any vegetation removal associated with installation of bridges and other features. This would be offset by the revegetation of the abandoned trail segment in the creek floodplain. The impact reduction measures (see Section 3.5) employed during construction of the trail are intended to protect the immediate area under construction. Reduction of sediment discharge to the creek and moving the trail out of the floodplain would have a beneficial impact on wildlife.

**Cumulative effects.** The proposed trail removal and realignment under the Proposed Project Alternative would contribute a negligible increment to the total past, present and reasonably foreseeable future actions affecting wildlife in the Project area. The Proposed Project would contribute an overall beneficial impact to wildlife in the Project area as a result of habitat enhancements for listed aquatic species.

**Conclusions.** Implementation of the Proposed Project Alternative would result in negligible short-term impacts during construction and long-term, beneficial impacts to wildlife within the Redwood Creek watershed. Under CEQA, this alternative would result in beneficial (Class IV) impacts to wildlife.

## **Cultural Resources**

### **Affected Environment**

#### ***Regulatory Context***

The Proposed Project is an undertaking as defined in 36 Code of Federal Regulations §800.16(y) with the potential to cause effects on historic properties (36 Code of Federal Regulations §800.3(a)). As such, this analysis has been prepared to comply with Section 106 of the National Historic Preservation Act to take into account the effect of the undertaking on any district, site, building, structure, or object included in or eligible for inclusion in the NRHP.

#### ***Area of Potential Effects***

The Area of Potential Effects (APE) encompasses the area where ground disturbance would occur during implementation of the proposed Project, including access and staging areas. For the Redwood Creek Trail component of the project, the APE consists of approximately 2 -miles of the existing Redwood Creek Trail and an approximately 1-mile segment of new trail replacing a portion of the existing trail. The horizontal APE encompasses a 25-foot buffer from the centerline of the existing and new trail segments. Ground disturbance associated with the construction of the proposed Project would involve earthwork, including the removal and replacement of bridges and culverts, resulting in ground disturbance up to 2 feet deep. The construction of the Santos Meadow Bridge (Bridge 9) would involve the deepest disturbance, which is estimated to be up to 60 feet deep for the installation of bridge piers. The piers would be drilled into place. At the location of Culvert Removal 2 (Ponte Ranch Site), the APE extends between Culvert Removal 2 on the existing trail and the construction of Bridge 6 on the new trail alignment, roughly 150 feet south-west of a seasonal drainage that feeds into Redwood Creek. The deepest disturbance in this portion of the APE will occur within the creek bed, with soil removal efforts up to 10 feet deep beneath the existing culvert. Feature 1 (refuse deposit) is recorded on the east side of the drainage within the APE, since the archaeological investigation and evaluation of the Ponte Ranch Site, the Project has since been designed to avoid remaining portions of Feature 1 during project implementation.

For the Dias Ridge Trail Extension, two areas of effect were considered: an APE that encompasses the area that would be affected both directly and indirectly by the Project and, within this area, an Area of Direct Physical Impacts (ADPI), which consists of the footprint of ground disturbance related to Project construction and staging for the trail extension alternatives. The broader APE takes into account indirect, or visual, effects on buildings, structures, and cultural landscapes within and adjacent to the area of ground disturbance. For the trail extension, the ADPI consists of a 25-foot wide corridor along the alternatives (approximately 1,300 feet along the east side of Muir Woods Road/Highway 1 plus the hillside alternative alignments.)

#### ***Investigation Results Redwood Creek Trail***

As a result of the background research and field survey conducted for this project, three cultural resources were identified within the APE: (1) CDPR bridges and culverts along the Redwood Creek Trail; (2) a fence and four historic artifacts (described below); and (3) the Ponte Ranch Site, which includes structural

remains and a domestic refuse deposit associated with the Ponte family dairy ranch, dating from the 1930s to the 1960s. No prehistoric archaeological resources were identified during this investigation.

**CDPR Bridges and Culverts.** The three bridges and four culverts located within the APE would be removed or replaced as a result of the Project; they are listed in Table 2. The bridges and culverts within the APE were likely constructed after CDPR purchased the land in the 1960s but their construction dates are unknown. The exception is Culvert Removal 2, which is located at the Ponte Ranch Site and may be associated with the early use of the ranch. However, the culvert appears to have been modified since its original construction. The bridges are constructed of wood planks/logs and the culverts are made of corrugated metal with wood and rock cribbing. CDPR site records were prepared for the bridges and culverts in order to provide CDPR with documentation and to inventory the features within the APE.

**Table 3. CDPR Bridges and Culverts Within the APE**

Name	Construction Style/Material	Dimensions
Bridge Removal and Replace 1	Wood Plank /Log	62' Length
Culvert Removal 1	Corrugated Metal, Wood and Rock Cribbing	48" Diameter
Culvert Removal 2	Concrete, Wood and Rock Cribbing	24" Diameter
Culvert Removal 3	Corrugated Metal, Wood and Rock Cribbing	48" Diameter
Bridge Removal 1	Wood Plank/Log	40' Length
Bridge Removal 2	Wood Plank/ Log	70' Length
Bridge 13/ Remove Culvert	Corrugated Metal, Wood and Rock Cribbing	48" Diameter

Source: (GANDA 2015)

**Fence and Isolated Artifacts.** This site consists of a fence line, which has been burned and is essentially collapsed. The fence consists of two sections. One portion runs roughly east–west along the contour of a steep 25 to 30° north-facing slope. This section consists of approximately 60 1- to 2-foot wide, rough-cut burned fence posts. No barbed wire is present. The other section turns 90° upslope to the north and consists of both standing and collapsed fence posts, both burned and unburned. This section has some strands of barbed wire still present on the post, and extends outside the APE for an unknown distance.

This site also includes four artifacts: two machine-made aqua glass soda/mineral water bottles with crown finishes; one amber machine-made export-size beer bottle with crown finish; and one ceramic Hutter-style bottle stopper (patented February 7, 1893). All three bottles postdate 1904, the year the Owens Bottle Machine Co., began producing the first machine-made bottles. The Hutter Stopper, on the other hand, exhibits a transfer printed logo for the Fredericksburg Brewing Co., which was in operation from 1889 to 1918. The stopper and beer bottle may be related; however, the finish suggests a crown cap was the more likely closure type for the bottle. The artifacts were identified to the south and east of the corner of the collapsed fence line, near a large bay tree. Three other large bay trees are located just to the east.

Close examination of the area, including removal of duff with hand trowels, did not uncover any other artifacts. The absence of additional historic materials, combined with the lack of structural features, and the isolated artifacts being identified on a steep slope, all indicate the unlikely presence of historic building remains associated with dairy ranching activities in this location.

