Targeted Supplemental Environmental Assessment
For the Willow Creek Road 2nd Bridge Area Fish Passage Project

The National Oceanic and Atmospheric Administration's (NOAA) Community-based Restoration Program (CRP) is administered within the National Marine Fisheries Service's Office of Habitat Conservation, under the authority of the Fish and Wildlife Coordination Act, 16 U.S.C. 661, as amended by the Reorganization Plan No. 4 of 1970 and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The CRP proposes to provide financial assistance to a habitat restoration activity entitled "Willow Creek Road 2nd Bridge Area Fish Passage Project," through the NOAA Restoration Center's (RC) Open Rivers Initiative.

Purpose and Need for Action

The purpose of the proposed action is to increase Coho Salmon (*Oncorhynchus kisutch*) and Steelhead Trout (*O. mykiss*) survival by opening and increasing valuable rearing habitat in Willow Creek, which drains directly into the Russian River, thence the Pacific Ocean in coastal central California. The overall objective of the proposed action is to increase salmonid and other aquatic species survival through installation of a new clear-span bridge to reestablish channel connectivity and fish passage in Willow Creek, to allow natural channel development, to provide habitat connectivity, and to maintain public access.

After reviewing the proposed project, we determined that the action described below falls within the scope and effect of activities analyzed in the February 6, 2002 Programmatic Environmental Assessment (PEA) for the Community-based Restoration Program Implementation Plan and the June 23, 2006 Supplement (SPEA), except for potential impacts related to certain species listed under the Endangered Species Act (ESA). The PEA and the SPEA are incorporated by reference into this targeted supplemental environmental assessment (TSEA). A formal ESA Section 7 consultation was initiated by the U.S. Army Corps of Engineers (ACOE) with the U.S. Fish and Wildlife Service (USFWS), Sacramento Office on February 3rd, 2010 due to potential adverse impacts to the California Red-legged Frog (*Rana draytonii aurora*) and Myrtle's Silverspot Butterfly (*Speyeria zerene myrtleae*). A Biological Opinion (BiOp) was issued by the USFWS on January 28th, 2011. NOAA RC staff determined that this project was not likely to adversely affect federally endangered Central California Coast (CCC) Coho Salmon or federally threatened CCC Steelhead Trout or their critical habitat and included this project under the RC's programmatic Biological Opinion (BiOp) for small restoration projects; and subsequently prepared this TSEA. This level of review is described in the SPEA and reflects analysis provided in the BiOp. The California Department of Parks and Recreation (DPR) issued a Final Mitigated Negative Declaration (MND) in April 2010 in accordance with California Environmental Quality Act (CEQA) Guidelines §15071. The purpose of this document was to evaluate the potential environmental effects of the proposed Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park. Minimization and mitigation measures have been incorporated into the project to avoid potentially significant impacts or reduce them to a less-than-significant level.

This Targeted Supplemental Environmental Assessment (TSEA) tiers to and incorporates by reference the above referenced PEA and SPEA in accordance with 40 C.F.R. §1502.20 and NAO 216-6, subsection 5.09a. The TSEA also incorporates the BiOp's evaluations and determinations by including the BiOp as an attachment to this TSEA. Additionally, this TSEA incorporates the California DPR MND's evaluation and determinations by including the MND as an attachment to this TSEA. This DPR MND can be found at CA DPR Russian River District Headquarters P.O. Box 123, Duncans Mills, CA 95430-0123. This TSEA level of review is conducted in accordance with the implementation procedures described in the SPEA and appropriately focuses on consideration of effects to species listed under the Endangered Species Act, 16 U.S.C. 1531 et seq. Beyond consideration of site-specific effects to the listed species, our review of the proposed action has not revealed any substantial changes in the proposed action or new potentially significant adverse effects to other elements of the human environment which would require additional review in the TSEA or supplementation of the pre-existing NEPA documents.

Alternatives Considered

I. *No Action Alternative*

Under the no-action alternative, the NOAA RC would not fund the proposed project to open, increase and enhance habitat, and Willow Creek's habitat would continue to deny access to listed salmonids and continue to decline in the habitat quality, resulting in a less favorable environment for all species that use this reach of stream.

II. *Preferred Alternative*

The purpose of the proposed action is to reestablish channel connectivity and fish passage in Willow Creek, to allow natural channel development, to provide habitat connectivity, and to maintain public access. The proposed action will replace six channel-constraining culverts with a bridge crossing that will allow for natural channel conditions and fish passage. This action is will increase coho salmon and steelhead trout survival by opening and increasing valuable rearing habitat in Willow Creek. Specific methods to achieve the objectives of the proposed action are described in greater detail below.

Affected Environment

For the purposes of the effects assessment, the action area includes all areas within the project footprint of the proposed action including the proposed bridge crossing and associated road and culvert work, proposed channel excavation and development work, and the proposed replacement of culverts under Willow Creek road to enhance conditions in the Gristmill Wetland. The action area also includes the area immediately downstream of the second bridge crossing that could be subject to decreased water quality caused by dewatering and vegetation removal activities as well as Gristmill Pond which could be affected by channel creation and where a bullfrog removal program will be implemented.

Background

The proposed action is located on the Sonoma Coast west of the community of Duncan Mills and southeast of Jenner, California, on the county-maintained Willow Creek Road and adjacent habitats in lower Willow Creek, a tributary to the Russian River. The objectives of the project

are to reestablish channel connectivity and fish passage in Willow Creek, to allow natural channel development, to provide habitat connectivity, and to maintain public access.

Outside of the road right-of-way, the project site is owned and operated by the California DPR as part of Sonoma Coast State Park. Willow Creek is considered a high priority watershed for California Department of Fish and Game's (CDFG) coho salmon restocking program. Viability of the watershed for the coho salmon recovery program is presently limited due to fish passage restrictions related to Willow Creek Road at the second bridge crossing (Willow Creek Road crosses Willow Creek in the lower valley at three locations).

The bermed roadway at the second bridge crossing restricts channel connectivity and impedes channel-forming processes at the creek's geomorphically preferred location. Historical channel management practices (realignment and frequent dredging) sought to control the natural tendency of the creek to form a number of highly interconnected stream channels within the lower Willow Creek Valley. The channel at the second bridge crossing required regular maintenance to conform to the bridge location established at that time. Dredging of the channel ceased in the mid-1980s when it was deemed a financially and ecologically unsustainable practice. Natural aggradational processes immediately reasserted control over the system in the vicinity of the second bridge crossing, filling the historical man-made channel and inducing channel migration to the west side of the valley.

In spring 2007, the Willow Creek Technical Advisory Committee reviewed a range of culvert and bridge options to restore fish passage at the second bridge crossing. A consensus was reached to design and install a channel crossing at the valley thalweg that will provide for fish passage, channel development, hydraulic connectivity, and a 20- to 50-year lifespan.

Existing Conditions

Willow Creek flows from an 8.7-square mile watershed into the Russian River approximately 2 miles upstream of the river's mouth at Jenner in Sonoma County. Located on the western edge of the Coast Range, Willow Creek flows in a northwesterly direction following an inactive fault trace. Most of the Willow Creek watershed is part of the 10,286-acre Sonoma Coast State Park.

The project area consists of the second Willow Creek Road bridge crossing and the floodplain immediately upstream to the third bridge. The project site is approximately 1.5 miles from the intersection of Highway 1 and is surrounded by DPR property. The nearest private residences are approximately 1 mile to the north. Approximately 500 feet to the west is a DPR maintenance facility, an abandoned historic residence, barn and accessory structures, and two temporary mobile homes. To the north and south is the Willow Creek riparian corridor, and to the east lies open space.

Immediately upstream of the culverts at the second bridge crossing, Willow Creek consists of a shallow (4-8 inch depth) marsh-like habitat with no definable channel formed by backed-up stream flow extending approximately 75 feet upstream. Upstream of this ponded reach, Willow Creek flows through a relatively well-defined channel adjacent to Willow Creek Road for approximately 700 feet. Average channel widths are approximately 2 feet and average depths range from 6 to 10 inches. Significant pools, large woody debris, and undercut banks are largely absent from this reach. Upstream, a number of small "tributary" channels originate in a small

cattail-dominated marsh. These tributary channels are poorly defined and shallow. Upstream of this small cattail marsh, the channel veers eastward toward the center of the narrow valley and extends approximately 1,200 feet upstream to another larger cattail marsh referred to as the Gristmill wetland. Throughout this reach, the channel is relatively well-defined, substrates are dominated by silt and sand with some gravel, and patches of emergent vegetation are present in the channel. Some undercut banks and minor amounts of downed logs and branches provide limited cover in this reach; pool formation is sparse. The upstream end of this reach is formed by the confluence of two channels, one originating from a perennial pond (Gristmill pond) located within the Gristmill wetland and the other originating from the historical flood control channel on the north side of the valley. Gristmill pond is estimated to be approximately 0.6 acres and 2 feet deep. The channel exiting the pond is approximately 3 feet wide and 1.5 feet deep with relatively swift streamflow. This channel contains no riparian vegetation but flows through dense sedges lining both sides of the channel. The historical channel originating from the north is shallow (2-3 inches) and approximately 4 feet wide. Upstream of the perennial pond the current Willow Creek Channel alignment veers northeast toward the historical channel.

Project Description

The proposed action will replace the six existing culverts at the second bridge crossing with a single-span, precast concrete bridge. This will include installing the new bridge, footings, and abutments, road side sloping and realignment, and channel realignment. No improvements are proposed for the existing concrete bridge that spans the inactive man-made historical channel. The new bridge will span 43 feet with a bridge deck width of 27.5 feet. The new concrete bridge abutments will be supported by 16 inch diameter pipe piles driven approximately 70 feet deep. Bridge approaches will be graded to meet the elevation of the existing bridge on the western approach and the 18-foot road contour on the eastern approach. To reduce the frequency of road flooding in the vicinity of the existing culverts, approximately 790 feet of the existing Willow Creek Road will be raised and repaved.

Channel construction within Willow Creek will be minimal and will include excavation of an unreinforced channel bed under the bridge to the expected thalweg elevation. The channel will be graded to conform to existing upstream and downstream incipient channel features. The thalweg under the bridge will be set at an elevation of 12.6 feet. It is expected that subsequent flows will create natural channel features and dimensions while connecting the existing channels currently forming on the south side of the valley.

A road leading to the DPR maintenance area intersects Willow Creek Road adjacent to an existing drainage supported by two 24-inch diameter by 40-foot long culverts. The two existing culverts would be removed and replaced by a single 18-inch diameter by 85-foot long culvert that will pass under the raised area at the intersection and maintain flow to a seasonal wetland west of the road. Culvert removal and replacement and raising the road elevation and bridge approaches will create a slightly larger road footprint and will result in the permanent loss of 0.04 acre of wetland and 0.04 acre of coastal prairie habitat. Construction activities will result in temporary effects to 0.55 acre of riparian habitat and 0.03 acre of coastal prairie habitat.

Adaptive Channel Development

Channel development in wetlands will create a primary channel through two areas of wetland upstream of the new bridge. Channel work will consist of hand pruning and removal of vegetation, primarily cattails, willow, and alders, in two separate reaches totaling approximately 1,000 linear feet (4 feet wide by 2 feet deep), to link already established, well-defined channels at the wetland's upstream and downstream edges. This will result in temporary effects to 0.07 acre of wetland habitat.

The exact location of channel development work and the amount and spatial frequency of vegetation removal will be determined and field-staked in mid to late summer when water levels have receded. The project geomorphologist, working with the project biologist and State Parks ecologist, will evaluate the site to determine where incipient channels can best be connected while avoiding adverse impacts on the existing Gristmill Pond. Manual vegetation removal will occur in late summer to early fall.

Should it be determined that future adaptive management work is required to facilitate channel formation, consultation with the USFWS will be re-initiated.

Dewatering Plan

If water is present within Willow Creek in the project reach during construction of the new bridge, the creek will need to be dewatered. To avoid the discharge of silt-laden water into Willow Creek during construction, several techniques may be utilized. Work will take place during summer low-flow conditions. If there is perennial flow within the project reach, coffer dams or similar water diversion structures will be constructed at the up- and downstream ends of the project site and water will be diverted around the site. Coffer dams will be constructed with the use of river-run gravel and/or sand bags. On-site materials used during the dewatering will be returned to the stream channel. Off-site materials will be removed from the site. Coffer dams will be placed in locations that will minimize the amount of stream reach dewatered while allowing adequate construction access. Dams will be placed at appropriate locations that minimize disturbance to the aquatic environment. Surface flow in Willow Creek may cease during the summer months leaving only isolated perennial pools or a dry creek bed, in which case, coffer dams will not required. If only isolated pools are present, they will be pumped out as necessary.

An approved screened pump intake will be used to divert water around the work area or from isolated pools. If minimal surface flow is present, flow may be diverted through the coffer dam by a gravity fed pipe. Pumps will be screened in accordance with Juvenile Fish Screen Criteria for Pump Intakes developed by NOAA's National Marine Fisheries Service (NOAA Fisheries Service 1996) and will consist of 3/32-inch screen mesh. The pump will be placed in a large basin with holes to allow water to be drawn into the pump. Both the outside of the basin and the pump will be screened with 2/32-inch mesh to ensure aquatic species do not get sucked into the pumps. The water diversion pipe will consist of a large, plastic pipe and will be placed along the stream channel. Four-inch flex pipe may also be used. The use of PVC pipe will be avoided. The inlet and outlet of the diversion pipe will be screened so aquatic and terrestrial species do not enter the structures. Throughout construction, a sump pump of adequate capacity may be needed to remove subsurface water flowing into the work area. If needed, sump pumps will be powered by a generator or external power source and properly screened.

Habitat Enhancement and Restoration

In order to compensate for adverse affects to California red-legged frog, DPR proposes to enhance water quality at Gristmill wetland and pond (2.6 acres of wetland including 2.0 acres of palustrine emergent wetland and 0.6 acre of palustrine wetland/open water) by reconnecting a perennial spring to the marsh through replacement of a failed culvert under Willow Creek Road and excavating a channel that will direct water to the pond, as needed.

The Gristmill wetland site receives water from three springs. The water from these springs flows across Willow Creek Road and into the Gristmill wetland and pond. As water crosses the road, it travels within an inboard ditch and indirectly makes its way across the road at one of several low spots. In the summer months of 2009 water temperatures entering the road prism were consistently measured in the mid 60's (Fahrenheit) and water discharging from the road prism has been measured in the mid to high 70's. Water temperatures increase as solar radiation and latent heat from the road surface warms the water. Elevated water temperatures are a significant concern as they may reduce available dissolved oxygen (DO), increase metabolic rates of aquatic organisms and may lead to outmigration from these habitats.

DPR will improve existing conditions by installing three stream crossings; one multi- plate arch and two armored crossings. Each crossing would be located as close to the inlet of surface runoff as feasible. The crossings would route surface flows across the road prism to the wetland via the most direct route, reducing thermal loading by decreasing exposure to solar radiation and latent heat. Installation of the stream crossings would require excavation of a small outlet through 0.02 acre of ruderal habitat on the roadside berm and would result in 0.01 acre of temporary effects to riparian vegetation.