**Ponte Ranch Site.** The Ponte Ranch Site, a single archaeological site with multiple features, is a mid-twentieth century Portuguese dairy ranch that lies largely in ruins and has been obscured by vegetation. The ranch site is located on the south side of Redwood Creek and encompasses both sides of a seasonal drainage that runs northeast–southwest from the ridge to the south. The site includes structural remains and domestic refuse.

The architectural remains of the ranch complex are located within and adjacent to the APE. The most intact and recognizable structure is the milking barn, which consists of a remnant foundation, troughs, and walls. Other ranch-related features were observed, such as a portion of the water conveyance system, partial foundations associated with the ranch house, and possible garage or storage shed foundations.

During the investigation for the proposed Project a total of 16 features were identified; 10 of which are within the APE and 6 are outside the APE. Of the features within the APE, only Feature 5 (garage foundation remnant) and Feature 16 (remnant fencing) would be subject to project-related disturbances and require removal. The remaining features within the APE would not be disturbed during project implementation. These include Feature 1 (refuse deposit), Feature 2 (water conveyance system), Feature 3 (ranch house foundation), Feature 4 (milking barn complex), Feature 6 (spigot), Feature 7 (ornamental tree), and Features 9, 10, and 14 (refuse deposits).

One historic-period refuse deposit (Feature 1) identified near the location of Culvert Removal 2 is a surface deposit scattered along the east bank of a seasonal drainage containing artifacts dating to the 1930s and 1940s. The artifacts consisted of glass bottles and jars, cans, corrugated metal, buckets, pans, and a bed frame, all of which appeared to be related to the occupation of the former ranch house, located roughly 35 feet northeast of the deposit. Additional archaeological testing was conducted in consultation with CDPR and NPS and resulted in the recovery of a large assemblage of whole bottles and bottle fragments, and a limited number of ferrous metal and ceramic artifacts. Additionally, a small, but diverse faunal assemblage was recovered.

The Ponte Ranch Site is recommended eligible for inclusion in the NRHP and California Register of Historical Resources (CRHR) for its potential to yield important information relevant to the history of Azorean Portuguese dairy ranching in southern Marin County and regional historical research themes.

### ***Investigation Results Dias Ridge Trail Extension***

An archeological survey was completed during the spring of 2015 for an area totaling 6 acres. The survey resulted in the documentation of 1 isolated find outside of the APE, remains of a wooden water tank. No archeological properties were documented within the APE during this survey; however, site P-21-002798 (historic-period trash scatter associated with the Golden Gate Dairy) is immediately adjacent to the proposed trail alignment. This historic-period trash scatter has not been evaluated for the National Register, nor has its vertical extent been explored. Due to its documented location outside of the present project area, monitoring of any ground disturbing activity in the area should be sufficient to avoid adverse impacts to the resource.

### **Impact of Alternative A (No Action Alternative)**

Under the No Action Alternative, ground-disturbing activities associated with trail realignment and extension would not occur. Use of the existing trail would continue. This has the possibility of disturbing previously unidentified cultural resources. There would be no impacts or negligible impacts to cultural resources previously identified within the APE.

**Cumulative effects.** Cumulative impacts to cultural resources under the No Action Alternative would be negligible because there would be no new trail construction, but use of the existing trail would continue. The impacts from the continued trail use could combine with other past, present, and future projects to have an added net long-term negligible effect on cultural resources.

**Conclusions.** Under this alternative, no project-related construction activities would occur. Therefore there would be little adverse effect cultural landscape or archeological resources. Under CEQA, this alternative would result in less than significant (Class III) impacts to cultural resources.

## **Impact of Alternative B (Proposed Project)**

Impacts to cultural resources could result from ground-disturbing activities during the trail realignment and the extension, which would require earthwork. These activities include removing existing bridges, culverts, and crib walls that currently impact drainage channels. The bridges and culverts identified as historical resources during site surveys were recorded in order to provide CDPR with documentation and to inventory the features. Through the implementation of Impact Reduction Measures (in Section 3.5) as part of the proposed Project, impacts to cultural resources from construction activities would be avoided or minimized. The measures require the presence of a qualified archaeologist and the recovery and documentation of features. The trail realignment, improvements, and extension may reveal previously unidentified cultural resources which would be managed and recorded as required by the impact reduction measures. Under CEQA, the impacts of the proposed Project would result in less than significant (Class III) impacts to cultural resources.

### **Cumulative effects.**

The Proposed Project Alternative would contribute a negligible amount to cumulative impacts to cultural resources when combined with other past, present, and future projects including other trail construction or maintenance as well as fire management activities

### **Conclusions.**

The Proposed Project would result in short-term, negligible impacts to cultural resources during construction activities (Class III).

## **Air Quality**

### **Affected Environment**

The project site is located in southern Marin County. Existing air quality conditions within the project vicinity were described in the Headlands Institute Campus Improvement and Expansion Plan EA and the Marin Equestrian Stables Plan EA, in August 2009 and October 2011, respectively. Because these projects are in the general project vicinity, the air quality setting of those EAs is considered valid for the project and is summarized and updated below.

Air quality within the San Francisco Bay Area Air Basin is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD is responsible for implementing emissions standards and administers air quality regulations developed at the federal, state, and local levels. BAAQMD operates a regional air quality monitoring network that regularly measures concentrations of major categories of air pollutants called criteria pollutants. These include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. The San Rafael monitoring station is the closest to the study area and provides data for ozone, carbon monoxide, and PM<sub>10</sub> (particles smaller than 10 micrometers in diameter). (NPS 2009).

Southern Marin County naturally experiences a low potential for the buildup of air pollution because the distance from the ocean is short and relatively low terrain elevations allow maritime air to flow across the area. Air pollution potential is highest in eastern Marin County, where most of the population is located in semi-sheltered valleys. In the southeast portion of the county, the influence of marine air keeps pollution levels low. (BAAQMD 2012).<sup>1</sup> Air quality monitoring data from San Rafael (2012-2014) indicates that air quality is generally quite good, and ozone and carbon monoxide standards were not exceeded

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<sup>1</sup> BAAQMD. California Environmental Quality Act Air Quality Guidelines; Appendix C. Updated May 2012.

in the monitoring period. National and California-specific ambient air quality standards for particulate matter, including PM10 and PM2.5 (particles 2.5 micrometers in diameter and smaller), are occasionally exceeded during one to two 24-hour periods per year. (ARB 2015).

Regional flow patterns affect air quality in the southern Marin NPS and CDPR lands by moving pollutants downwind, with prevailing winds from the west or northwest. Moderate winds disperse pollutants and reduce pollutant concentrations. A thermal inversion layer can trap pollutants, primarily in the sheltered valleys. Normal precipitation occurs from November through February and totals an average of 35 inches. (NPS 2009).

## Environmental Consequences

### *Impact of Alternative A (No Action Alternative)*

Under Alternative A, construction proposed under the Project would not occur. No additional sources of air contaminants would be introduced into the project area as a result of not implementing the Project. Impacts would be similar to those occurring at present.