DPR will also implement a bullfrog control program and California red-legged frog monitoring program at Gristmill wetland and pond. The bullfrog control program is intended to reduce bullfrog predation of and competition with California Red-legged Frogs. California Red-legged Frog and bullfrog monitoring will be conducted concurrent with bullfrog control efforts and will occur four times per year for the three year period following project construction. Each control effort will consist of a four-hour night time effort to locate frogs by eye-shine, hand capture frogs to confirm species, and permanently remove bullfrogs from within the project area. DPR will note numbers of each species observed, date, location, and methods used. DPR will also conduct an egg mass survey each year with the Gristmill pond. An annual report will be submitted to the USFWS in December of each year.

In order to compensate for adverse effects to Myrtle's Silverspot Butterfly, within one year of project construction, DPR will restore 1 acre of coastal prairie habitat occupied by dog tooth violet that has been invaded by Douglas fir seedlings, saplings, and poles and by coyote bush. The invasion of competing species is rapidly occurring in the absence of fire. Douglas fir will be cut, lopped, and scattered and coyote bush will be lopped and stems painted with glyphosate. Following treatment, the restored area will be absent of Douglas fir and contain less than ten percent cover of coyote bush.

Cultural and Historical Resources

The proposed action has been evaluated for potential for adverse impacts to historical and cultural resources and it has been determined that no adverse impacts to cultural and historical resources will result. Similarly, DPR's Final Mitigated Negative Declaration, hereby incorporated by reference into this TSEA, determined that potential adverse impacts to cultural and historical resources resulting from the proposed project were less than significant.

Other Environmental Resources

The proposed action also has been evaluated in the DPR MND for the following areas: aesthetics, agricultural resources, air quality, biological resources, geology, soils and hazards, hazardous materials, hydrology and water quality, land use planning, mineral resources, noise, population and housing, public services, recreation, transportation and/or traffic and utility and service. There was no potential for adverse impacts on agriculture, land use planning, mineral resources, population and housing, public services, recreation, and utilities and service systems associated with the proposed project.

Conservation/Mitigation Measures

The applicant proposes to implement the following measures, described in the attached USFWS Biological Opinion which is hereby incorporated by reference into this TSEA, to minimize the proposed action's effects to the California Red-legged Frog and Myrtle's Silverspot Butterfly:

General Measures

(1) Proper erosion control and water quality Best Management Practices (BMPs) will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. An erosion and sediment control plan will be developed and implemented. In stream work will only occur in dry or dewatered sections.

(2) Non-native, invasive plant species will be removed from the project site, and native trees, shrubs, and herbs will be planted to improve plant diversity and wildlife habitat.

(3) During vegetation removal, large trees with extensive canopy will be maintained to the maximum extent feasible to preserve the existing cover over the stream channel.

(4) Any vegetation to be removed will be hand-cleared. No machinery or vehicles that disturb the ground surface will be allowed in areas in which the ground is not clearly visible.

(5) The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and where feasible, these areas shall be outside of riparian and wetland areas.

(6) Prior to the start of construction activities, a USFWS-approved biologist will conduct a training session for all construction personnel. Training will include a description of California Red-legged Frog and Myrtle's Silverspot Butterfly, their habitats and behavior, a discussion of measures to be implemented to ensure these species are not impacted by project activities, and

proper procedures for staff if any individuals are detected within the project area.

California Red-legged Frog

(1) Work activities will be completed between April 1 and November 1, set forth by the USFWS Biological Opinion and incorporated by reference into this TSEA for California Red-legged Frog and Myrtle Silverspot Butterfly. Restricting work to this time period will reduce potential impacts to the California Red-Legged frog by avoiding the normal breeding period. Should the applicant demonstrate a need to conduct activities outside of this period, USFWS approval shall be obtained.

(2) No more than 5 calendar days prior to the onset of activities, a USFWS-approved biologist shall conduct a pre-construction survey of the work site for listed species. If any California Red-legged Frogs are found, the USFWS will be contacted and the USFWS-approved biologist will be allowed sufficient time to move any animal(s) from the work site before work activities begin. The animal(s) shall be moved to a safe location outside the work area in an area that will remain undisturbed throughout the project. California Red-legged Frogs will be translocated to appropriate habitat for their life cycle. The biologist will monitor any translocated animal until it is determined that it is not imperiled by predators or other dangers. If any other listed species are found, the USFWS will be immediately contacted and no actions will be taken without prior authorization from the USFWS.

(3) Following the preconstruction survey, temporary wildlife exclusion fencing and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site and to protect riparian trees during construction activities.

(4) Prior to the start of daily construction activities, a USFWS-approved biologist or biological monitor will inspect the construction area and all associated equipment. If any California Red-legged Frogs are found, work will cease, the USFWS will be contacted, and the animal(s) shall be moved by the USFWS-approved biologist to a safe location outside the work area according to the protocol described in measure 2 above. If any other listed species are found, the USFWS will be immediately contacted and no actions will taken without prior authorization from the USFWS.

(5) Only USFWS-approved biologists will participate in activities associated with the capture, handling, and monitoring of California Red-legged Frogs. Actions taken to move California Red-legged Frogs will be consistent with applicable USFWS and California Department of Fish and Game regulations and permits. Any biologist involved with the surveying/handling will employ sterilization techniques appropriate to avoid the transmission of diseases to and from the site.

(6) Tightly woven fiber netting or similar material shall be used for erosion control or other purposes at the project to ensure that California Red-legged Frogs do not get trapped. Plastic mono-filament netting (erosion control matting), rolled erosion control products or similar material shall not be used at the project site because California Red-legged Frogs and other species may become entangled or trapped in it.

(7) All construction-related holes, capable of entrapping wildlife, will be covered at the end of each workday in a manner that will prevent entrapment. Prior to commencing construction activities each workday, trenches shall be thoroughly inspected for animals.

(8) Because California Red-legged Frogs may take refuge in cavity-like and den-like structures such as pipes and may enter stored pipes and become trapped, all construction pipes, culverts, or similar structures that are stored at a construction site for one or more overnight periods will be either securely capped prior to storage or thoroughly inspected by the on-site biologist and/or the on-site monitor for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a California Red-legged Frog is discovered inside a pipe, the protocol in measure 2 above will be followed.

Myrtle's Silverspot

(1) Prior to ground disturbing activities, a USFWS-approved biologist will flag all larval host plants of the Myrtle's Silverspot Butterfly within 50 feet of the project footprint. Flagged areas will be avoided to the maximum extent practicable.

(2) Prior to removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no Myrtle's Silverspot Butterflies are occupying the site. If Myrtle's Silverspot Butterfly adults or larvae are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the USFWS.

(3) Following the preconstruction survey temporary exclusionary fencing will be installed around the work area in sensitive coastal prairie habitat prior to construction to preclude disturbance beyond construction limits.

(4) The USFWS-approved biologist will have the authority to stop any action that might result in damage or harm to any larval food plants of the Myrtle's Silverspot Butterfly outside of the project footprint. If work is stopped, the USFWS will be notified immediately by the on-site biological monitor or the USFWS-approved biologist.

The applicant also proposes to implement the following measures, described in the attached DPR Final Mitigated Negative Declaration, to minimize the proposed action's effects on the following:

Air Quality

(1) All construction areas (dirt/gravel roads and surrounding dirt/gravel area) will be watered at least twice daily during dry, dusty conditions.

(2) All trucks hauling soil, sand, or other loose materials on public roads will be covered or required to maintain at least two feet of freeboard.

(3) All construction-related equipment engines will be maintained in good condition, in proper tune (according to manufacturer's specifications), and in compliance with all State and federal requirements.

(4) Earth or other material that has been transported onto paved roadways by trucks, construction equipment, erosion, or other project-related activity will be promptly removed.

Biological Resources

(1) If water is present during any part of project activities, and dewatering is deemed necessary, a dewatering and species protection plan will be developed by the project's biologist. The plan will be developed and implemented by a qualified and permitted biologist.

(2) To avoid impacts on aquatic and terrestrial species within the immediate work area, prior to disturbance of the stream channel and removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no special-status species are occupying the site. If special-status species are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the regulatory agencies. In addition, the site will be surveyed periodically during construction to ensure that no special-status species are being impacted by construction activities. The biologist will also monitor to ensure water quality standards are being met and sediment and/or debris are not entering downstream aquatic habitats.

(3) To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. In addition, construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.

(4) To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.

(5) To avoid potential impacts on special-status plants, a focused botanical survey will be completed during the appropriate blooming period for the above-mentioned species. If special-status plants are found occupying the site, avoidance measures will be in place during construction to minimize disturbance (e.g., temporary construction fencing around existing populations).

(6) If impacts to special status plants are unavoidable, appropriate mitigation measures will be implemented (e.g., seed collection and revegetation). Replacement to disturbance will occur at a 4:1 ratio.

(7) The project biologist will conduct a preconstruction training session for construction crew members. The training will include a discussion of the sensitive biological resources within the project area and the potential presence of special-status species, special-status species' habitats, protection measures to ensure species are not impacted by project activities, and project boundaries.

(8) Hand labor will be used to control exotic and unwanted vegetation. The use of chemical agents and mechanical equipment within the stream channel will be avoided.

(9) Proper erosion control and other water quality BMPs will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. Work in aquatic habitats will be scheduled to occur during the dry season, with work up on the elevated road surfaces scheduled toward the end of construction when rainfall becomes more probable. When work in wetted areas is necessary, they will be dewatered as described above. An erosion and sediment control plan will be developed and implemented for the project.

(10) Temporary wildlife exclusionary and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site once construction has commenced (following the preconstruction survey) and to protect riparian trees during construction activities.

(11) During vegetation removal, large trees with extensive canopy will be maintained, as feasible, to preserve the existing cover over the stream channel.
(12) Net wetland loss (0.035 acres) will be compensated by wetland restoration elsewhere in the park at a 4:1 ratio through reconnection and enhancement of the old grist mill spring with the Willow Creek floodplain, which provides good quality existing wetland habitat 0.5 mile upstream of the project area.

Cultural and Historical Resources

(1) A preconstruction meeting will be held to acquaint project personnel with the possibility of encountering sensitive cultural resources. Prehistoric resources may include chert or obsidian flakes, projectile points, mortars, and pestles; dark friable soil containing shell and bone dietary debris; heat-affected rock; or human burials. Historic resources may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, often in old wells and privies.

(2) In the event that previously undocumented cultural resources (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic trash) are encountered during project construction by anyone, the state representative will temporarily halt at that specific location and direct contractors to other project-related tasks. A DPR-qualified archaeologist will record and evaluate the find and work with state representative to implement avoidance, preservation, or recovery measures as appropriate prior to any work resuming at that specific location.

(3) If the DPR-qualified archaeologist determines that the find(s) are significant, a qualified historian, archaeologist, and/or Native American representative (if appropriate) will monitor all subsurface work including trenching, grading, and excavations in that area. If it is determined, the find indicates a sacred or religious site. Formal consultation with appropriate representatives will occur as necessary.

(4) In the event that human remains are discovered, work will cease immediately in the area of the find and the project manager/site supervisor will notify the appropriate DPR personnel. Any human remains and/or funerary objects will be left in place. The DPR Sector Superintendent (or authorized representative) will notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (NAHC) will be notified within 24 hours of the discovery if the Coroner

determines that the remains are Native American. The NAHC will designate the "Most Likely Descendent" (MLD) of the deceased Native American. The MLD will recommend an appropriate disposition of the remains. If a Native American monitor is on-site at the time of the discovery and that person has been designated the MLD by the NAHC, the monitor will make the recommendation of the appropriate disposition.

Geology, Soils and Hazards

(1) Project design will take into account the following geotechnical considerations: weak surface soils to about 2 feet below the existing road, compressible soils to depths of 45 to 48 feet, potentially liquefiable soils, and predicted strong seismic shaking.

(2) Topsoils containing organic matter will be removed and stockpiled for reuse in landscaping.

(3) Weak soils will be removed and replaced with engineered fill.

(4) Fill will be free of organic material, have low expansion potential, and conform to the specifications in the geotechnical report.

(5) Seismic design will use Site Class E and all specified seismic design criteria from the geotechnical report.

(6) The new bridge will be built on driven piles. The piles will be either 12-inch square precast concrete or 16-inch diameter steel pipe. If other pilings are used, the geotechnical consultants will be contacted for additional design specifications.

(7) Contractor will adhere to all specifications in the geotechnical report and will contact the geotechnical engineer prior to pile driving to obtain driving criteria based upon the hammer to be used.

(8) Geotechnical engineers will review project plans and specifications to determine consistency with the geotechnical recommendations.

(9) A preconstruction meeting will occur between the geotechnical engineer, general contractor, subcontractors, civil engineer, and other members of the design team to address design issues, clarify procedures, and construction coordination.

(10) Critical construction steps, such as site excavation, fill compaction, and foundation installation, will be monitored by the geotechnical consultants.

Hazardous Materials

(1) All equipment will be inspected for leaks immediately prior to the start of construction, and regularly inspected thereafter until equipment is removed from the project site.

(2) A designated staging area will be identified where equipment refueling may occur. A spill kit will be maintained on-site throughout the duration of the project.

(3) Equipment will be cleaned and repaired (excepting emergency repairs) in the maintenance shop, away from the project site. Any contaminated water, sludge, spill residue, or other hazardous compounds will be disposed of outside park boundaries at a lawfully permitted or authorized destination.

(4) Two alternative routes will be designated by State Parks to allow access during construction.

(5) Prior to the beginning of construction, DPR will develop a Project Fire Safety Plan. The Plan will include emergency calling procedures to dispatch the Monte Rio Fire Protection District. All employees working on site will receive safety trainings regarding these procedures.

(6) Spark arrestors will be required for all motorized equipment.(7) Construction crews will be required to park vehicles away from flammable material such as dry grasses and brush. DPR staff will be required to have a State Park radio on site, which allows direct contact to a centralized dispatch, CalFire or Russian River Fire Protection District.

Hydrology and Water Quality

(1) If the excavation sites must be dewatered, the water will be discharged in a manner that will cause no substantial increase in stream turbidity or discharge of fine sediment to the stream channel.

(2) All appropriate BMPs will be implemented as needed to ensure that there is no discharge of fine sediment, concrete, concrete wash water, or roiled water to the creek.

(3) Building materials and/or construction equipment will not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.

(4) Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from project related activities that could be hazardous to aquatic life will be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials placed within or where they may enter a stream or lake will be removed immediately.

(5) All debris and waste will be picked up daily and properly disposed of at an appropriate site.

Noise

(1) Construction activities will generally be limited to the daylight hours between Monday and Friday; however, weekend work could be implemented to accelerate construction or address emergency or unforeseen circumstances. If weekend work is necessary, no work will occur on Saturday or Sunday before 8 am or after 7 pm.

(2) Internal combustion engines used for any purpose at the job site will be equipped with a muffler of a type recommended by the manufacturer.

(3) Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., engine enclosures, acoustically-attenuating shields, or shrouds, intake silencers, ducts, etc.) whenever feasible and necessary.

(4) To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. Construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.

(5) To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.

(6) Should work occur during the breeding season a qualified biologist will survey the area to ensure that no nesting activity is occurring in the project area. Should nesting activity be observed the area will be avoided until nesting birds have fledged.

Transportation/Traffic

(1) Signage will be provided to redirect traffic at logical turnaround areas in advance of the construction zone.

(2) Two alternative routes will be designated by DPR to allow access during construction.