**Cumulative effects.** The Proposed Project would not be undertaken; therefore, there would be no contribution to a cumulative effect except for continued use of the trail as currently occurs.

**Conclusions.** Air emissions would be similar to those occurring currently. Under CEQA, this alternative would result in less than significant (Class III) impacts to air quality.

### *Impact of Alternative B (Proposed Project)*

Air emissions related to the Project can result from both mobile sources (equipment and vehicles) and from particulate matter (dust). Trail removal and realignment activities would temporarily contribute negligible amounts of fugitive dust emissions and vehicle and equipment exhaust in the immediate vicinity of the construction areas. It is unlikely any fugitive dust would impact park operations or visitor experience as work would occur in a very small area of the park and would not require extensive use of motorized equipment or expose large areas of bare earth, which could result in particulate matter becoming airborne.

**Cumulative effects.** Construction-related emissions of other projects in the region are included in the emission inventory that forms the basis for BAAQMD's regional air quality plans. Because those emissions are not expected to impede attainment or maintenance of ozone and CO standards in the Bay Area (BAAQMD 1999) (NPS 2009a), cumulative impacts of the Project are, to a large extent, addressed by BAAQMD's regional planning and are considered to be no more than negligible to less than significant.

To the extent construction activities of any other project occur at the same time, in no case would such an impact be anticipated to exceed the threshold for a moderate adverse impact. Such an impact would only be anticipated very infrequently during periods of intense construction activity, and is therefore unlikely.

Some of the cumulative projects could generate additional mobile source emissions, and would generate a negligible amount in view of the 2,000 vehicle trips per day BAAQMD threshold for individual sites. Further, the Muir Woods National Monument Reservation System is anticipated to reduce the number of vehicles on the road over the long term, particularly during peak periods. This would have a beneficial impact on long-term emissions. In combination with the negligible impacts on long-term emissions, overall long-term cumulative impacts would also be considered negligible.



**Conclusions.** The Proposed Project Alternative would result in less than significant short-term regional and local adverse impacts. Implementing the Proposed Project Alternative would not impair park air quality. Under CEQA, this alternative would result in less than significant (Class III) impacts to air quality.

## Noise/Soundscape

### Affected Environment

Natural soundscapes in parks are valued components of the park visitor's experience. Human enjoyment of and need for quiet and solitude are major considerations for visitors to rural and wild landscapes. Additionally, natural sound is an important ecological attribute, with changes in the soundscape affecting park wildlife. The Redwood Creek Trail environment is dominated by natural sounds of flowing water, birds, and rustling of vegetation. Occasional sounds of aircraft passing overhead or motor vehicles on Muir Woods Road are the sounds that can aptly be considered as "noise", and these are transitory. Sound decreases with distance and can be reduced by sound-absorbing surfaces. In the case of the Redwood Creek Trail environment, the distance from Muir Woods Road and the existing vegetation help reduce sound intrusions along the northern portion of the trail. The southern portion of the Redwood Creek Trail is closer to the road, and noise from passing vehicles would be perceptible. This is an existing condition unchanged by the Project. On the Dias Ridge Trail Extension, users would be aware of noise from passing vehicles; however, this also is an existing condition that is not altered by the Project. Because of the slightly increased distance from the highway and the presence of intervening vegetation, the noise would be slightly but insubstantially reduced.

### Environmental Consequences

#### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, the existing soundscape would remain the same. Therefore, there would have no additional impacts on the natural soundscape.

**Cumulative effects.** Under the No Action Alternative, the Redwood Creek Trail improvements would not be undertaken and the trail realignment and extension would not occur; therefore, there would be no effect on the soundscape at the park and no impact on the park soundscape when considered with other past, present, and reasonably foreseeable future actions.

**Conclusions.** The No Action Alternative would not result in any additional impacts to the existing soundscape. Under CEQA, this alternative would have no impacts to noise and soundscape.

#### *Impact of Alternative B (Proposed Project)*

Under the Proposed Action Alternative, a slight increase in ambient noise would occur during the trail improvement and realignment activities. Any sound generated from construction would be temporary, lasting only as long as the activity generating the sound, and would have a negligible impact on the park soundscape. Construction noise would be limited to the immediate vicinity of the area of the activity. There would be increased noise from hikers along the new trail alignment, which would be a transfer of noise that occurred on the decommissioned trail segment. The impact reduction measures employed as part of the Proposed Project during construction of the trail are intended to minimize noise generation. There would be no long-term overall change in the soundscape, as no increase in trail use is anticipated. In the realigned segment of the trail, noise from trail users would be shifted out of the riparian area of the creek to an upland area. This would improve the ecological soundscape along the creek, but increase the sound along the upland route. However, noise created by trail users is intermittent and often negligible.

**Cumulative effects.** The proposed Redwood Creek Trail improvements would not contribute an increment of noise to the total cumulative past, present and reasonable foreseeable future soundscape in the park. While noises would be generated in the immediate vicinity of the trail during construction, these would be addressed by the noise reduction measures applied to the proposed Project. After trail construction activities are complete intermittent sounds from trail use would occur, similar to existing conditions. Thus, the proposed action would contribute negligible short-term noise impacts and no long-term increase in noise.

**Conclusions.** The proposed Action Alternative would have a less than significant and temporary impact on the natural soundscape in the immediate vicinity of the project area during the construction. After construction use of the trail extension would introduce intermittent noise that would have a long-term negligible adverse impact on the natural soundscape along the new trail segment, but this would be offset by a comparable noise reduction along the decommissioned trail segment. Under CEQA, this alternative would result in less than significant (Class III) impacts to noise and soundscape.

## Park Operations

### Affected Environment

Park Operations within MTSP and the GGNRA could be affected to varying degrees by the two alternatives. The existing Redwood Creek Trail requires attention from law enforcement, maintenance, and resource management staff. Maintenance and patrol activities would not increase as a result of the Project, which would improve the trail and better protect the environment. The improvements would reduce the need for ongoing maintenance as compared to existing conditions. The extension of Dias Ridge Trail would be relatively short, and would represent a nominal addition of facilities that would be the responsibility of park staff.

### Environmental Consequences

#### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, there would be no impacts to park operations as the Proposed Project activities would not occur. However, deteriorating trail tread and structures may result in increased maintenance needs over time.

**Cumulative effects.** Under the No Action Alternative, the Redwood Creek Trail improvements would not occur and the respective trails would not be realigned or extended. Conditions would remain as they are, with continued deterioration of resources and facilities. There would be no cumulative effects on park operations. Current maintenance regimens for the Redwood Creek Trail would be continued. Over time there may be need for increased maintenance compared to existing levels.