Environmental Effects

I. *No Action Alternative*

Under the no-action alternative, NOAA RC would not fund the proposed project. The restoration project would not take place, Coho salmon survival rates would not improve, and there would be no other effects to the human environment, including the California Red-legged Frog and Myrtle's Silverspot Butterfly**.**

II. *Preferred Alternative*

The BiOp issued by the USFWS concluded that while the proposed action may adversely affect the federally endangered Myrtle's Silverspot Butterfly and the federally threatened California Red-legged Frog, it will not jeopardize the continued existence of these species. USFWS' conclusion is based on the short duration and small scale of the proposed action, the implementation of conservation and management measures to minimize effects to listed species, and the expected long-term benefits to listed species resulting from the proposed habitat restoration efforts.

The Final Mitigated Negative Declaration (MND) prepared by the California DPR concluded that the proposed project would not have any significant impacts on the environment, once all proposed mitigation measures have been implemented. This conclusion is supported by the following findings:

(1) There was no potential for adverse impacts on agriculture, land use planning, mineral resources, population and housing, public services, recreation, and utilities and service systems associated with the proposed project.

(2) Potential adverse impacts resulting from the proposed project were found to be less than significant in the following areas: aesthetics, air quality, cultural resources, geology, global climate change, hazardous materials, hydrology and water quality, noise, and transportation and traffic.

(3) Full implementation of the proposed mitigation measures included in the MND would reduce potential project related adverse impacts on biological resources to a less than significant level.

Cumulative and Indirect Impacts

As was referenced in the DPR MND, proposed actions in the Willow Creek watershed underwent extensive public and agency review. Additional proposed restoration projects that may be implemented in the future include logging road and skid trail upgrades, decommissioning of roads and the placement of large wood within the stream channel to promote habitat complexity for aquatic organisms. Cumulatively, the future projects would benefit the existence of salmonids and other organisms within the watershed but are not expected to cause a significant impact in conjunction with this project. There are no other planned projects within the vicinity. As referenced in the USFWS BiOp, cumulative impacts could include climate change. The global average temperature has risen by approximately 0.6 degrees Celsius during the 20th Century. There is an international scientific consensus that most of the warming observed has been caused by human activities and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases. Ongoing climate change likely imperils several listed species including the California Red-legged Frog and Myrtle's Silverspot butterfly and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or food sources, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat. There are no foreseeable potential indirect impacts associated with this project.

Amount or Extent of Take

The USFWS anticipates incidental take of the California Red-legged Frog will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive nature of this species, its size, and cryptic appearance. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat. Conservation/mitigation measures proposed within the *Affected Environment* section in this Environmental Assessment (EA) will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. Based on the USFWS Biological Opinion, NOAA anticipates incidental take of the California Red-legged Frog will result from the proposed project. Due to the difficulty in quantifying the number of frogs that will be taken as a result of the proposed action, all California Red-legged Frogs inhabiting the 0.76-acre work area within the action area (this includes 0.08 acre of wetlands and coastal prairie in the expanded road footprint, the 0.55-acre and 0.07-acre areas of channel construction, the 0.03-acre of coastal

prairie upland habitat to be temporarily disturbed by road construction, and the 0.03-acre of ruderal and riparian habitat to be disturbed by habitat enhancement activities) will be subject to incidental take in the form of harm, harassment and capture; and one (1) California Red-legged Frog will be subject to incidental take in the form of death or injury, based on the findings in the USFWS Biological Opinion.

Based on the USFWS Biological Opinion, NOAA anticipates incidental take of Myrtle's Silverspot Butterfly will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive and cryptic nature of the early stages of this species (eggs, larvae, pupae), and their small size. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat. Conservation/mitigation measures described in the *Affected Environment section* in this EA will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. Based on the USFWS Biological Opinion, NOAA therefore anticipates incidental take of Myrtle's Silverspot Butterfly will result from the proposed project. Upon implementation of the reasonable and prudent measures, all individuals of Myrtle's Silverspot Butterfly inhabiting the 0.76-acre work area within the action area will be subject to incidental take in the form of harm, harassment, capture, injury and mortality.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for Myrtle's Silverspot Butterfly and the California red-legged frog will become exempt from the prohibitions described under Section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, NOAA agrees with the USFWS determination that the level of anticipated take is not likely to result in jeopardy to the California red-legged frog or the Myrtle's Silverspot Butterfly.

Reasonable and Prudent Measure

Based on the USFWS Biological Opinion, NOAA believes the following reasonable and prudent measure is necessary and appropriate to minimize the effects of the Willow Creek Road 2nd Bridge Fish Passage Project on California Red-legged Frogs and Myrtle's Silverspot Butterfly:

> The ACOE through the applicant shall fully implement all of the Conservation/Mitigation Measures as described in the *Affected Environment* section of this EA.

Terms and Conditions

To be exempt from the prohibitions of Section 9 of the Act, the ACOE shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

The following terms and conditions will implement the Reasonable and Prudent Measure described above:

(1) The applicant shall minimize the potential for harm, harassment, injury, and death of federally listed wildlife species resulting from project related activities including implementation of the Conservation/Mitigation Measures in this EA.

(2) If requested, during or upon completion of construction activities, the applicant shall ensure the USFWS, CDFG, or their authorized agent's immediate access to the project area. The on-site biologist and/or a representative from the applicant's agency shall accompany USFWS personnel on an on-site inspection of the project area(s) to review project effects to California Red-legged Frog and Myrtle's Silverspot Butterfly and their habitats.

(3) The applicant shall ensure compliance with the *Reporting Requirements* of the biological opinion.

List of Agencies/Persons Consulted

Stephanie Jentsch, Ryan Olah
U.S. Fish and Wildlife Service, Sacramento, California

Jon Ambrose
NOAA Fisheries, Protected Resources Division, Santa Rosa, California

Brendan O'Neil
CA Department of Parks and Recreation, Russian River District, Duncans Mills, California

Attachments
USFWS' January 28, 2011 Biological Opinion

CA DPR April 2010 Final Mitigated Negative Declaration

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2010-F-0346-1

JAN 28 2011

Ms. Jane M. Hicks
Regulatory Branch (Attn: Justin Yee)
U. S. Army Corps of Engineers
San Francisco District
333 Market Street
San Francisco, California 94105-2197

Subject: Biological Opinion on the Proposed Willow Creek Road 2nd Bridge Area Fish Passage Project in Sonoma County, California (Corps File No. 2008-00432S)

Dear Ms. Hicks:

This letter is in response to the Army Corps of Engineers' (Corps) January 27, 2010, request for section 7 consultation with the U.S. Fish and Wildlife Service (Service) on the effects of the Proposed Willow Creek Road 2nd Bridge Fish Passage Project in Sonoma County, California (proposed action). The Corps' letter was received by the Service on February 3, 2010. At issue are the proposed action's potential effects on the federally threatened California red-legged frog (*Rana draytonii*), endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*), endangered California freshwater shrimp (*Syncharis pacifica*), and the endangered Sonoma alopecurus (*Alopecurus aequalis sonomensis*). No designated or proposed critical habitat is located within the project area; therefore, none will be affected. This response is provided in accordance with the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Service concurs with your determination that the proposed action may affect, but is not likely to adversely affect the California freshwater shrimp. The Service's determination is based on our understanding that proposed work within the stream channel would take place only in portions of Willow Creek where channel-forming processes have been impeded resulting in marsh-like conditions with no definable channel. These conditions do not provide preferred winter or summer habitat for California freshwater shrimp.

The Service concurs with your determination that the proposed action may affect, but is not likely to adversely affect the Sonoma alopecurus. The Service's determination is based on the results of protocol-level rare plant surveys conducted in spring and summer of 2009. The surveys did not detect this species within project area.

TAKE PRIDE IN AMERICA

The Service does not concur with your determination that the proposed project is not likely to adversely affect the Myrtle's silverspot butterfly. Western dog violet (*Viola adunca*), the host plant for the Myrtle's silverspot butterfly, occurs within the project area.

The Service concurs with your determination that the proposed action may adversely affect the California red-legged frog. This document represents the Service's biological opinion on the effects of the proposed action on the California red-legged frog and Myrtle's silverspot butterfly.

This document was prepared based on: (1) information provided in the Corps' letter dated January 27, 2010; (2) the October, 2008, *Biological Resources Evaluation and Preliminary Wetland Assessment, Willow Creek Road 2nd Bridge Area Fish Passage Project, Sonoma Coast State Park* prepared by Prunuske Chatham, Inc. for Steward of the Coast and Redwoods; (3) the December, 2009, *Initial Study Draft Mitigated Negative Declaration Willow Creek Road 2nd Bridge Area Fish Passage Project* prepared by California Department of Parks and Recreation (DPR); (4) the December, 2008, *Adaptive Geomorphic Plan for the Willow Creek Valley Above the 2nd Bridge Crossing, Sonoma County, California* prepared by O'Connor Environmental, Inc.; (5) the November, 2009, *Dewatering and Species Protection Plan Willow Creek Road 2nd Bridge Area Fish Passage and Channel Restoration Project* prepared by Prunuske Chatham, Inc; (6) a visit to the project site on April 6, 2010, attended by the Service and representatives from the Corps, DPR, and Prunuske Chatham, Inc.; (7) the *Willow Creek Fish Passage Mitigation Measures Addendum* dated June 3, 2010; (6) various emails and phone conversations between DPR and the Service; and (8) other information available to the Service.

Consultation History:

February 3, 2010:	The Service received the Corps request for consultation and associated attachments.
April 6, 2010:	Site visit attended by the Service, the Corps, DPR, and Prunuske Chatham.
April 26, 2010:	Conference call with DPR and the Service to discuss additional information needs and conservation measures.
June 3, 2010:	The Service received the *Willow Creek Fish Passage Mitigation Measures Addendum* from DPR.
June 29, 2010:	The Service sent a draft project description to DPR.
July 7, 2010 to December 22, 2010:	Emails exchanged between DPR, Prunuske Chatham, and the Service to finalize the project description for the proposed action and clarify project impacts.

Description of the Proposed Action

Background

The proposed action is located on the Sonoma Coast west of the community of Duncan Mills and southeast of Jenner, California, on the county-maintained Willow Creek Road and adjacent habitats in lower Willow Creek, a tributary to the Russian River. The objectives of the project are to reestablish channel connectivity and fish passage in Willow Creek, to allow natural channel development, to provide habitat connectivity, and to maintain public access.

Outside of the road right-of-way, the project site is owned and operated by the DPR as part of Sonoma Coast State Park. Willow Creek is considered a high priority watershed for California Department of Fish and Game's (CDFG) coho salmon restocking program. Viability of the watershed for the coho salmon recovery program is presently limited due to fish passage restrictions related to Willow Creek Road at the second bridge crossing (Willow Creek Road crosses Willow Creek in the lower valley at three locations).

The bermed roadway at the second bridge crossing restricts channel connectivity and impedes channel-forming processes at the creek's geomorphically preferred location. Historic channel management practices (realignment and frequent dredging) sought to control the natural tendency of the creek to form a number of highly interconnected stream channels within the lower Willow Creek Valley. The channel at the second bridge crossing required regular maintenance to conform to the bridge location established at that time. Dredging of the channel ceased in the mid-1980s when it was deemed a financially and ecologically unsustainable practice. Natural aggradational processes immediately reasserted control over the system in the vicinity of the second bridge crossing, filling the historic man-made channel and inducing channel migration to the west side of the valley.

In spring 2007, the Willow Creek Technical Advisory Committee reviewed a range of culvert and bridge options to restore fish passage at the second bridge crossing. A consensus was reached to design and install a channel crossing at the valley thalweg that will provide for fish passage, channel development, hydraulic connectivity, and a 20- to 50-year lifespan.

Existing Conditions

Willow Creek flows from an 8.7-square mile watershed into the Russian River approximately 2 miles upstream of the river's mouth at Jenner in Sonoma County. Located on the western edge of the Coast Range, Willow Creek flows in a northwesterly direction following an inactive fault trace. Most of the Willow Creek watershed is part of the 10,286-acre Sonoma Coast State Park.

The project area consists of the second Willow Creek Road bridge crossing and the floodplain immediately upstream to the third bridge. The project site is approximately 1.5 miles from the intersection of Highway 1 and is surrounded by DPR property. The nearest private residences are approximately 1 mile to the north. Approximately 500 feet to the west is a DPR maintenance facility, an abandoned historic residence, barn and accessory structures, and two temporary

mobile homes. To the north and south is the Willow Creek riparian corridor, and to the east lies open space.

Immediately upstream of the culverts at the second bridge crossing, Willow Creek consists of a shallow (4-8 inch depth) marsh-like habitat with no definable channel formed by backed-up stream flow extending approximately 75 feet upstream. Upstream of this ponded reach, Willow Creek flows through a relatively well-defined channel adjacent to Willow Creek Road for approximately 700 feet. Average channel widths are approximately 2 feet and average depths range from 6 to 10 inches. Significant pools, large woody debris, and undercut banks are largely absent from this reach. Upstream, a number of small "tributary" channels originate in a small cattail-dominated marsh. These tributary channels are poorly defined and shallow. Upstream of this small cattail marsh, the channel veers eastward toward the center of the narrow valley and extends approximately 1,200 feet upstream to another larger cattail marsh referred to as the Gristmill wetland. Throughout this reach, the channel is relatively well-defined, substrates are dominated by silt and sand with some gravel, and patches of emergent vegetation are present in the channel. Some undercut banks and minor amounts of downed logs and branches provide limited cover in this reach; pool formation is sparse. The upstream end of this reach is formed by the confluence of two channels, one originating from a perennial pond (Gristmill pond) located within the Gristmill wetland and the other originating from the historic flood control channel on the north side of the valley. Gristmill pond is estimated to be approximately 0.6 acres and 2 feet deep. The channel exiting the pond is approximately 3 feet wide and 1.5 feet deep with relatively swift streamflow. This channel contains no riparian vegetation but flows through dense sedges lining both sides of the channel. The historic channel originating from the north is shallow (2-3 inches) and approximately 4 feet wide. Upstream of the perennial pond the current Willow Creek Channel alignment veers northeast toward the historical channel.

Project Description

The proposed action will replace the six existing culverts at the second bridge crossing with a single-span, precast concrete bridge. This will include installing the new bridge, footings, and abutments, road side sloping and realignment, and channel realignment. No improvements are proposed for the existing concrete bridge that spans the inactive man-made historical channel. The new bridge will span 43 feet with a bridge deck width of 27.5 feet. The new concrete bridge abutments will be supported by 16 inch diameter pipe piles driven approximately 70 feet deep. Bridge approaches will be graded to meet the elevation of the existing bridge on the western approach and the 18-foot road contour on the eastern approach. To reduce the frequency of road flooding in the vicinity of the existing culverts, approximately 790 feet of the existing Willow Creek Road will be raised and repaved.

Channel construction within Willow Creek will be minimal and will include excavation of an unreinforced channel bed under the bridge to the expected thalweg elevation. The channel will be graded to conform to existing upstream and downstream incipient channel features. The thalweg under the bridge will be set at an elevation of 12.6 feet. It is expected that subsequent flows will create natural channel features and dimensions while connecting the existing channels currently forming on the south side of the valley.

A road leading to the DPR maintenance area intersects Willow Creek Road adjacent to an existing drainage supported by two 24-inch diameter by 40-foot long culverts. The two existing culverts would be removed and replaced by a single 18-inch diameter by 85-foot long culvert that will pass under the raised area at the intersection and maintain flow to a seasonal wetland west of the road. Culvert removal and replacement and raising the road elevation and bridge approaches will create a slightly larger road footprint and will result in the permanent loss of 0.04 acre of wetland and 0.04 acre of coastal prairie habitat. Construction activities will result in temporary effects to 0.55 acre of riparian habitat and 0.03 acre of coastal prairie habitat.