**Conclusions.** There would be no new impacts to park operations as a result of the No Action Alternative. However, by not addressing the issues identified in the Purpose and Need of the proposed Project, the No Action Alternative may increase the need for trail maintenance over time. Under CEQA, this alternative would have a less than significant impact (Class III) on park operations.

#### *Impact of Alternative B (Proposed Project)*

Park operations could be affected during the construction. Some trail segments could be temporarily disrupted or made inaccessible during construction. Construction phasing would minimize these effects. Once complete, trail improvements included in the proposed Project would reduce operation and maintenance needs in general on the trail, freeing these resources for other park operational needs.

**Cumulative effects.** The Proposed Action Alternative would not contribute to the total cumulative past, present and reasonable foreseeable future park operations. The improvements would reduce conditions that require ongoing or periodic maintenance, and therefore would not impact park operations when added to the other trail construction projects in the Project area. The proposed Project would contribute a beneficial impact to park operations due to a reduction in maintenance needs as a result of upgraded and improved trail conditions.

**Conclusions.** The proposed Project would result in few impacts to Park Operations. Construction of the proposed Project would result in short-term adverse impacts due to less than significant disruptions to trail access during construction, which would require a minor amount of staff time to post and enforce. The Dias Ridge Trail Extension would add additional length of trail to the trail network and would require upkeep. However, long-term beneficial impacts would result from a decreased need for maintenance of the improved Redwood Creek Trail. Under CEQA, this alternative would result in less than significant (Class III) impacts as well as beneficial (Class IV) impacts to park operations.

## Geology Resources and Soils

### Affected Environment

The study area for geologic resources includes the Project area; however, descriptions of the larger area are provided as background where relevant.

The Project area is located within the Coast Ranges geologic province of California, part of a block of folded and faulted marine sedimentary and volcanic rocks. The region consists primarily of Mesozoic (248 to 65 million years ago [mya]) metamorphic and sedimentary rocks of the Great Valley complex, thrust upward when Cretaceous (145-65 mya) marine rock of the Franciscan complex was subducted underneath, deforming the rocks into the landscape present today. The Great Valley Complex is composed mostly of conglomerate, sandstone, and shale, while the Franciscan Complex consists of metamorphosed sandstone, shale, limestone, chert, greenstone, serpentine, greywacke, and various other metamorphic rocks (Marin County CDA 2005). In Pleistocene times (1.8 mya to 10,000 years ago) sea water levels rose during interglacial periods and the encroaching water in and around San Francisco Bay deposited thick layers of sediments known as bay mud. Conversely, during glacial stages of the Pleistocene local sea level dropped as much as 350 feet, causing significant incising of stream channels and valley headcutting as water retreated from the continent and toward the Pacific Ocean (Marin County CDA 2005). In general, rocks at the surface within the Coast Range are Holocene-aged (10,000 years ago to present) sediments that are typically loose debris susceptible to seismic shaking, landsliding and liquefaction; these include bay mud, dune sand, marine and marsh deposits, landslide deposits, alluvium and colluvium. The older Pleistocene deposits consist of volcanic gravel, older beach deposits, and older alluvial/colluvial and marine terrace deposits that also have a potential for liquefaction and landsliding, especially when associated with seismic events (Marin County CDA 2005).

Geologic materials in the Project area are primarily Quaternary sand dunes, alluvium (water-transported materials) and other deposits underlain by the Franciscan Complex, which consist mostly of metamorphosed Mesozoic sedimentary and igneous rock as described above. There are also interspersed areas of colluvium, or slope failure deposits, which are discussed further in this section.

The Redwood Creek corridor primarily consists of riparian soils which are classified as part of the Blucher-Cole Complex, which are 2-5 percent slopes. Soils of this type are commonly found on alluvial fans and basin/valley bottomlands. Parent materials are typically alluvium (e.g., earth materials that have been transported and deposited by water) derived from sandstone, granite, and shale. These soils are comprised of silt and clay loams that are somewhat poorly drained.

## Environmental Consequences

### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, there would be no impacts from trail construction activities associated with the removal and realignment of the Redwood Creek Trail or extension of the Dias Ridge Trail. There would be continued sedimentation and erosion occurring at points along the existing trail. Impacts to geologic resources and soils under this alternative are adverse and long-term in duration, and minor in intensity for the existing trail.

**Cumulative Impacts.** Cumulative impacts to geology and soils under the No Action Alternative would be negligible because there is no additional trail construction. However, the impacts from the continued fine sediment build-up in Redwood Creek could combine with other past, present, and future projects to have an added net long-term negligible effect as increased sediment is transported during construction of other projects and from trail use.

**Conclusions.** There would be continued less than significant adverse impacts from ongoing erosion occurring along the Redwood Creek Trail under the No Action Alternative. Under CEQA, this alternative would have less than significant (Class III) impacts to geology and soils.

### *Impact of Alternative B (Proposed Project)*

The Proposed Project Alternative includes the realignment of the north end of the Redwood Creek Trail and various improvements along the trail, as well as an extension of the Dias Ridge Trail to connect with the Redwood Creek Trail. Existing trail conditions have resulted in erosion along the Redwood Creek Trail and sediment contributions to Redwood Creek. The realignment of the trail (which includes construction of a new trail segment and the removal of an existing trail segment, as well as culverts and bridges located in the floodplain and the restoration of the land currently used for the trail) would reduce sedimentation and erosion. During trail construction activities, there would be adverse, less than significant, short-term impacts due to the localized temporary effects resulting from erosion and sediment release. The impact reduction measures employed during construction are intended to minimize or prevent these effects in the area under construction.

**Cumulative effects.** The proposed trail removal and realignment under the Proposed Project Alternative would contribute a negligible increment to the total past, present, and reasonably foreseeable future actions affecting the geology and soils in the Project area. The Proposed Project would contribute an overall beneficial impact to the geology and soils of the Redwood Creek watershed by reducing erosion.

**Conclusions.** There would be negligible adverse short-term impacts due to the localized temporary effects of trail construction. However, the removal of the trail from the Redwood Creek floodplain and the general trail improvements would result in long-term beneficial impacts to geology and soils due to the decrease in long-term erosion. Under CEQA, this Proposed Project Alternative would result in beneficial (Class IV) impacts to geology and soils.

## Water Resources

### **Affected Environment**

The Redwood Creek watershed begins at the peak of Mt. Tamalpais and extends southwest to Muir Beach, where it empties to the Pacific Ocean at an intermittent tidal lagoon. The watershed encompasses an area of less than nine square miles. The watershed provides habitat for several sensitive species, including northern spotted owl, California red-legged frog, coho salmon, and steelhead.

The main tributaries to Redwood Creek include Bootjack, Fern, Kent Canyon, Rattlesnake, and Spike Buck creeks. The Redwood Creek Watershed contains a variety of habitat types including coastal chaparral, grassland, old-growth redwood forest, mixed hardwood forest, seasonal wetlands, and riparian woodlands. Prior to the land use changes that followed European occupation of the watershed, a large intermittently tidal lagoon occurred at the mouth of Redwood Creek. This lagoon once covered approximately 25 acres. The majority (95 percent) of the land within the watershed is in public ownership. Within the watershed boundaries lie portions of MTSP, NPS property including the National Monument and GGNRA land, and MMWD land. Two communities occupy a portion of the watershed at its southern end, Green Gulch Farm and Muir Beach.

## Environmental Consequences

### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, there would be no impacts from trail construction as the trail realignment and extension would not occur. However, impacts to the Redwood Creek floodplain and drainages would continue to occur due to existing trail conditions and its location. Much of the trail's current alignment is within the creek's floodplain, which likely increases the amount of fine sediment reaching Redwood Creek that would otherwise occur and disrupts the connectivity of the creek and its floodplain.

**Cumulative effects.** Cumulative impacts to water quality under the No Action Alternative would be negligible because there would be no additional trail construction. However, the impacts from the continued fine sediment build-up in the Redwood Creek could combine with other past, present, and future projects to have an added net long-term negligible effect as increased sediment is transported during other construction projects and from trail use.

**Conclusions.** The No Action Alternative would have long term, less than significant adverse effects on water quality within the Redwood Creek watershed. Under CEQA, this alternative would result in a less than significant (Class III) impact to water quality.

### *Impact of Alternative B (Proposed Project)*

The Proposed Project Alternative includes such actions as realigning the northern reach of the trail to a new 1.1-mile trail segment in a more suitable location outside of the floodplain and abandoning and decommissioning 0.9 mile of existing trail in the floodplain; removing culverts and bridges in the abandoned section and restoring the land; eliminating fords and replacing them with bridges; and removing culverts and cribs walls and replacing them with bridges. These actions would benefit water quality in Redwood Creek by promoting natural drainage, reducing fine sediment delivery to the creek, and facilitating coarse sediment delivery. In addition, removing the trail from the floodplain would allow for future connectivity of the creek and floodplain to be re-established. However, there would be adverse, less than significant, short-term impacts under this alternative due to the localized temporary effects resulting from sediment release from trail construction. The impact reduction measures employed during construction are intended to protect the immediate area under construction and the water quality and stream habitat of the streams affected by construction.

**Cumulative effects.** The proposed trail removal, realignment, and extension under the Proposed Project Alternative would contribute a negligible increment to the total past, present and reasonably foreseeable future actions affecting water resources in the Project area. The Proposed Project would contribute an overall beneficial impact to the water resources of the Redwood Creek watershed.

**Conclusions.** Implementation of the Proposed Project Alternative would result in long-term, beneficial impacts to water quality within the Redwood Creek watershed. Under CEQA, this alternative would result in beneficial (Class IV) impacts to water resources.

## Visitor Experience

### Affected Environment

The Project area encompasses portions of the MTSP and the GGNRA, and is near the National Monument. Nearly all of the Redwood Creek Trail is in the MTSP with the exception of about 500 feet of trail that crosses the GGNRA. The Dias Ridge Trail Extension would be on GGNRA land.

MTSP provides year-round recreational opportunities and receives more than 500,000 visitors annually (CDPR 2015). The GGNRA is one of the most heavily visited National Parks in the United States, with the National Monument and Muir Beach being particularly popular. MTSP and the GGNRA lands surrounding the project area are unique not only in their diversity and quantity of natural and cultural features, but also in their proximity to a large population and a major urban area with worldwide status as a tourist destination (NPS 2015).

More than 50 miles of hiking trails are within MTSP, which connect to a larger, 200-mile-long trail system. Redwood Creek Trail is restricted to hikers and equestrians and the trail is part of a popular equestrian loop that includes sections of the Miwok and Dias Ridge trails. These sections of the Miwok and Dias ridge trails are also part of the Bay Area Ridge Trail. Users access the Redwood Creek Trail from Muir Woods Road or via a spur trail that contacts Muir Woods Road south of Santos Meadow. The Redwood Creek Watershed Trail is an integral part of the larger trail network on Mt. Tamalpais and the Marin Headlands. The Dias Ridge Trail is a multi-use trail open to hikers, equestrians, and bicyclists (CDPR 2015).

### Environmental Consequences

#### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, the Redwood Creek Trail improvements and Dias Ridge Trail Extension would not occur. Recreational opportunities would not be enhanced. Existing trail conditions, which include a 1,300-foot gap between the southern ends of the Redwood Creek and Dias Ridge trails at Highway 1, would remain in place and there would be no connection to the future Dias Ridge Trail Phase 3

**Cumulative effects.** Under the No Action Alternative, the Redwood Creek Trail improvements and Dias Ridge Trail Extension would not occur. Therefore, there may be a negligible but adverse long-term cumulative impact of this alternative's actions on visitor use and experience by not improving conditions of the existing trail and not connecting the existing trail network to allow visitors to complete the Redwood Creek-Miwok- Dias Ridge trail loop.

**Conclusions.** Under the No Action Alternative, not improving existing conditions and not offering connections to larger regional trail planning efforts would result in less than significant, long-term impacts to visitor use and experience. Under CEQA, this alternative would result in less than significant (Class III) impacts to visitor experience.

#### *Impact of Alternative B (Proposed Project)*

While the trail removal and realignment would provide similar recreational opportunities to the existing conditions, the overall quality of the visitor experience would be increased due to improved trail conditions. In addition, the trail extension would address hazardous conditions for pedestrians, bicycles, and



equestrians travelling along the narrow shoulder of Highway 1. The trail extension would provide an increase in recreational resources by forming an approximately 5.4-mile continuous trail circuit and would be another step in completing the Bay Area Ridge Trail.

**Cumulative effects.** The Proposed Action Alternative would contribute a minor increment of new trail experience to the total cumulative past, present and reasonable foreseeable future park operations by adding the Dias Ridge Trail Extension to the trail network. With the completion of trail improvements and the trail extension, combined with the other trails in the area, there would be increased opportunities for the public to recreate and explore the park so the impact would be beneficial.

**Conclusions.** Under the Proposed Project Alternative trail improvements and the expansion of recreational resources would result in long-term beneficial impacts to visitor experience. Under CEQA, this alternative would result in beneficial (Class IV) impacts to visitor experience.

## Traffic and Transportation

### Affected Environment

The Golden Gate Strait and the San Francisco Bay separate Marin County from the City of San Francisco, the San Francisco Peninsula, and the East Bay communities. The Project area, located in a rural area of Marin County, is difficult to access by persons not using private automobiles or private tour vans and buses. Public transit consists of the Muir Woods Shuttle operated by the Marin County Transit District between Sausalito and the National Monument. Service is seasonal, with weekend service available from April through October, with additional Monday and Friday service from late May through early September. Weekday service is available only from mid-June through mid-August.