Adaptive Channel Development

Channel development in wetlands will create a primary channel through two areas of wetland upstream of the new bridge. Channel work will consist of hand pruning and removal of vegetation, primarily cattails, willow, and alders, in two separate reaches totaling approximately 1,000 linear feet (4 feet wide by 2 feet deep), to link already established, well-defined channels at the wetland's upstream and downstream edges. This will result in temporary effects to 0.07 acre of wetland habitat.

The exact location of channel development work and the amount and spatial frequency of vegetation removal will be determined and field-staked in mid to late summer when water levels have receded. The project geomorphologist, working with the project biologist and State Parks ecologist, will evaluate the site to determine where incipient channels can best be connected while avoiding adverse impacts on the existing Gristmill Pond. Manual vegetation removal will occur in late summer to early fall.

Should it be determined that future adaptive management work is required to facilitate channel formation, consultation with the Service will be re-initiated.

Dewatering Plan

If water is present within Willow Creek in the project reach during construction of the new bridge, the creek will need to be dewatered. To avoid the discharge of silt-laden water into Willow Creek during construction, several techniques may be utilized. Work will take place during summer low-flow conditions. If there is perennial flow within the project reach, coffer dams or similar water diversion structures will be constructed at the up- and downstream ends of the project site and water will be diverted around the site. Coffer dams will be constructed with the use of river-run gravel and/or sand bags. On-site materials used during the dewatering will be returned to the stream channel. Off-site materials will be removed from the site. Coffer dams will be placed in locations that will minimize the amount of stream reach dewatered while allowing adequate construction access. Dams will be placed at appropriate locations that minimize disturbance to the aquatic environment. Surface flow in Willow Creek may cease during the summer months leaving only isolated perennial pools or a dry creek bed, in which case, coffer dams will not required. If only isolated pools are present, they will be pumped out as necessary.

An approved screened pump intake will be used to divert water around the work area or from isolated pools. If minimal surface flow is present, flow may be diverted through the coffer dam by a gravity fed pipe. Pumps will be screened in accordance with Juvenile Fish Screen Criteria for Pump Intakes developed by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NOAA Fisheries Service 1996) and will consist of 3/32-inch screen mesh. The pump will be placed in a large basin with holes to allow water to be drawn into the pump. Both the outside of the basin and the pump will be screened with 2/32-inch mesh to ensure aquatic species do not get sucked into the pumps. The water diversion pipe will consist of a large, plastic pipe and will be placed along the stream channel. Four-inch flex pipe may also be used. The use of PVC pipe will be avoided. The inlet and outlet of the diversion pipe will be screened so aquatic and terrestrial species do not enter the structures. Throughout construction, a sump pump of adequate capacity may be needed to remove subsurface water flowing into the work area. If needed, sump pumps will be powered by a generator or external power source and properly screened.

Habitat Enhancement and Restoration

In order to compensate for adverse affects to California red-legged frog, DPR proposes to enhance water quality at Gristmill wetland and pond (2.6 acres of wetland including 2.0 acres of palustrine emergent wetland and 0.6 acre of palustrine wetland/open water) by reconnecting a perennial spring to the marsh through replacement of a failed culvert under Willow Creek Road and excavating a channel that will direct water to the pond, as needed.

The Gristmill wetland site receives water from three springs. The water from these springs flows across Willow Creek Road and into the Gristmill wetland and pond. As water crosses the road, it travels within an inboard ditch and indirectly makes its way across the road at one of several low spots. In the summer months of 2009 water temperatures entering the road prism were consistently measured in the mid 60's (Fahrenheit) and water discharging from the road prism has been measured in the mid to high 70's. Water temperatures increase as solar radiation and latent heat from the road surface warms the water. Elevated water temperatures are a significant concern as they may reduce available dissolved oxygen (DO), increase metabolic rates of aquatic organisms and may lead to outmigration from these habitats.

DPR will improve existing conditions by installing three stream crossings; one multi- plate arch and two armored crossings. Each crossing would be located as close to the inlet of surface runoff as feasible. The crossings would route surface flows across the road prism to the wetland via the most direct route, reducing thermal loading by decreasing exposure to solar radiation and latent heat. Installation of the stream crossings would require excavation of a small outlet through 0.02 acre of ruderal habitat on the roadside berm and would result in 0.01 acre of temporary effects to riparian vegetation.

DPR will also implement a bullfrog control program and California red-legged frog monitoring program at Gristmill wetland and pond. The bullfrog control program is intended to reduce bullfrog predation of and competition with California red-legged frogs. California red-legged frog and bullfrog monitoring will be conducted concurrent with bullfrog control efforts and will

occur four times per year for the three year period following project construction. Each control effort will consist of a four-hour night time effort to locate frogs by eye-shine, hand capture frogs to confirm species, and permanently remove bullfrogs from within the project area. DPR will note numbers of each species observed, date, location, and methods used. DPR will also conduct an egg mass survey each year with the Gristmill pond. An annual report will be submitted to the Service in December of each year.

In order to compensate for adverse effects to Myrtle's silverspot butterfly, within one year of project construction, DPR will restore 1 acre of coastal prairie habitat occupied by dog tooth violet that has been invaded by Douglas fir seedlings, saplings, and poles and by coyote bush. The invasion of competing species is rapidly occurring in the absence of fire. Douglas fir will be cut, lopped, and scattered and coyote bush will be lopped and stems painted with glyphosate. Following treatment, the restored area will be absent of Douglas fir and contain less than ten percent cover of coyote bush.

Conservation Measures

The applicant proposes to implement the following measures to minimize the proposed action's effects to the California red-legged frog and Myrtle's silverspot butterfly:

General Measures

1. Proper erosion control and water quality Best Management Practices (BMPs) will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. An erosion and sediment control plan will be developed and implemented. In stream work will only occur in dry or dewatered sections.

2. Non-native, invasive plant species will be removed from the project site, and native trees, shrubs, and herbs will be planted to improve plant diversity and wildlife habitat.

3. During vegetation removal, large trees with extensive canopy will be maintained to the maximum extent feasible to preserve the existing cover over the stream channel.

4. Any vegetation to be removed will be hand-cleared. No machinery or vehicles that disturb the ground surface will be allowed in areas in which the ground is not clearly visible.

5. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and where feasible, these areas shall be outside of riparian and wetland areas.

6. Prior to the start of construction activities, a Service-approved biologist will conduct a training session for all construction personnel. Training will include a description of California red-legged frog and Myrtle's silverspot butterfly, their habitats and behavior, a

discussion of measures to be implemented to ensure these species are not impacted by project activities, and proper procedures for staff if any individuals are detected within the project area.

California Red-legged Frog

1. Work activities will be completed between April 1 and November 1. Should the applicant demonstrate a need to conduct activities outside of this period, Service approval shall be obtained.

2. No more than 5 calendar days prior to the onset of activities, a Service-approved biologist shall conduct a pre-construction survey of the work site for listed species. If any California red-legged frogs are found, the Service will be contacted and the Service-approved biologist will be allowed sufficient time to move any animal(s) from the work site before work activities begin. The animal(s) shall be moved to a safe location outside the work area in an area that will remain undisturbed throughout the project. California red-legged frogs will be translocated to appropriate habitat for their life cycle. The biologist will monitor any translocated animal until it is determined that it is not imperiled by predators or other dangers. If any other listed species are found, the Service will be immediately contacted and no actions will be taken without prior authorization from the Service.

3. Following the preconstruction survey, temporary wildlife exclusion fencing and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site and to protect riparian trees during construction activities.

4. Prior to the start of daily construction activities, a Service-approved biologist or biological monitor will inspect the construction area and all associated equipment. If any California red-legged frogs are found, work will cease, the Service will be contacted, and the animal(s) shall be moved by the Service-approved biologist to a safe location outside the work area according to the protocol described in measure 2 above. If any other listed species are found, the Service will be immediately contacted and no actions will taken without prior authorization from the Service.

5. Only Service-approved biologists will participate in activities associated with the capture, handling, and monitoring of California red-legged frogs. Actions taken to move California red-legged frogs will be consistent with applicable Service and California Department of Fish and Game regulations and permits. Any biologist involved with the surveying/handling will employ sterilization techniques appropriate to avoid the transmission of diseases to and from the site.

6. Tightly woven fiber netting or similar material shall be used for erosion control or other purposes at the project to ensure that California red-legged frogs do not get trapped. Plastic mono-filament netting (erosion control matting), rolled erosion control products or

similar material shall not be used at the project site because California red-legged frogs and other species may become entangled or trapped in it.

7. All construction-related holes, capable of entrapping wildlife, will be covered at the end of each workday in a manner that will prevent entrapment. Prior to commencing construction activities each workday, trenches shall be thoroughly inspected for animals.

8. Because California red-legged frogs may take refuge in cavity-like and den-like structures such as pipes and may enter stored pipes and become trapped, all construction pipes, culverts, or similar structures that are stored at a construction site for one or more overnight periods will be either securely capped prior to storage or thoroughly inspected by the on-site biologist and/or the on-site monitor for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a California red-legged frog is discovered inside a pipe, the protocol in measure 2 above will be followed.

Myrtle's Silverspot

1. Prior to ground disturbing activities, a Service-approved biologist will flag all larval host plants of the Myrtle's silverspot butterfly within 50 feet of the project footprint. Flagged areas will be avoided to the maximum extent practicable.

2. Prior to removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no Myrtle's silverspot butterflies are occupying the site. If Myrtle's silverspot adults or larvae are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the Service.

3. Following the preconstruction survey temporary exclusionary fencing will be installed around the work area in sensitive coastal prairie habitat prior to construction to preclude disturbance beyond construction limits.

4. The Service-approved biologist will have the authority to stop any action that might result in damage or harm to any larval food plants of the Myrtle's silverspot butterfly outside of the project footprint. If work is stopped, the Service will be notified immediately by the on-site biological monitor or the Service-approved biologist.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area includes all areas within the project footprint of the proposed action including the proposed bridge crossing and associated road and culvert work, proposed channel excavation and development work, and the proposed replacement of culverts under Willow Creek road to enhance conditions in the Gristmill Wetland. The action

area also includes the area immediately downstream of the second bridge crossing that could be subject to decreased water quality caused by dewatering and vegetation removal activities as well as Gristmill Pond which could be affected by channel creation and where a bullfrog removal program will be implemented.

Analytical Framework for the Jeopardy Analysis

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on three components: (1) the *Status of the Species* and *Environmental Baseline*, which evaluates the species' range-wide condition, the factors responsible for that condition, and the survival and recovery needs; and evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the listed species; (2) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (3) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on them.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California red-legged frog's and Myrtle's silverspot butterfly's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these listed species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the listed species, and the role of the action area in the survival and recovery of the listed species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Status of the Species

California Red-legged Frog

***Listing Status*:** The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002). On March 17, 2010, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (75 FR 12816).

***Description*:** The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

***Distribution*:** The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding, Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The California red-legged frog was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002).

California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2010).

***Status and Natural History*:** California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, California red-legged frogs also have been found in ephemeral creeks and drainages and in ponds with minimal riparian and emergent vegetation. California red-legged frogs breed between November and April, although earlier breeding records have been reported in southern localities, in still or slow-moving water often with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). California red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984). Individuals occurring in coastal drainages are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold season.

During other parts of the year, habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees. Sometimes the non-breeding habitat used by California red-legged frogs is extremely limited in size. For example, non-breeding California red-legged frogs have been found in a 6 foot wide coyote brush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005).

Sheltering habitat for California red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5-mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment, Tatarian (2008) noted that a 57 percent majority of frogs fitted with radio transmitters in the Round Valley study area in eastern Contra Costa County stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. This study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and man-made structures such as a downed barn door; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992).

California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow California red-legged frogs to experience extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, California red-legged frogs may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of larval California red-legged frogs is not well studied, but is likely similar to that of other ranid frogs, feeding on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frogs, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Metapopulation and Patch Dynamics: The direction and type of habitat used by dispersing animals is especially important in fragmented environments (Forys and Humphrey 1996). Models of habitat patch geometry predict that individual animals will exit patches at more "permeable" areas (Buechner 1987; Stamps *et al.* 1987). A landscape corridor may increase the patch-edge permeability by extending patch habitat (La Polla and Barrett 1993), and allow individuals to move from one patch to another. The geometric and habitat features that constitute a "corridor" must be determined from the perspective of the animal (Forys and Humphrey 1996).

Because their habitats have been fragmented, many endangered and threatened species exist as metapopulations (Verboom and Apeldom 1990; Verboom *et al.* 1991). A metapopulation is a collection of spatially discrete subpopulations that are connected by the dispersal movements of the individuals (Levins 1970; Hanski 1991). For metapopulations of listed species, a prerequisite to recovery is determining if unoccupied habitat patches are vacant due to the attributes of the habitat patch (food, cover, and patch area) or due to patch context (distance of the patch to other patches and distance of the patch to other features). Subpopulations on patches with higher quality food and cover are more likely to persist because they can support more individuals. Large populations have less of a chance of extinction due to stochastic events (Gilpin and Soule 1986). Similarly, small patches will support fewer individuals, increasing the rate of extinction. Patches that are near occupied patches are more likely to be recolonized when local extinction occurs and may benefit from emigration of individuals via the "rescue" effect (Hanski 1982;

Gotelli 1991; Holt 1993; Fahrig and Merriam 1985). For the metapopulation to persist, the rate of patches being colonized must exceed the rate of patches going extinct (Levins 1970). If some subpopulations go extinct regardless of patch context, recovery actions should be placed on patch attributes. Patches could be managed to increase the availability of food and/or cover. Movements and dispersal corridors likely are critical to California red-legged frog population dynamics, particularly because the animals likely currently persist as metapopulations with disjunct population centers. Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Hilty and Merenlender 2004; Petit *et al.* 1995; Buza *et al.* 2000).

Most metapopulation or meta-population-like models of patchy populations do not directly include the effects of dispersal mortality on population dynamics (Hanski 1994; With and Crist 1995; Lindenmayer and Possingham 1996). Based on these models, it has become a widely held notion that more vagile species have a higher tolerance to habitat loss and fragmentation than less vagile species. But models that include dispersal mortality predict exactly the opposite: more vagile species should be more vulnerable to habitat loss and fragmentation because they are more susceptible to dispersal mortality (Fahrig 1998; Casagrandi and Gatto 1999). This prediction is supported by Gibbs (1998), who examined the presence-absence of five amphibian species across a gradient of habitat loss. He found that species with low dispersal rates are better able than more vagile species to persist in landscapes with low habitat cover. Gibbs (1998) postulated that the land between habitats serves as a demographic "drain" for many amphibians. Furthermore, Bonnet *et al.* (1999) found that snake species that use frequent long-distance movements have higher mortality rates than do sedentary species.

***Threats*:** Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976, Barry 1992, Hunt 1993, Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female

bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993) potentially preventing successful California red-legged frog reproduction. Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected California red-legged frogs. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the status of the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat to the California red-legged frog because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus. Ingles reported two species of trematodes from red-legged frogs (Fellers 2005). Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in the listed species being more susceptible to the effects of disease.