The Redwood Creek Trail extends from its northern trail head on Muir Woods Road at Deer Park Fire Road, close to Muir Woods National Monument, to Muir Woods Road near Highway 1, close to Muir Beach and the ocean. Users access the trail from Muir Woods Road across from Deer Park Fire Road in the north or near its intersection with Highway 1 in the south. Visitors can also access the trail via the Miwok Trail and a spur trail that connects to Muir Woods Road south of Santos Meadow. For the Dias Ridge Trail, parking is at Muir Beach and pull-outs along Panoramic Highway. Parking is available along the road on a first-come first-served basis.

Construction by CCC crews could occur on weekends. However, the work they would be doing would not affect visitors to the National Monument and not impact Muir Woods Road. Except to deliver equipment or crews to work sites, which are all off-road locations, they would not have equipment or vehicles on any roads.

### Environmental Consequences

#### *Impact of Alternative A (No Action Alternative)*

Under the No Action Alternative, the proposed trail construction would not occur and there would be no change in vehicular traffic or patterns. Therefore, there would be no impacts to traffic and transportation in the Project area.

**Cumulative effects.** There would be no cumulative impacts to traffic and transportation as a result of the No Action Alternative.

**Conclusions.** Traffic and transportation conditions would be the same as those occurring under the existing setting. Under CEQA, this alternative would have no impacts to traffic and transportation.

### ***Impact of Alternative B (Proposed Project)***

No increase in trail use is anticipated, as the proposed Project would add only a minor interconnection to the local trail system, but it would improve trail and environmental conditions as well as visitor safety. Therefore, no increase in vehicular traffic is expected to result from the proposed Project. The trail extension would result in minor improvements to the traffic movement and safety along Highway 1 by removing the need for trail users to walk along the shoulder of the highway to connect between the Redwood Creek and Dias Ridge trails. Parking and access to the trail would remain the same as existing conditions. In addition, a less than significant short-term increase in vehicular traffic would occur during construction, which would occur in stages over four or five dry-season construction periods. The number of construction vehicles needed to complete the proposed Project is minimal and would not contribute substantially to traffic in the Project area. This would include trucks delivering rock material for trail and wall construction, erosion control materials, and materials for bridge or wall construction, as well as removing construction and demolition debris. Personal vehicles of contractors and their workers would also be on the road. This would occur during Bridge 9 installation and Culvert 2 removal. This would be a small workforce and occur over a short period. As needed, workers could carpool from designated parking. Some traffic impacts would occur during the delivery of crane and bridge pieces, but this also would be short-term and would be coordinated with the County and California Highway Patrol.

**Cumulative effects.** The Proposed Project Alternative would contribute a negligible amount to cumulative impacts on traffic and transportation when combined with other past, present, and future projects. The increase in traffic due to construction activities would be short-term and seasonal, and – because of the rural nature of the area – unlikely to overlap with impacts from other projects. No increase in visitor traffic is anticipated. The less than significant short-term increase in traffic during construction would not contribute substantially to traffic congestion. There would be no impacts to access to recreational resources in the area as a result of the Proposed Project Alternative.

**Conclusions.** The Proposed Project Alternative would result in negligible short-term adverse effects to traffic and transportation in the Project area as a result of increased vehicular traffic from construction vehicles. There would be no impacts to access to recreational resources as a result of the Proposed Project Alternative. Under CEQA, this alternative would result in less than significant impacts (Class III) to traffic and transportation.

## **Visual Resources**

### **Affected Environment**

Aesthetics and visual resources refer to the components of the environment perceived through the visual sense only. Because a person's reaction and attachment to a given visual resource are subjective, visual changes inherently affect viewers differently. Accordingly, aesthetics and visual resource analysis is a systematic process to assess visible change in the physical environment and the anticipated viewer response to that change. The analysis of aesthetics and visual resources uses resource-specific qualitative and quantitative terminology. The following defines terms used in this analysis:

- **Viewshed:** The landscape that can be directly seen from key observation points or along a transportation corridor under favorable atmospheric conditions.
- **Visual Quality:** The relative worth of the overall impression or appeal of an area created by the physical features of the landscape, such as natural features (landforms, vegetation, water, color, adjacent scenery, and scarcity), and built features (roads, buildings, railroads, agricultural patterns, and utility lines). These features create the distinguishable form, line, color, and texture of the landscape compo-

sition that can be judged for scenic quality using criteria such as contrast, dominance, and view blockage or impairment.

Visual quality of a viewshed are discussed and qualitatively rated as follows:

- High: Where the valued natural landscape character is intact with only minute if any visual deviations. The existing natural landscape character is expressed at the highest possible level.
- Moderate: Where the valued natural landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the natural landscape character being viewed.
- Low: Where the valued natural landscape character appears moderately- to heavily-altered. Visual deviations (man-made structures) primarily dominate the valued landscape character being viewed with their attributes such as size, shape, color, edge effect and pattern having overwhelmed the natural landscape being viewed.

Much of the Project area has a high visual quality with a preponderance of natural conditions, with the exception of the trail extension portion where buildings and other man-made facilities are present. In general, the Project area is characterized by lush woods, open grasslands, and a varying terrain ranging from creek floodplains to steep slopes.

The Redwood Creek Trail is not visible for area roads, except at the trailheads, and is only intermittently visible from other trails. Because of its position in the landscape and owing to intervening roadside and riparian vegetation, the trail tread is not visible for Muir Woods Road. The realigned northern section of the trail would be farther from the road and equally shielded from view by vegetation. Trail users may be visible at various locations, as they are vertical elements in the viewshed, while the trail is a flat surface and difficult to see except from a superior vantage point. The area of the trail extension between Redwood Creek and Dias Ridge trails is visible from Highway 1, Muir Woods Road, Golden Gate Diary Ranch, and the very southern end of Dias Ridge Trail.

## **Environmental Consequences**

### ***Impact of Alternative A (No Action Alternative)***

Under the No Action Alternative, the proposed trail realignment and extension would not occur and would therefore not result in additional visual impacts to the Project area.

**Cumulative effects.** There would be no cumulative impacts to visual resources as a result of the No Action Alternative.

**Conclusions.** Under CEQA, this alternative would have no impacts to visual resources.

### ***Impact of Alternative B (Proposed Project)***

Under the Proposed Project Alternative, construction-related visual impacts would vary in intensity over the four years of periodic construction activity. The primary visual effects would be related to areas of disturbed ground and the presence of construction equipment. However, equipment and personnel required for the trail alignment and extension are expected to be minimal and would be in locations largely shielded from view except for trail users in the immediate vicinity. Their presence would be short-term as well. The realigned trail segment would have a negligible contribution to the visual effects on the surrounding viewshed as the trail segment would be very similar to the existing trail in terms of orientation and aesthetics. As a flat feature, a trail tends to not be visually intrusive except if there are substantial cuts in the slope to accommodate the trail or where it may be viewed from a superior angle. Similar to the existing trail, views of much of this new trail segment would be screened by vegetation. However, there are several sections along the new trail alignment where the trail would be located on a

higher elevation slope in comparison to the existing trail and trail users, if not the trail itself, may be more visible from nearby locations such as Kent Canyon. However, opportunities to view the trail would be few and the trail tread would be invisible or only minimally visible from most locations.

The trail extension would introduce alterations to the landscape in the Project area. There are several sensitive receptors (persons sensitive to impacts) in the vicinity of the new trail extension, including motorists on Highway 1 and Muir Woods Road, residents in homes along Highway 1, and visitors to Pelican Inn and Golden Gate Dairy Ranch. However, existing buildings, signage, fences, utility poles, road surfaces, and mailboxes result in a moderate to low visual quality as compared to the vicinity overall, which is predominantly natural vegetation and undisturbed topography. Existing conditions influence the viewing experience and viewer expectations, and the development of the extension trail would not result in a noticeable permanent alteration of the existing visual resources along the road. However, at-risk Monterey cypress trees in the historic wind row along the highway would be removed for safety, with 5 existing trees being retained. Removal of the at-risk trees would reduce crowding and allow the retained trees to flourish. In addition, 8 new cypress trees will be planted. Until the new trees have grown, this will open the view between the highway and paddock at Golden Gate Dairy.

**Cumulative effects.** The proposed Redwood Creek Trail improvements would contribute a negligible and localized visual impact to the total cumulative past, present, and reasonable foreseeable future condition of visual resources in the Project watershed. While visual impacts would be present in the immediate vicinity of the trail during construction, after the trail construction impacts to visual resources would no longer occur due to the proposed Project. The trail extension would introduce a new visible man-made change to the landscape that could combine with impacts from past, present, and future actions to cause a less than significant, long-term cumulative impact to visual resources in the Project area.

**Conclusions.** Construction activities associated with the trail realignment would have short-term and negligible effects on the visual resources of the Project area. The presence of the new trail extension would result in less than significant long-term impacts to visual resources. Under CEQA, this alternative would result in less than significant (Class III) impacts to visual resources.

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- \_\_\_\_\_. 2012. 2012 Annual Report: Long-term Monitoring of Coho Salmon and Steelhead Trout During Freshwater Life Stages in Coastal Marin County.
- \_\_\_\_\_. 2009. Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan, Marin County, California, Final Environmental Impact Statement. Golden Gate National Recreation Area. March.

## 6. Technical Reports Supporting Environmental Analysis

Various technical reports and surveys were prepared for the proposed Project area and are available on the NPS's Planning, Environment & Public Comment (PEPC) website -

<http://parkplanning.nps.gov/redwooddias>

*[Note that cultural resource reports are summarized on the PEPC website. This is to protect information on specific resource locations to help insure the integrity of the resources identified.]*

Garcia and Associates. 2015. [Summary] Cultural Resources Inventory and Evaluation Report for the Redwood Creek Trail Realignment Project, Marin County, California. October.

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National Park Service. 2015. Archaeological Survey for the Dias Connector Trail, Golden Gate National Recreation Area, Marin County, California. June

Northern Hydrology & Engineering. 2015. Technical Memorandum to Caroline Christman. *Re: Santos Meadows Bridge (Bridge 9) Hydraulic Assessment*. November 6.

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\_\_\_\_\_. 2015. Technical Memorandum to Caroline Christman. *Re: 50% Culvert #2 Design for Redwood Creek Trails Project*. June 5.

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## 7. List of Preparers and Contributors

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### **Golden Gate National Parks Conservancy**

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### **Aspen Environmental Group**

Fritts Golden	Senior Associate, Environmental Planner, NEPA/CEQA Specialist
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## **Appendix 1. Additional CEQA Required Material**



## Notice of Intent to Adopt a Negative Declaration

**TO:** All Interested Parties

The California Department of Parks and Recreation (CDPR) intends to adopt a Negative Declaration under the California Environmental Quality Act for improvements to the **Redwood Creek Trail** under the **Redwood Creek Trail Realignment and Dias Ridge Trail Extension Project**, as described below.

**Project Background:** CDPR, in collaboration with the National Park Service (NPS), proposes to improve the existing Redwood Creek Trail in Mt. Tamalpais State Park to improve visitor experience, rehabilitate the trail, and protect nearby Redwood Creek. Actions planned include: developing a 1.1 mile new trail segment located outside of the floodplain while decommissioning and abandoning a corresponding 0.9 mile of the existing trail located in the floodplain; removing culverts and bridges in the abandoned section and restoring the land; eliminating fords and replacing them with bridges; removing other existing bridges, removing various existing culverts and crib walls that adversely affect channels draining to the creek and replacing them with bridges; and repairing and rehabilitating the remaining trail tread. Construction of various project elements would occur during the summer dry season over the course of four years. Separately, the NPS proposes to extend the Dias Ridge Trail near Highway 1 and the Golden Gate Dairy.

**Information Available:** The CDPR has prepared a Negative Declaration and supporting Environmental Assessment/Initial Study (EA/IS) in collaboration with the NPS describing the project and its potential environmental effects. Based on this document, it has been determined that the proposed project will not have any significant adverse effects on the environment and will have beneficial effects. The joint EA/IS document may be reviewed at the following locations:

Mount Tamalpais State Park  
801 Panoramic Highway  
Mill Valley, CA 94941

Stinson Beach Library  
3521 Shoreline Highway  
Stinson Beach, CA 94970

Bay Area District Headquarters  
California Department of Parks and Recreation  
845 Casa Grande Road  
Petaluma, CA 94954

Mill Valley Public Library  
375 Throckmorton Ave.  
Mill Valley, CA 94941

For electronic access to the EA/IS and other project information or copies of reports, check CDPR's or NPS's web sites at:

CDPR: [http://www.parks.ca.gov/?page\\_id=981](http://www.parks.ca.gov/?page_id=981)

NPS: <http://parkplanning.nps.gov/redwooddias>

**Time for Review:** This Negative Declaration will undergo a public review period from November 25, 2015, through January 8, 2016. Written comments must be received by 5:00 p.m. on January 8, 2016, at the following address. (It is not necessary to send comments to both addresses).

Environmental Coordinator  
California Department of Parks and Recreation  
Attn: Redwood Creek Trail  
845 Casa Grande Road  
Petaluma, CA 94954

< or >

Superintendent  
Golden Gate National Recreation Area  
Attn: Redwood Creek Trail  
Bldg. 201, Fort Mason  
San Francisco, CA 94123

*Alternatively, written comments may be provide by one of these methods:*

**Email to:** [bree.hardcastle@parks.ca.gov](mailto:bree.hardcastle@parks.ca.gov) (Include "Redwood Creek Trail" on the subject line)

**Online at:** <http://parkplanning.nps.gov/redwooddias>

## Mandatory Findings of Significance

### MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Does the project have impacts that are individually limited, but cumulatively considerable? ( <i>Cumulatively considerable</i> means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Significance criteria established by CEQA Guidelines, Appendix G.