***Recovery*:** The recovery plan for California red-legged frogs identifies eight Recovery Units (Service 2002). The establishment of these Recovery Units is based on the Recovery Team's determination that various regional areas of the species' range are essential to its survival and recovery. The status of the California red-legged frog will be considered within the smaller scale of Recovery Units as opposed to the overall range. These Recovery Units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each Recovery Unit. Within each Recovery Unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

Myrtle's Silverspot Butterfly

***Listing Status*:** Myrtle's silverspot butterfly was listed as an endangered species in 1992 (Service 1992). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998).

***Description*:** The Myrtle's silverspot butterfly is one of four related coastal subspecies of *Speyeria zerene* that occur from Washington to California: the glorious silverspot (*Speyeria zerene gloriosa*), threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*), endangered Behrens' silverspot butterfly (*Speyeria zerene behrensii*), and endangered Myrtle's silverspot butterfly. All three listed silverspot butterflies occupy restricted habitat types close to the coast, and have been seriously impacted by human activities. The wingspan of the Myrtle's silverspot butterfly averages 2.1 to 2.3 inches with the upper surface of both hind and fore wings being golden brown to fulvous with many conspicuous black spots, lines, and other markings, while the undersides of the wings are light tan, reddish brown, and brown with black lines and distinctive silver spots and black spots. The base of the wings, as well as the body, are covered with hairs.

***Distribution*:** The historic range of the Myrtle's silverspot butterfly is believed to have included the northern California coastal dunes and bluffs from the river mouth (south bank) of the Russian River in Sonoma County, and southward to Point Ano Nuevo in San Mateo County (Launer *et al.* 1992, Service 1998). By the late 1970s, Myrtle's silverspot populations south of the Golden Gate Bridge were believed to be extinct and extant populations were known only from Marin County at the Point Reyes National Seashore. In 1990, an additional population was discovered at a site in northernmost coastal Marin County, near Estero de San Antonio, on property proposed for a golf resort and residential development (Service 1998).

***Status and Natural History*:** Myrtle's silverspot butterfly inhabits coastal dunes, coastal prairie, and coastal scrub at elevations ranging from sea level to 1,000 feet, and as far as 3 miles inland (Launer *et al.* 1992). The adult butterflies prefer areas protected from onshore winds, but can be observed in exposed areas when winds are calm. Critical factors in the distribution of Myrtle's silverspot butterfly include presence of the presumed larval host plant, western dog violet (*Viola adunca*), and availability of nectar sources for adults (Launer *et al.* 1992). Although alternate larval host plants have neither been confirmed nor ruled out for the Myrtle's silverspot butterfly, other subspecies of *Speyeria zerene* and other species of silverspot butterfly larvae can feed on more than one species in the genus *Viola* (Scott 1986). Adult Myrtle's silverspot butterflies have been observed nectaring on non-native species such as bull thistle and rarely Italian thistle. In dune scrub habitat, these butterflies seek nectar from several native species such as gum plant, western pennyroyal, yellow sand verbena, seaside daisy, and mule ears. Other flowering plants that may serve as good nectar sources for the opportunistic adults include brownie thistle and groundsel (Service 1998). The related threatened Oregon silverspot butterfly has been observed to visit yarrow, goldenrod, beach aster, the non-native rough cat's-ear, and pearly everlasting (Service 1998). Nectar availability is correlated with adult longevity and egg production in females of many butterfly species (Murphy *et al.* 1983; Opler and Krizek 1984), but this relationship has not yet been investigated in Myrtle's silverspot butterfly.

Butterflies are poikilothermic (cold blooded) and they cannot regulate their body temperatures internally (Clench 1964; Opler and Krizek 1984). In general, butterflies cannot fly when air temperatures drop below 60.8 degrees Fahrenheit; air temperatures higher than 100.4 degrees Fahrenheit in combination with high humidity, are unsuitable for most species (Opler and Kriezek 1984). Butterflies use a variety of behavioral actions to raise their body temperature including changing the wing and body orientation to the sun, elevating or depressing their

abdomen, perching at different heights or locations, changing the height of their flight, and moving in and out of the shade (Opler and Kriezek 1984; Kingsolver 1985). The dark coloration of Myrtle's silverspot butterfly may be a thermal adaptation to the fog belt that occurs at Point Reyes National Seashore, since dark objects absorb more sunlight than light objects. Wing color and darker colors at the bases of the wings, such as that possessed by Myrtle's silverspot butterfly, may play an important role in the efficiency of basking for thermoregulation (Kingsolver 1985).

Female Myrtle's silverspot butterflies lay their eggs singly on or near dried leaves and stems of violets. Within a few weeks after the eggs are laid, the larvae (caterpillars) hatch, feed on the lining of the egg, crawl a short distance into the surrounding foliage or litter, and spin a silk pad on which they spend the summer, fall, and winter (Service 1998). The period of inactivity is a resting state called diapause, during which time the larvae do not feed. The larvae may be able to extend their diapause for more than one year. Upon termination of diapause in the spring, the caterpillar finds a nearby violet and begins feeding (Service 1998). Feeding may be difficult to observe, and occurs at dusk and possibly at night. The larval feeding stage lasts about 7–10 weeks, after which the larvae form their pupae within a chamber they make with leaves spun together with silk (Service 1998). The adult butterfly emerges from the pupa after about two weeks; typically emergence occurs from mid-June to mid-July (Service 1998). The flight season for Myrtle's silverspot butterfly extends from mid-June to early October (Launer *et al.* 1992). During this time period they mate, lay eggs, and die. Males emerge earlier than females and patrol widely for females (Service 1998). Both sexes are good flyers and can travel kilometers in search of nectar, mates, or violets (Launer *et al.* 1992). Adult activity is closely tied to weather conditions: they are active during calm weather and inactive during windy periods.

***Threats*:** The listing of the Myrtle's silverspot butterfly was based on its extirpation from the southern third of its historical range south of the Golden Gate Bridge, and adverse effects of urban development, invasive non-native vegetation, livestock grazing, and other human influences throughout its range. Myrtle's silverspot butterfly occurs in separate populations whose long-term persistence may depend upon movement between populations. Habitat degradation that results in the loss of intervening populations, larval food plants, and adult nectar sources may make movements between populations more difficult.

Illegal collection is also a threat to Myrtle's silverspot butterfly. Specimens of this animal are known to have been illegally collected in Point Reyes National Seashore. Illegal collection of adults is likely to continue at a level that is difficult to quantify. Substantial areas of habitat and potential habitat for Myrtle's silverspot are protected in the Point Reyes National Seashore and the northern unit of the Golden Gate National Recreation Area.

***Status of the Species*:** Field surveys conducted by the Center for Conservation Biology at Stanford University in 1991 through 1993 found that there were two separate populations of Myrtle's silverspot butterfly at the Point Reyes National Seashore. The surveys also found two additional populations at Estero de San Antonio (including land reserved for a proposed golf resort) in Marin County and east of Bodega Bay (Service 2009). The population at the proposed golf resort property was estimated to support between 2,500 and 5,000 adult Myrtle silverspot

butterflies in 1991 (Service 1998). Other nearby areas with potentially suitable habitat were not surveyed. The proposal for the golf course was withdrawn and later replaced with a proposal for low density residential development and open space (Service 1998). Due to the lack of historic data previous to the 1990's, it is not known if populations of Myrtle's silverspot have declined at Point Reyes National Seashore. However, the population, centered on North Beach (extending from Abbotts Lagoon to South Beach and east to Drakes Estero and Drakes Beach) was estimated to number in the low thousands in 1993. More recent survey work in 1997 put the population estimate at 50-200 individuals, with no Myrtle's silverspot butterflies being found in portions of the 1993 range. The other population, located on the Tule Elk Reserve, was estimated to number in the mid-hundreds in 1993. The 1997 survey of this northern Point Reyes population resulted in a population estimate of 250-500 (Launer *et al.* 1998). Only a single individual has been observed in the Bodega Bay area in the last 15 years (Service 2009).

Recovery: The recovery plan for the Myrtle's silverspot butterfly (Service 1998) provides a recovery strategy for the species that includes the following measures: (1) protect habitat where remaining populations occur; (2) identify and establish vegetation management that benefits the native ecosystem of larval host plants and adult nectar sources; (3) re-introduce populations of the butterfly to prioritized areas; (4) control illegal collecting; (5) conduct or fund research to identify critical recover needs or actions; and (6) monitor existing populations and survey historic and unsurveyed locations.

Environmental Baseline

California Red-legged Frog

DPR staff have detected adult California red-legged frogs within the action area and documented breeding in Gristmill Pond. The nearest California red-legged frog occurrence documented in the California Natural Diversity Database (CNDDB) is located in Willow Creek less than 0.5 miles downstream of the action area (CDFG 2010). Within the action area perennial and intermittent stream habitat in Willow Creek, freshwater marsh and wetland areas associated with the creek, and Gristmill Pond provide suitable aquatic breeding and non-breeding habitat for California red-legged frog. Riparian forest and coastal prairie in the action area provide suitable upland habitat.

Myrtle's Silverspot Butterfly

The nearest occurrence of Myrtle's silverspot butterfly to the action area was documented in 1975 approximately 1.5 miles to the west at Goat Rock State Beach (CDFG 2010). No recent occurrences have been documented at this location and it is unknown whether Myrtle's silverspot butterflies persist in the area. At the time of listing and again in 2003 Myrtle's Silverspot butterflies were observed approximately 7 miles south of the action area near the town of Bodega Bay (Service 1992, A. Launer, Stanford University, in litt. 2008; G. Smick in litt. 2008). It is unknown whether these observations represent single members of a colony or dispersing individuals.

Coastal prairie habitat suitable for Myrtle's silverspot butterfly occurs within and adjacent to the action area. Seven western dog violets were observed within the project footprint in June, 2010, and numerous additional western dog violets were observed within coastal prairie habitat on the hillside immediately south of the action area. Plant species that provide adult food sources also occur within and adjacent to the action area. Adult Myrtle's silverspot butterflies are highly mobile and, like other silverspot butterflies, may fly considerable distances. Therefore, based on the biology and ecology of the animal and the presence of suitable larval and adult food sources and habitat in and adjacent to the action area, Myrtle's silverspot butterfly could occur within the action area.

Effects of the Proposed Action

California Red-legged Frog

Raising the elevation of the road and bridge approaches in the project area will result in the permanent loss of 0.04 acre of seasonal wetland and 0.04 acre of coastal prairie that provide foraging and refugia habitat for California red-legged frog. Culvert removal, bridge construction, channel excavation under the bridge, and (should water be present in Willow Creek) dewatering activities will result in the temporary loss of up to 0.55 acre of aquatic and riparian habitat and 0.03 acre of coastal prairie habitat for California red-legged frogs within and adjacent to Willow Creek. Hand pruning and removal of vegetation to create a pilot channel through two marshy areas of Willow Creek will result in the temporary effects to an additional 0.07 acre of aquatic habitat for California red-legged frog. Installation of a stream crossing to improve water quality in Gristmill wetland and pond will result in the permanent loss of 0.02 acre of ruderal habitat and 0.01 acre of temporary effects to riparian vegetation. This will result in direct and indirect effects to the species.

Culvert removal and construction of bridge structures will require the use of large and small construction equipment that could disturb, collapse, or crush animal burrows resulting in injury or mortality to frogs. Use of large equipment and vehicles within the action area may also result in the death or injury of the California red-legged frog through vehicle strike. Conducting awareness training for employees, conducting preconstruction surveys for California red-legged frogs, having a Service-approved biologist present at the work site to prevent injury to California red-legged frogs and move frogs to a safe location, and minimizing the area to be disturbed by project activities will minimize these effects.
Although surveys for California red-legged frogs and the presence of an on-site biological monitor will reduce the likelihood of injury caused by ground disturbing activities within the work area, capturing and handling these animals to remove them from a work area may result in the harassment and harm of these individuals. Stress, injury, and mortality may occur as a result of improper handling, containment, and transport of individuals.

Erosion may occur as a result of accessing the project area, culvert removal, bridge construction, and dewatering activities and could cause increased sedimentation and introduce debris and hazardous substances from leaking equipment into the water, resulting in decreased water quality. In locations where erosion fencing is utilized, California red-legged frogs may get

entangled or trapped in the netting resulting in the injury or death of individuals. Use of tightly woven fiber netting instead of plastic mono-filament netting will reduce the likelihood of frog entrapment in erosion control materials. Conducting work during the dry season and using best management practices for bridge construction and erosion control will minimize effects from sedimentation.

Project construction and increased human presence within the project area will increase disturbance to California red-legged frogs and will likely displace frogs from the action area, potentially exposing displaced individuals to increased levels of predation and decreasing their ability to find required resources such as food and shelter as they move along the Willow Creek corridor. Contaminated equipment and workers within the proposed project area may introduce or spread nonnative invasive plant species, which would diminish vegetative cover and riparian habitat utilized by California red-legged frogs. The presence of a Service-approved biologist who will ensure efforts to avoid the introduction of invasive species are implemented and direct efforts to remove exotic plants will minimize the likelihood of introducing or spreading invasive plant species.

Natural channel development will take place in Willow Creek following project construction and will result in alterations to creek structure. This could result in portions of Willow Creek becoming less accessible to California red-legged frogs or their primary prey. Additionally, following restoration of fish passage, salmonids could use Gristmill pond for off-channel rearing habitat. This could result in increased predation of California red-legged frog tadpoles by juvenile salmonids. Adverse effects to California red-legged frog habitat will be offset by enhancing water quality in Gristmill pond (0.6 acre) and wetland (2.0 acres) and by implementing a 3-year bullfrog control program at Gristmill pond to reduce predation of California red-legged frog by bullfrogs which are currently known to inhabit the pond.

Myrtle's Silverspot Butterfly

The seven western dog violet plants within the project footprint will be permanently removed and approximately 0.04 acre of coastal prairie habitat will be permanently impacted. An additional 0.03 acre of coastal prairie habitat will be temporary impacted during road construction. Within the 0.76-acre word area which includes 0.08 acre of wetlands and coastal prairie in the expanded road footprint, the 0.55-acre and 0.07-acre areas of channel construction, the 0.03 acre of coastal prairie upland habitat to be temporarily disturbed by road construction, and the 0.03 acre of ruderal and riparian habitat to be disturbed by habitat enhancement activities, effects to Myrtle's silverspot adults and larvae could include injury or mortality from being crushed by earth moving equipment, construction debris, worker foot traffic, and moving vehicles. Myrtle's silverspot larvae are small and the vegetation surrounding each western dog violet can be too dense to detect the larvae, preventing site surveys or relocation of larvae. Construction and grading activities may produce dust which can interfere with the respiration and foraging of active adults.

Direct effects will be minimized by flagging all Myrtle's silverspot larval host plants and erecting fencing around work areas to prevent workers and equipment from entering adjacent habitat.

Potential mortality of adult Myrtle's silverspot butterflies will be minimized by conducting a preconstruction survey and avoiding any areas where adults are observed. To compensate for the permanent loss of coastal prairie habitat and loss of larval host plants, 1 acre of coastal prairie habitat that supports western dog violet and that has been invaded by Douglas-fir and coyote bush will be restored within one year of project construction.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The global average temperature has risen by approximately 0.6 degrees Celsius during the 20th Century (IPPC 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (IPPC 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases (Adger *et al.* 2007). Ongoing climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007) likely imperils several listed species including the California red-legged frog and Myrtle's silverspot butterfly and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or food sources, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat

Conclusion

After reviewing the current status of the California red-legged frog and the Myrtle's silverspot butterfly; the environmental baseline for the action area; the effects of the Proposed Willow Creek Road 2nd Bridge Area Fish Passage Project, and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of these listed species. We based this conclusion on the short duration and small scale of the proposed action, the implementation of conservation measures to minimize effects to listed species, and the expected long-term benefits to listed species resulting from the proposed habitat restoration efforts.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat

modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates incidental take of the California red-legged frog will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive nature of this species, its size, and cryptic appearance. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat. Conservation measures proposed in the *Description of the Proposed Action* in this biological opinion will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. The Service, therefore, anticipates incidental take of the California red-legged frog will result from the proposed project. Due to the difficulty in quantifying the number of frogs that will be taken as a result of the proposed action, all California red-legged frogs inhabiting the 0.76-acre work area within the action area (this includes 0.08 acre of wetlands and coastal prairie in the expanded road footprint, the 0.55-acre and 0.07-acre areas of channel construction, the 0.03 acre of coastal prairie upland habitat to be temporarily disturbed by road construction, and the 0.03 acre of ruderal and riparian habitat to be disturbed by habitat enhancement activities) will be subject to incidental take in the form of harm, harassment and capture; and one (1) California red-legged frog will be subject to incidental take in the form of death or injury.

The Service anticipates incidental take of Myrtle's silverspot butterfly will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive and cryptic nature of the early stages of this species (eggs, larvae, pupae), and their small size. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat. Conservation measures described in the *Description of the Proposed Action* in this biological opinion will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. The Service, therefore, anticipates incidental take of Myrtle's silverspot butterfly will result from the proposed project. Upon implementation of the reasonable and prudent measures, all individuals of Myrtle's silverspot butterfly inhabiting

the 0.76-acre work area within the action area will be subject to incidental take in the form of harm, harassment, capture, injury and mortality.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for Myrtle's silverspot butterfly and the California red-legged frog will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the California red-legged frog or the Myrtle's silverspot butterfly.

Reasonable and Prudent Measure

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the effects of the Willow Creek Road 2nd Bridge Fish Passage Project on California red-legged frogs and Myrtle's silverspot butterfly:

> The Corps through the applicant shall fully implement all of the Conservation Measures as described in the *Description of the Proposed Action* of this biological opinion.

Terms and Conditions

To be exempt from the prohibitions of Section 9 of the Act, the Corps shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

The following terms and conditions will implement the Reasonable and Prudent Measure described above:

1. The applicant shall minimize the potential for harm, harassment, injury, and death of federally listed wildlife species resulting from project related activities including implementation of the Conservation Measures in this biological opinion.

2. If requested, during or upon completion of construction activities, the applicant shall ensure the Service, CDFG, or their authorized agents immediate access to the project area. The on-site biologist and/or a representative from the applicant's agency shall accompany Service personnel on an on-site inspection of the project area(s) to review project effects to California red-legged frog and Myrtle's silverspot butterfly and their habitats.

3. The applicant shall ensure compliance with the *Reporting Requirements* of this biological opinion.

Reporting Requirements

The Service must be notified within one (1) business day of the finding of any injured California red-legged frog or Myrtle's silverspot butterfly, or any unanticipated damage to their habitats associated with the proposed project. Injured frogs must be cared for by a licensed veterinarian or other qualified person such as the Service-approved biologist. Notification should include the date, time, and precise location of the individual/incident clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. Dead individuals must be sealed in a zip-lock® plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it. The bag containing the specimen must be frozen in a freezer located in a secure area. The Service contact persons are the Division Chief, Endangered Species Program at the Sacramento Fish and Wildlife Office (916) 414-6600, and the Resident Agent-in-Charge of the Service's Law Enforcement Division, 2800 Cottage Way, Room W-2928, Sacramento, California 95825, at (916) 414-6660.

The applicant shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days of the date of the completion of construction activity. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California red-legged frog and Myrtle's silverspot butterfly, if any; (v) occurrences of incidental take of any listed species, if any; (vi) documentation of employee environmental education; and (vii) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. The Service requests notification of the implementation of any conservation recommendations in order to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats. We propose the following conservation recommendations:

1. The Corps should assist the Service in implementing recovery actions identified in the Recovery Plan for the California Red-legged Frog (Service 2002) and Recovery Plan for Seven Coastal Plants and the Myrtle's Silverpot Butterfly (Service 1998).

2. The Corps should encourage or require the use of appropriate locally collected California native species in revegetation and habitat enhancement efforts.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the Proposed Willow Creek Road 2nd Bridge Area Fish Passage Project. As provided in 50 CFR §402.16 and in the terms and conditions of this biological opinion, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions concerning this biological opinion on the Proposed Willow Creek Road 2nd Bridge Area Fish Passage Project, please contact Stephanie Jentsch or Ryan Olah at the letterhead address, at telephone number (916) 414-6600, or email Stephanie_Jentsch@fws.gov or Ryan_Olah@fws.gov.

Sincerely,

for Susan K. Moore
Field Supervisor

cc:
Scott Wilson, Adam McKanny, California Department of Fish and Game, Yountville, CA
Brendan O'Neil, California Department of Parks and Recreation, Duncan Mills, CA

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FINAL
MITIGATED NEGATIVE DECLARATION

WILLOW CREEK ROAD 2ND BRIDGE AREA FISH PASSAGE PROJECT

April 2010

Lead Agency

State of California
DEPARTMENT OF PARKS AND RECREATION
Russian River District
P.O. Box 123
Duncan Mills, CA 95430-0123

MITIGATED NEGATIVE DECLARATION

PROJECT: Willow Creek Road 2nd Bridge Area Fish Passage
Sonoma Coast State Park

LEAD AGENCY: California Department of Parks and Recreation (DPR)

AVAILABILITY OF DOCUMENTS:
The Initial Study for this Mitigated Negative Declaration was made available throughout the 30-day public review period at the reference desks of the Guerneville Library. It was also available at the public information desks of DPR's Northern Service Center and Russian River District Headquarters offices. The Final Mitigated Negative Declaration and all supporting materials will be available, by request, at DPR's Russian River District Headquarters office.

PROJECT DESCRIPTION:
The California Department of Parks and Recreation proposes to replace six channel-constraining culverts with a single-span, precast concrete bridge. The purposes of the project are to support channel formation and maintenance processes, to remove a significant barrier to fish passage, and to improve public access. The project is located on lower Willow Creek Road in Sonoma County approximately two miles southeast of the community of Jenner.

FINDINGS
An Initial Study has been prepared to assess the proposed project's potential impacts on the environment and the significance of those impacts and is incorporated in the Draft MND. Based on this Initial Study, it has been determined that the proposed project would not have any significant impacts on the environment, once all proposed mitigation measures have been implemented. This conclusion is supported by the following findings:

- There was no potential for adverse impacts on agriculture, land use planning, mineral resources, population and housing, public services, recreation, and utilities and service systems associated with the proposed project.

- Potential adverse impacts resulting from the proposed project were found to be less than significant in the following areas: aesthetics, air quality, cultural resources, geology, global climate change, hazardous materials, hydrology and water quality, noise, and transportation and traffic.

- Full implementation of the proposed mitigation measures included in this MND would reduce potential project-related adverse impacts on biological resources to a less than significant level.

MITIGATION MEASURES

The following mitigation measures have been incorporated into the scope of work for the Willow Creek Road 2nd Bridge Area Fish Passage Project and will be fully implemented by DPR to avoid or minimize adverse environmental impacts identified in this MND. These mitigation measures will be included in contract specifications and instructions to DPR personnel involved in implementing the project.

The following conditions and mitigation measures will be implemented by State Parks as part of the Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park:

AESTHETICS

No mitigation measures necessary.

AGRICULTURAL RESOURCES

No mitigation measures necessary.

AIR QUALITY

MINIMIZATION MEASURE AIR-1

- All construction areas (dirt/gravel roads and surrounding dirt/gravel area) will be watered at least twice daily during dry, dusty conditions.
- All trucks hauling soil, sand, or other loose materials on public roads will be covered or required to maintain at least two feet of freeboard.
- All construction-related equipment engines will be maintained in good condition, in proper tune (according to manufacturer's specifications), and in compliance with all State and federal requirements.
- Earth or other material that has been transported onto paved roadways by trucks, construction equipment, erosion, or other project-related activity will be promptly removed.

BIOLOGICAL RESOURCES

MINIMIZATION MEASURE BIO-1

- If water is present during any part of project activities, and dewatering is deemed necessary, a dewatering and species protection plan will be developed by the project's biologist. The plan will be developed and implemented as described in the Biological Resources Evaluation recommendations (PCI 2008) by a qualified and permitted biologist. See Appendix E.
- To avoid impacts on aquatic and terrestrial species within the immediate work area, prior to disturbance of the stream channel and removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no special-status species are occupying the site. If special-status species are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the regulatory agencies. In addition, the site will be surveyed periodically during construction to ensure that no special-status species are being impacted by construction activities. The biologist will also

monitor to ensure water quality standards are being met and sediment and/or debris are not entering downstream aquatic habitats.

- To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. In addition, construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.
- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- To avoid potential impacts on special-status plants, a focused botanical survey will be completed during the appropriate blooming period for the above-mentioned species. If special-status plants are found occupying the site, avoidance measures will be in place during construction to minimize disturbance (e.g., temporary construction fencing around existing populations).
- If impacts to special status plants are unavoidable, appropriate mitigation measures will be implemented (e.g., seed collection and revegetation). Replacement to disturbance will occur at a 4:1 ratio.
- To avoid impacts to Myrtle's silverspot butterflies and their host plants, the following measures will be taken. Prior to construction, butterflies surveys will be completed within the project area to determine if adults or larvae are present. If adult or larvae are found to be present, additional protection measures may be necessary, and further consultation with U.S. Fish and Wildlife Service will be required. If not found, the following protection measures will be implemented. Existing populations of larval host plants [western dog violet (*Viola adunca*)] will be avoided, as feasible. Plants will be protected through the installation of temporary fencing around all known plants and these areas avoided. If western dog violets are found to be present within the area of impact, they will be transplanted to appropriate habitat off-site. As feasible, adult nectar plants [e.g., coyote mint (*Monardella villosa*), bull thistle (*Cirsium vulgare*)], will be flagged and avoided during construction.
- The project biologist will conduct a preconstruction training session for construction crew members. The training will include a discussion of the sensitive biological resources within the project area and the potential presence of special-status species, special-status species' habitats, protection measures to ensure species are not impacted by project activities, and project boundaries.

MINIMIZATION MEASURE BIO-2

- Hand labor will be used to control exotic and unwanted vegetation. The use of chemical agents and mechanical equipment within the stream channel will be avoided.
- Proper erosion control and other water quality BMPs will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. Work in aquatic habitats will be scheduled to occur during the dry season, with work up on the elevated road surfaces scheduled toward the end of construction when rainfall becomes more probable. When work in wetted areas is necessary, they will

be dewatered as described above. An erosion and sediment control plan will be developed and implemented for the project.

- Temporary wildlife exclusionary and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site once construction has commenced (following the preconstruction survey) and to protect riparian trees during construction activities.
- During vegetation removal, large trees with extensive canopy will be maintained, as feasible, to preserve the existing cover over the stream channel.

MITIGATION MEASURE BIO-3

- Net wetland loss (0.035 acres) will be compensated by wetland restoration elsewhere in the park at a 4:1 ratio through reconnection and enhancement of the old grist mill spring with the Willow Creek floodplain, which provides good quality existing wetland habitat 0.5 mile upstream of the project area.

CULTURAL RESOURCES

MINIMIZATION MEASURE CULT-1

- A preconstruction meeting will be held to acquaint project personnel with the possibility of encountering sensitive cultural resources. Prehistoric resources may include chert or obsidian flakes, projectile points, mortars, and pestles; dark friable soil containing shell and bone dietary debris; heat-affected rock; or human burials. Historic resources may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, often in old wells and privies.
- In the event that previously undocumented cultural resources (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic trash) are encountered during project construction by anyone, the state representative will temporarily halt at that specific location and direct contractors to other project-related tasks. A DPR-qualified archaeologist will record and evaluate the find and work with state representative to implement avoidance, preservation, or recovery measures as appropriate prior to any work resuming at that specific location.
- If the DPR-qualified archaeologist determines that the find(s) are significant, a qualified historian, archaeologist, and/or Native American representative (if appropriate) will monitor all subsurface work including trenching, grading, and excavations in that area. If it is determined, the find indicates a sacred or religious site. Formal consultation with appropriate representatives will occur as necessary.
- In the event that human remains are discovered, work will cease immediately in the area of the find and the project manager/site supervisor will notify the appropriate DPR personnel. Any human remains and/or funerary objects will be left in place. The DPR Sector Superintendent (or authorized representative) will notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (NAHC) will be notified within 24 hours of the discovery if the Coroner determines that the remains are Native American. The NAHC will designate the “Most Likely Descendent” (MLD) of the deceased Native American. The MLD will recommend an appropriate disposition of the remains. If a Native American monitor is on-site

at the time of the discovery and that person has been designated the MLD by the NAHC, the monitor will make the recommendation of the appropriate disposition.

GEOLOGY, SOILS, AND HAZARDS

MINIMIZATION MEASURE GEO-1

- Project design will take into account the following geotechnical considerations: weak surface soils to about 2 feet below the existing road, compressible soils to depths of 45 to 48 feet, potentially liquefiable soils, and predicted strong seismic shaking.
- Topsoils containing organic matter will be removed and stockpiled for reuse in landscaping.
- Weak soils will be removed and replaced with engineered fill.
- Fill will be free of organic material, have low expansion potential, and conform to the specifications in the geotechnical report; see Appendix C.
- Seismic design will use Site Class E and all specified seismic design criteria from the geotechnical report.

MINIMIZATION MEASURE GEO-2

- The new bridge will be built on driven piles. The piles will be either 12-inch square precast concrete or 16-inch diameter steel pipe. If other pilings are used, the geotechnical consultants will be contacted for additional design specifications.
- Contractor will adhere to all specifications in the geotechnical report and will contact the geotechnical engineer prior to pile driving to obtain driving criteria based upon the hammer to be used.
- Geotechnical engineers will review project plans and specifications to determine consistency with the geotechnical recommendations.
- A preconstruction meeting will occur between the geotechnical engineer, general contractor, subcontractors, civil engineer, and other members of the design team to address design issues, clarify procedures, and construction coordination.
- Critical construction steps, such as site excavation, fill compaction, and foundation installation, will be monitored by the geotechnical consultants.

HAZARDOUS MATERIALS

MINIMIZATION MEASURE HAZMAT-1

- All equipment will be inspected for leaks immediately prior to the start of construction, and regularly inspected thereafter until equipment is removed from the project site.
- A designated staging area will be identified where equipment refueling may occur. A spill kit will be maintained on-site throughout the duration of the project.
- Equipment will be cleaned and repaired (excepting emergency repairs) in the maintenance shop, away from the project site. Any contaminated water, sludge, spill residue, or other hazardous compounds will be disposed of outside park boundaries at a lawfully permitted or authorized destination.

MINIMIZATION MEASURE HAZMAT-2

- Two alternative routes will be designated by State Parks to allow access during construction.