- a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?**

The project would implement protective measures during construction. These would prevent degradation of the environment, prevent a substantial reduction in fish or wildlife habitat, not cause a fish or wildlife population to drop below self-sustaining levels, not threaten to eliminate a plant or animal community, not reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Overall, the project would have a beneficial environmental effect by reducing or eliminating negative effects on Redwood Creek from the Redwood Creek Trail. The trail extension would have the positive effect of reducing the hazards posed by walking on the shoulder of Highway 1.

- b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, effects of other current projects, and the effects of probable future projects.)**

The project has limited impacts on individual resources, and where they occur they are less than significant and short-term. These impacts are not cumulatively considerable.

- c. Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?**

The project would not cause adverse effects on human beings

## Environmental Determination

### Environmental Factors Potentially Affected

None of environmental factors below that would be potentially affected by this project have any impact that is a "Potentially Significant Impact" requiring implementation of mitigation. Impact reduction measures incorporated into the project ensure that all impacts are less than significant where they occur at all.


- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Aesthetics               | <input type="checkbox"/> Agriculture & Forestry Resources | <input type="checkbox"/> Air Quality                        |
| <input type="checkbox"/> Biological Resources     | <input type="checkbox"/> Cultural Resources               | <input type="checkbox"/> Geology/Soils                      |
| <input type="checkbox"/> Greenhouse Gas Emissions | <input type="checkbox"/> Hazards & Hazardous Materials    | <input type="checkbox"/> Hydrology/Water Quality            |
| <input type="checkbox"/> Land Use/Planning        | <input type="checkbox"/> Mineral Resources                | <input type="checkbox"/> Noise                              |
| <input type="checkbox"/> Population/Housing       | <input type="checkbox"/> Public Services                  | <input type="checkbox"/> Recreation                         |
| <input type="checkbox"/> Transportation/Traffic   | <input type="checkbox"/> Utilities/Service Systems        | <input type="checkbox"/> Mandatory Findings of Significance |

### Environmental Determination

On the basis of this initial evaluation:

- ☒ I find that the Proposed Project **COULD NOT** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.
- ☐ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.
- ☐ I find that the Proposed Project **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.
- ☐ I find that the Proposed Project may have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the Proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the Proposed Project, nothing further is required.

  
Victor Bjelajac, Staff Park and Recreation Specialist

  
Date

## Appendix 2: Proposed Phasing and Construction Schedule

The Schedule below is for the Redwood Creek Trail Realignment, which is planned to occur over a 4-year period. The Dias Ridge Trail Extension construction is independent of the realignment construction. It would be completed in one season and could occur before, during, or after phases of the Redwood Creek Trail construction schedule. Consequently, the overall Project Schedule could be 4 to 5 years, depending on when the Extension was constructed.

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### Pre-Construction Year

- Spotted Owl Protocol Survey- March, 6 weeks
- Vegetation removal in fall or winter, before owl nesting season. Cut veg to 8 to 12" and maintain until construction season. Work corridor 15 to 20 feet wide, 1.1 miles long.

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### Construction Phase

In general, construction would occur from June through October, but may be delayed by local circumstances.

#### Year 1

- Spotted Owl Protocol Survey- March, 6 weeks
- Landbird Nesting Survey –May (for June brushing start)
- Remove Bridge Removal 1
- Install Temp Bridge near Culvert 2 and gate/fence for closure (to stay in place through Year 3)
- Install barriers at Kent Canyon and intersection of Miwok Trail for intermittent closures
- Remove vegetation for new trail alignment, including fallen bay trees near Bridge 7
- Cut and prepare stockpile areas to receive soil and rock from cutting trail tread (3 locations)
- Install sediment controls
- Cut new trail alignment and finish trail tread
- Install all 7 bridges on new alignment (Bridges 2 through 8)

**Closure:** Temporary closure from Miwok Trail to Bridge Removal 1 during trail cutting. The north end of trail is on a steep slope with grassland, and soil/rock may fall to existing trail. Block trail at Kent Canyon as well during trail cutting.

#### Year 2

- Landbird Nesting Survey –May (for June brushing start)
- Bat roosting survey prior to work at Bridge 9, Santos Meadow Bridge
- Haul rock for armored crossings over temp bridge and either end of trail, stockpile on trail tread
- Install all the armored crossings on the new alignment (8)
- Fine tune the trail surface on new alignment
- Install Santos Meadow Bridge and trail
- Decommission horse fords and old trail at Santos Meadow Bridge
- Open New Trail and Santos Meadow Bridge to visitor use
- Revegetation at Santos Meadow Bridge

**Closure:** New trail alignment would be closed until the end of construction, would be opened fall of this year. Santos Meadow Bridge would be closed during work and opened once bridge is complete.

### Year 3

- Landbird Nesting Survey –May (for June brushing start)
- Replace Bridge 1 and decommission horse fords
- Remove Culvert 1
- Reconstruct trail from Muir Woods Rd (across from Deer Park Fire Road) to Miwok Trail
- Remove Bridge Removal 2 and decommission horse fords
- Install Channel Cascade at Culvert 2
- Complete Headcut Repairs
- Remove Culvert 3
- Construct rock wall and rock armored crossing on Spur Trail
- Decommission old trail alignment
- Decommission social trails from Muir Woods Road to Redwood Creek Trail
- Remove Temp bridge near Culvert 2 at end of construction season
- Add woody debris to block public access to old alignment
- Revegetate at removal sites as needed

**Closure:** The old trail alignment from Santos Meadow Bridge to the north end of the trail (at Deer Park Fire Road) would be closed starting from the beginning of construction season and would be permanently closed to the intersection with Miwok Trail thereafter.

### Year 4

- Landbird Nesting Survey –May (for June brushing start)
- Remove 3 crib walls (Bridge 10,11, 12) and install rock armoring
- Remove culvert 4
- Install 4 bridges (Bridges 10-13)
- Install 1 armored crossing
- Add tread to sections of trail where large rock is exposed
- Revegetate at Removal Sites

**Closure:** Trail from Highway 1 to Bridge 10 would be closed for this work, Spur Trail would be closed during tread work from Spur Trail to intersection near Santos Meadow Bridge.

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## Maintenance and Monitoring Phase

### Year 5

- Maintain new trail
- Revegetation Monitoring
- Monitoring features as required by permits

### Years 6 through 9

- Revegetation Monitoring
- Monitoring features as required by permits