MINIMIZATION MEASURE HAZMAT-3

- Prior to the beginning of construction, DPR will develop a Project Fire Safety Plan. The Plan will include emergency calling procedures to dispatch the Monte Rio Fire Protection District. All employees working on site will receive safety trainings regarding these procedures.
- Spark arrestors will be required for all motorized equipment.
- Construction crews will be required to park vehicles away from flammable material such as dry grasses and brush.
- DPR staff will be required to have a State Park radio on site, which allows direct contact to a centralized dispatch, CalFire or Russian River Fire Protection District.

HYDROLOGY AND WATER QUALITY

MINIMIZATION MEASURE HYDRO-1

- If the excavation sites must be dewatered, the water will be discharged in a manner that will cause no substantial increase in stream turbidity or discharge of fine sediment to the stream channel.
- All appropriate BMPs will be implemented as needed to ensure that there is no discharge of fine sediment, concrete, concrete wash water, or roiled water to the creek.
- Building materials and/or construction equipment will not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.
- Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from project related activities that could be hazardous to aquatic life will be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials placed within or where they may enter a stream or lake will be removed immediately.
- All debris and waste will be picked up daily and properly disposed of at an appropriate site.

LAND USE PLANNING

No mitigation measures necessary.

MINERAL RESOURCES

No mitigation measures necessary.

NOISE

MINIMIZATION MEASURE NOISE-1

- Construction activities will generally be limited to the daylight hours between Monday and Friday; however, weekend work could be implemented to accelerate construction or address emergency or unforeseen circumstances. If weekend

work is necessary, no work will occur on Saturday or Sunday before 8 am or after 7 pm.

- Internal combustion engines used for any purpose at the job site will be equipped with a muffler of a type recommended by the manufacturer.
- Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., engine enclosures, acoustically-attenuating shields, or shrouds, intake silencers, ducts, etc.) whenever feasible and necessary.
- To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. Construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.
- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- Should work occur during the breeding season a qualified biologist will survey the area to ensure that no nesting activity is occurring in the project area. Should nesting activity be observed the area will be avoided until nesting birds have fledged.

POPULATION AND HOUSING

No mitigation measures necessary.

PUBLIC SERVICES

No mitigation measures necessary.

RECREATION

No mitigation measures necessary.

TRANSPORTATION/TRAFFIC

MINIMIZATION MEASURE TRAFFIC-1

- Project construction will be scheduled after Labor Day.
- Signage will be provided to redirect traffic at logical turnaround areas in advance of the construction zone.

MINIMIZATION MEASURE TRAFFIC-2

- Two alternative routes will be designated by DPR to allow access during construction.

UTILITIES AND SERVICE

No mitigation measures necessary.

No significant corrections, additions, and deletions have been made to the Willow Creek Road 2nd Bridge Area Fish Passage Project Draft MND. Minor punctuation, spelling, and grammatical corrections that contribute to ease of understanding, but have no significant impact on the content, have not been noted.

This document, along with the Draft Initial Study/Mitigated Negative Declaration (SCH#2010022054), corrected as noted above; Comments and Response to Comments; Mitigation Monitoring and Reporting Program; and the Notice of Determination, constitute the Final Mitigated Negative Declaration for the Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park.

Pursuant to Section 21082.1 of the California Environmental Quality Act, the California Department of Parks and Recreation (DPR) has independently reviewed and analyzed the Initial Study and Negative Declaration for the proposed project and finds that these documents reflect the independent judgment of DPR. DPR, as lead agency, also confirms that the project mitigation measures detailed in these documents are feasible and will be implemented as stated in the Negative Declaration.

Jack Ekström — Date
Environmental Coordinator
Russian River District
California Department of Parks & Recreation

Liz Burko — Date
District Superintendent
Russian River District
California Department of Parks & Recreation

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1 INTRODUCTION

1.1 Legislative Guidance

The Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared by the California Department of Parks and Recreation (DPR) to evaluate the potential environmental effects of the proposed **Willow Creek Road 2nd Bridge Area Fish Passage Project** at Sonoma Coast State Park, Sonoma County, California. This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code (PRC) §21000, *et seq*., and the State CEQA Guidelines, California Code of Regulations (CCR) §15000, *et seq*.

An Initial Study is conducted by a lead agency to determine if a project may have a significant effect on the environment (CCR §15063(a)). If there is substantial evidence that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) must be prepared in accordance with CEQA Guidelines §15064(a). However, if the lead agency determines that revisions in the project plans or proposals made by or agreed to by the project proponent mitigate the potentially significant effects to a less-than-significant level, a Mitigated Negative Declaration may be prepared instead of an EIR (CCR §15070(b)). The lead agency prepares a written statement describing the reasons a proposed project would not have a significant effect on the environment and, therefore, why an EIR need not be prepared. This IS/MND conforms to the content requirements under CEQA Guidelines §15071.

1.2 Lead Agency

The lead agency is the public agency with primary approval authority over the proposed project. In accordance with CEQA Guidelines §15051(b)(1), "the lead agency will normally be an agency with general governmental powers, such as a city or county, rather than an agency with a single or limited purpose." The lead agency for the proposed project is DPR. The contact person for the lead agency is:

Brendan O'Neil – Senior Environmental Scientist
California Department of Parks & Recreation, Russian River District
P.O. Box 123
Duncans Mills, CA 95430-0123

All inquiries regarding environmental compliance for this project, including comments on this environmental document, should be addressed to:

Brendan O'Neil, Senior Environmental Scientist
California Department of Parks & Recreation, Russian River District
P.O. Box 123
Duncans Mills, CA 95430
Fax: 707-865-2046
E-mail address: boneil@parks.ca.gov

Submissions must be in writing and postmarked, or received by fax or e-mail, no later than March 20, 2010. The originals of any faxed document must be received by regular mail within ten (10) working days following the deadline for comments, along with proof of successful fax transmission.

1.3 Document Purpose and Organization

The purpose of this document is to evaluate the potential environmental effects of the proposed Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park. Minimization and mitigation measures have been incorporated into the project to avoid potentially significant impacts or reduce them to a less-than-significant level.

This document is organized as follows:

- Chapter 1 - Introduction
  Summarizes the background and purpose of the project, describes the organization of this document, and summarizes the findings.

- Chapter 2 - Project Description
  Details the project background, location, purpose, objectives, implementation, adaptive management, and consistency with local plans and policies and includes a discussion of visitation to Willow Creek, regulatory setting and discretionary approvals, and related projects.

- Chapter 3 - Environmental Setting, Impacts, and Mitigation Measures
  Identifies the significance of any potential environmental impacts, explains the environmental setting for each resource area, and evaluates the potential impacts identified in the CEQA Environmental (Initial Study) Checklist. Measures to minimize potential impacts are included, and mitigation measures are incorporated, where appropriate, to reduce potentially significant impacts to a less-than-significant level.

- Chapter 4 - Mandatory Findings of Significance
  Identifies and summarizes the overall significance of any potential impacts on natural and cultural resources, cumulative impacts, and impacts on humans, as identified in the Initial Study.

- Chapter 5 - Summary of Conditions and Mitigation Measures
  Summarizes the minimization and mitigation measures incorporated into the project as a result of the Initial Study.

- Chapter 6 - References
  Identifies sources of information used in the preparation of the IS/MND.

- Chapter 7 - Report Preparation
  Provides a list of those involved in the preparation of this Initial Study and Mitigated Negative Declaration.

- Appendix A – Interim Report: 30% Design and the Preferred Alternative
  Discusses the multiple options for replacing the culverts that were assessed during the 30% design phase of the project and briefly summarizes the site constraints, viability of the structure options, and the preferred alternative.

- Appendix B – Project Plans and Specifications, Sheets 1 through 8
  Includes a plan view, longitudinal profile, and cross sections of the proposed project, along with construction specifications and details.

- Appendix C – Geotechnical Study Report: Willow Creek 2nd Bridge Crossing, Willow Creek Road, Sonoma County, California

- Appendix D – Adaptive Geomorphic Plan for the Willow Creek Valley above the 2nd Bridge Crossing, Sonoma County, California

- Appendix E – Biological Resources Evaluation and Preliminary Wetland Delineation

- Appendix F – Vascular Plants of Willow Creek 2nd Bridge Project Area

- Appendix G – Typical Dewatering and Species Protection Plan

- Appendix H – Acronyms

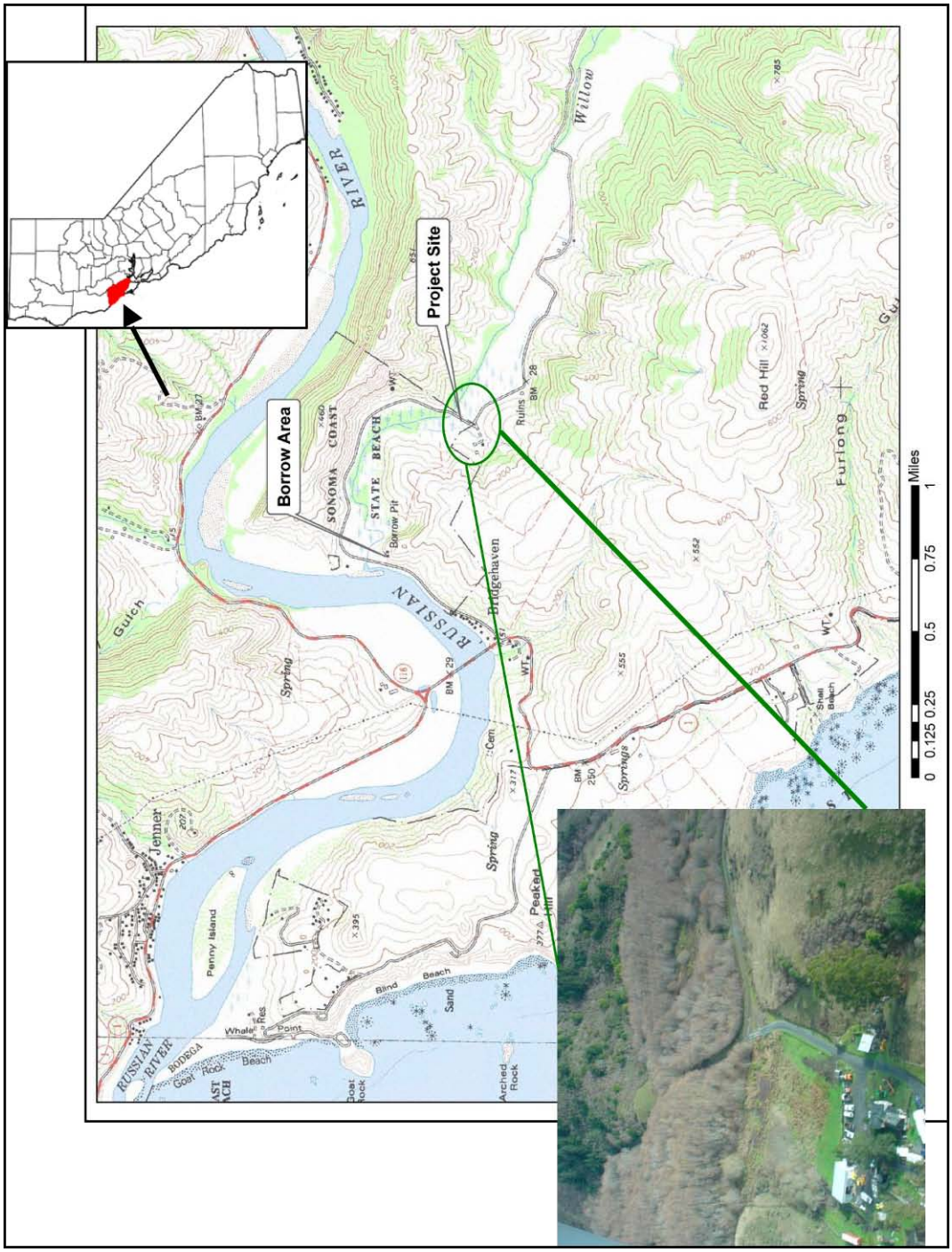
1.4 Summary of Findings

Chapter 3 of this document contains the Environmental (Initial Study) Checklist that identifies the potential impacts by environmental issue and provides a brief discussion of each potential impact resulting from implementation of the proposed project.

Based on the Initial Study and supporting environmental analyses provided in this document, the proposed Willow Creek Road 2nd Bridge Area Fish Passage Project would result in no impacts on aesthetics, agricultural resources, land use and planning, mineral resources, population and housing, public services, recreation, and utilities and service systems. Impacts on air quality, cultural resources, global climate change, hazardous materials, hydrology and water quality, noise, and transportation/traffic would be less than significant, and measures to minimize impacts are provided where possible. Minimization and mitigation measures are included that will reduce impacts on biological resources and geology, soils, and hazards to a less-than-significant level.

In accordance with §15064(f) of the CEQA Guidelines, a Mitigated Negative Declaration shall be prepared if the proposed project would not have a significant effect on the environment after the inclusion of mitigation measures in the project. Based on the available project information and the environmental analyses presented in this document, there is no substantial evidence that, after the incorporation of mitigation measures, the proposed project would have a significant effect on the environment. It is proposed that a Mitigated Negative Declaration be adopted in accordance with the CEQA Guidelines.

Figure 1. Vicinity Map Showing Project Location



Source: USGS

2 PROJECT DESCRIPTION

2.1 Project Background

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared by the California Department of Parks and Recreation (DPR) to evaluate the potential environmental effects of the proposed Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park, located two miles southeast of the community of Jenner, in Sonoma County, California. The proposed project will replace six existing culverts with a single-span, precast concrete bridge. The purposes of the project are to remove impediments to natural stream channel formation, to remove a significant barrier to anadromous fish passage, and to improve public access.

The Willow Creek channel feasibility study (PCI 2005a) outlined a range of "fixes" for the 2nd bridge floodplain crossing to allow for natural channel-forming processes and to restore fish passage. The original investigation focused on establishing a single-thread channel in lower Willow Creek at the existing bridge location. However, it was dismissed as an option because it was found to be neither self-maintaining nor sustainable. Findings indicated that the lowest part of the valley, the thalweg, had moved to the south and is now located at the six constricting culverts rather than under the existing 2nd bridge. Also, the creek's historic configuration appears to be a series of interconnecting channels rather than a single one. Options considered ranged from replacing the floodplain culverts at the west side of the crossing, to building a causeway across the valley, to removing the bridge and crossing altogether and rerouting the road on the east side of the valley and out of the floodplain.

In 2005, the Willow Creek Technical Advisory Committee (TAC)[1] reached initial consensus that rerouting the road may be the preferred, long-term, ecologically superior alternative. Scoping for this alternative was immediately initiated by DPR, and an on-site route assessment was done in the fall of 2005 that determined road realignment was not an economically, geologically, or ecologically viable option. Rerouting the road would require extensive road cuts into unstable slopes, be twice as long as the existing road, traverse untouched, coastal grassland ridges, and cross intact riparian areas and marshy wetlands. Even if the costs and ecological impacts were mitigated, it was considered unlikely that permits or the public concurrence needed to establish a new road would be obtainable.

The TAC was reconvened in spring 2007, and numerous bridge and culvert options were reviewed in the context of ecological and hydraulic performance, future and existing road service levels, relative costs, and implementation timeframes. A new

[1] The TAC is a multi-disciplinary team that was convened by Stewards of the Coast and Redwoods (Stewards) in 2001. It consists of representatives from the California Department of Fish & Game, NOAA's National Marine Fisheries Service, the North Coast Regional Water Quality Control Board, DPR, Sonoma County Department of Transportation and Public Works, Stewards, Trout Unlimited, LandPaths, and private consultants with expertise in range management, fish passage, biology, ecology, geomorphology, hydrology, and regulatory compliance planning.

consensus was reached to design and install a channel crossing at the valley thalweg (west side of the 2nd bridge roadway) that would provide for channel development, hydraulic connectivity, fish passage, and have a 20- to 50-year lifespan. Choices included a free-span bridge and multiple-arched or box culverts.

This proposed project falls short of the ecologically superior and long-term options afforded by road decommissioning or a valley-spanning causeway. However, it was determined by the TAC that this approach to solving fish passage and channel connectivity was the most reasonable given the costs, right-of-way issues, and implementation needs and constraints. The proposed project does not preclude the later installation of additional, similar structures to create a raised, open causeway-like structure across the valley bottom should the need arise. Although the channel feasibility study (PCI 2005a) stated that multiple culverts would only have a lifespan of 5 to 15 years, further examination of the predicted channel evolution process, existing sediment transport dynamics, and hydraulic conditions at the site indicate the proposed fix will last a minimum of 20 years and is likely to be functional for much longer.

2.2 Project Location

Willow Creek flows from an 8.7-square mile watershed into the Russian River approximately 2 miles upstream of the river's mouth at Jenner in Sonoma County (Figure 1). Located on the western edge of the Coast Range, Willow Creek flows in a northwesterly direction following an inactive fault trace. Most of the Willow Creek watershed is part of the 10,286-acre Sonoma Coast State Park.

Willow Creek Road is a Sonoma County road which traverses the Willow Creek watershed. The road is ten miles in length and extends from State Highway One near Bridgehaven to Coleman Valley Road (approximately 3 miles west of Occidental). From highway one, Willow Creek Road first crosses Willow Creek at 1st Bridge at a distance of 0.75 mile, 2nd Bridge is 1.75 miles, and 3rd Bridge is 2.75 miles for the intersection of Highway One. Two private residences are located approximately 3.5 miles from the intersection of Highway One. The County has installed gates blocking public access to Willow Creek Road. The lower gate is located just above the residences at approximately 4.0 miles from the intersection of Highway One and the second is located just below the next group of residences at 8.0 miles from the intersection of Highway One. The upper two miles of Willow Creek Road passes through a rural residential neighborhood before terminating at the intersection with Coleman Valley Road.

The project area consists of the 2nd Willow Creek Road crossing and the floodplain immediately upstream to the 3rd bridge. The project site is approximately 1.75 miles from the intersection of Highway One and is surrounded by DPR property. The nearest private residences are approximately 1.75 miles to the north. Approximately 500 feet to the west is a DPR maintenance facility, an abandoned historic residence, barn and accessory structures, and two temporary mobile homes. To the north and south is the Willow Creek riparian corridor, and to the east lies open space.

2.3 Need for the Project

The 2nd bridge crossing has become a migration barrier to anadromous[2] salmonids and other aquatic species. Fish population surveys in 1962, 1963, and 1965 documented coho salmon and steelhead trout throughout the mid-lower, mid, and upper sections of Willow Creek (up to the rock falls) in schools of 15 to 20 in each pool (CDFG 1995:8). Subsequent surveys indicated a steady decline in population density, especially of coho salmon.

Concurrent with the population surveys, stream inventories assessing key habitat features were performed. These studies, along with other assessments of historic land-use practices, sediment supply and deposition, large woody debris, and channel morphology provided clues to the disappearance of anadromous salmonids in the Willow Creek watershed. These limiting factors are discussed in detail in Chapter 4 of the *Willow Creek Watershed Management Plan* (PCI 2005b).

The bermed roadway restricts channel connectivity and impedes channel-forming processes at the creek's geomorphically preferred location. High rates of sediment production in the Willow Creek watershed from past land-use practices have led to intensified channel and valley aggradation in lower Willow Creek. Low valley slopes, combined with frequent backwater conditions during high flows in the Russian River, naturally promote sediment deposition upstream of the tidal wetlands at the mouth of Willow Creek.

Historic channel management practices (realignment and frequent dredging) sought to control the natural tendency of the creek to form an anastamosing[3] system within the lower Willow Creek valley. A road was established in the 1930s that crossed the creek in the lower valley at three locations. The channel at the 2nd crossing required regular maintenance to conform to the bridge location established at that time.

Land use in lower Willow Creek transitioned from the historic agriculture and its associated channel and upland management practices to wildland in 1978 after the purchase of the area with public funding and its conversion to a State Park. Dredging of the channel ceased in the mid-1980s when it was deemed a financially and ecologically unsustainable practice. The natural processes immediately reasserted control over the system in the vicinity of the 2nd bridge, filling the man-made channel and inducing channel migration to the west side of the valley.

[2] The term "anadromous" is used to describe fish such as steelhead and salmon that return from the sea to the rivers and streams where they were born in order to breed.

[3] An "anastamosing" system is one in which a number of highly interconnected stream channels develop in broad, gentle valleys such as Willow Creek.

2.4 Project Objectives

The objectives of the project are to reestablish channel connectivity and fish passage, to allow natural channel development, to provide habitat connectivity, and to maintain public access. The project is consistent with the goals and guidelines of the *Sonoma Coast State Park General Plan* (DPR 2007a). See specific General Plan discussions in Section I: Aesthetics; Section IV: Biological Resources; Section V: Cultural Resources; Section X: Land Use and Planning; and Section XV: Recreation.

2.5 Project Description Details

The proposed project will replace six existing culverts with a single-span, precast concrete bridge. Plan view, profile, and cross sections are found in Appendix A; see page 11 of Appendix A for other photos. Design details include:

- A bridge clear-span length of 43 feet,
- A bridge deck width of 27.5 feet,
- A bridge deck elevation of 20 feet National Geodetic Vertical Datum of 1929 (NGVD),
- Concrete bridge abutments supported by 16-inch diameter pipe piles driven approximately 70 feet deep,
- Bridge approaches graded to meet existing bridge elevation on the western approach and the 18-foot road contour on the eastern approach, and
- Bridge guard rails and a 6-inch concrete curb designed to meet Caltrans' highway design specifications.

Minimal channel construction is included in the project plan. To remove the culverts and to provide for natural stream channel configuration the channel at the bridge location will be excavated to the expected thalweg elevation and graded to conform to existing upstream and downstream incipient channel features. The thalweg under the bridge will be set at an elevation of 12.6 feet. It is expected that subsequent flows will create natural channel features and dimensions while connecting the existing channels currently forming on the south side of the valley.

To reduce the frequency of road flooding in the vicinity of the existing culverts, approximately 790 feet of the existing roadway will be raised and repaved. This includes approximately 120 feet of roadway leading to the DPR maintenance facility. Grading the bridge approaches will include fill at the edges of the roadway to raise the road elevation approximately 3 feet to match the bridge surface elevation. The grading will result in approximately 2,100 cubic yards of cut and 2,500 cubic yards of fill. The net fill required for the project will be approximately 400 cubic yards.

Because the entire area off the road is wetland, some wetland fill will be required. There is an intersection at the corner of Willow Creek Road (adjacent to the culverts) with the road to the maintenance area. Raising both of these approaches to meet the bridge will create a slightly larger road footprint, allowing a reduced angle of the turn onto the

maintenance road and creating a small, grassed area. Two 24-inch diameter by 40-foot long culverts currently carry water into the corner of this junction and then west of the road. The corner has a small, degraded wetland that will be filled. Flow to the seasonal wetland west of the road will be maintained by replacing the two culverts with a single 18-inch diameter by 85-foot long culvert that will pass under the raised area at the intersection.

Upstream of the 2nd crossing, channel-forming processes have been hindered. Several measures will be taken to improve aquatic habitat and to improve hydrologic connectivity in this area:

- Hand falling of small trees (< 11”dbh) in dense, immature alder stands downstream of flow avulsion point to facilitate channel development upstream of the 2nd bridge and to improve riparian function through promotion of gallery forest development. The number and spatial frequency of removal has not yet been determined. The area of thinning will be ±30 acres.
- Construction of a large woody debris jam across the historic channel at flow avulsion point (approximately 4000 feet upstream of 2nd Bridge to facilitate flow convergence and channel development across the floodplain for fish passage. Project spoil materials will be used in association with the large woody debris to create topographic complexity within the floodplain.
- Construction of up to 100 small log structures, as needed, to encourage complex channel development throughout 3,000 feet within the lower reach.
- Excavation of a primary channel through two marshy areas where multiple, poorly connected channels presently exist in order to tie into the well-defined channels on the upstream and downstream edges of the marsh. Dimensions of the primary channel will be 2 feet deep, 4 feet wide, with the total length of excavated channel approximately 1,000 feet.
- Reconnection of a perennial spring to the floodplain pond by replacing a failed culvert under Willow Creek Road and excavating a channel that will direct water to the pond, as needed.

Monitor trends in channel development, sedimentation, and avulsion. Collect cross-section data and survey thalweg to identify potential problems with channel migration, sedimentation, and habitat quality. Fish presence/ absence surveys will occur prior to and after construction, along with spawner surveys.

2.6 Project Implementation

Bridge construction and channel enhancement will occur in 2010 upon approval of all applicable permits and receipt of funding. Work will occur after Labor Day in late summer and early fall in order to avoid the peak recreation season in the park, winter weather conditions, and potential impacts on bird nesting, which generally occurs between mid-March and mid-August in the Willow Creek area. Construction is expected to take two to three months depending on sequencing and availability of project

resources. Some advance work, such as pile driving, may occur prior to Labor Day to accelerate completion before the rainy season begins; pile driving will not occur in flowing water.

Figure 2. Photos of Proposed Type of Bridge

Single-span precast concrete bridge

Precast concrete bridge abutments

Photos courtesy of Pacific Bridge

Heavy equipment, such as excavators, graders, bulldozers, cranes, pile drivers, and dump trucks, will be used to construct the bridge. Equipment use will be limited to work sites or adjacent disturbed areas. Temporary construction staging areas will be located in the closed portions of the road and at the existing DPR maintenance facility, a turnout approximately 0.25 miles east of the project area on Willow Creek Road.

Best Management Practices (BMPs) have been incorporated into the project design to ensure that the natural and cultural resources in and around the project area are adequately protected during and after construction. The BMPs discussed in this document and used in the implementation of this project were derived from a variety of sources, including DPR, Sonoma County, Caltrans, California Stormwater Quality Association, and California Regional Water Quality Control Board. Temporary BMPs will be used to retain sediment on site throughout the duration of project construction. BMPs will be checked daily, maintained, and modified as needed, and BMPs will be used after construction to stabilize the site and minimize erosion.

2.7 Adaptive Management and Monitoring Plan

The *Adaptive Geomorphic Plan for the Willow Creek Valley above the 2nd Bridge Crossing, Sonoma County, California* (OEI 2008), included herein as Appendix D, was prepared to document and evaluate the fluvial geomorphic conditions of Willow Creek and its floodplain from approximately 200 feet below the 2nd bridge crossing to the 3rd bridge (study reach) and to evaluate future conditions after implementation of the proposed project. The study concluded that there is no need for aggressive channel construction and management of lower Willow Creek. Rather, the management plan contains three low-impact, adaptive management elements—installation of wood structures for channel steering and habitat improvement, selective tree removal, and minor channel excavation—that are recommended to hasten channel development and improve connectivity. These measures are included in the Project Description in Section 2.5 above.

A monitoring plan is also proposed to determine trends in channel development, sedimentation, and avulsion. The plan includes collection of cross-section data and a survey of the deepest part of the channel bottom (the thalweg) to identify potential problems with channel migration, sedimentation, and habitat quality. Fish presence/ absence surveys will occur prior to and after construction, along with spawner surveys.

2.8 Visitation to Willow Creek

Sonoma Coast State Park received approximately 3 million total visitors in 2005. Willow Creek watershed is the inland portion of Sonoma Coast State Park and is located off of the main thoroughfare of Highway 1. This portion of Sonoma Coast State Park receives a small fraction of the 3 million visitors for the entire Sonoma Coast State Park. Willow Creek is open to the public and served by the County road. There are limited dedicated public service facilities within Willow Creek (21 environmental campsites, two day use picnic benches and two trails). The campground and day use

facilities are open from April 1 to October 31. In 2009, combined use for Willow Creek facilities (campground and day use) attracted approximately 12,000 visitors.

The adjacent, recently acquired portion of the upper Willow Creek watershed (3,373 acres acquired in 2005) remains undeveloped, and access is available only through a permit-based program and guided tours conducted by the non-profit organization, LandPaths. The most frequent point of entry (Freezeout Creek) for LandPaths permit holders would not be affected by this project. In 2008, approximately 2,000 permit holders were registered with LandPaths.

2.9 Consistency with Local Plans and Policies

The proposed project is entirely within Sonoma Coast State Park and is consistent with the Sonoma Coast State Park General Plan's goals and guidelines. This project is consistent with DPR's mission and its management directives aimed at preservation and maintenance of natural resources. See further discussion in Section X: Land Use and Planning for specific General Plan guidelines that will be met through project implementation.

2.10 Regulatory Setting and Discretionary Approvals

Work in creeks and rivers in California is regulated by several public agencies, including the U.S. Army Corps of Engineers (Corps) under §404 of the federal Clean Water Act, the Regional Water Quality Control Boards (RWQCB) under §401 of the federal Clean Water Act and the State's Porter-Cologne Act, the California Department of Fish and Game (CDFG) under §1600, *et seq.*, of the Fish and Game Code, and the local city or county where the project will take place. The project will likely require the following:

- Corps Clean Water Act §404 Concurrence,
- North Coast RWQCB Clean Water Act §401 Certification,
- CDFG §1602 Streambed Alteration Agreement,
- Consultation with U.S. Fish and Wildlife Service (USFWS) and NOAA's National Marine Fisheries Service (NMFS) regarding potential impacts on Endangered and Threatened listed species,
- A Coastal Development Permit, and
- Public Resources Code §5024 Review and local Native American Heritage Commission Review.

The Sonoma County Department of Transportation and Public Works (SCDTPW) holds an easement for the roadway; DPR has fee title ownership of the underlying land. SCDTPW has agreed to allow DPR to modify the roadway for the purpose of improving watershed processes and fish passage. A formal agreement will be signed authorizing DPR to proceed with construction following the completion of the CEQA process and receipt of required discretionary approvals.

2.11 Related Projects

The Sonoma Coast State Park General Plan was finalized in 2007 (DPR 2007b). Proposed actions in the Willow Creek Unit underwent extensive public and agency review. There are no related projects proposed at this time that would involve changes to Willow Creek Road. Additional proposed restoration projects are in the scoping stage at this time and may include logging road and skid trail upgrades and decommissioning and the placement of large wood within the stream channel to promote habitat complexity for aquatic organisms.

3 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

PROJECT INFORMATION

1. Project Title:	Willow Creek Road 2nd Bridge Area Fish Passage Project
2. Lead Agency Name & Address:	California Department of Parks and Recreation
3. Contact Person & Phone Number:	Brendan O'Neil (707) 865-3129
4. Project Location:	Lower Willow Creek Road, Sonoma County
5. Project Sponsor Name & Address:	California Department of Parks and Recreation Russian River Distirct PO Box 123 Duncans Mills, CA 95430
6. General Plan Designation:	PQP – Public and Quasi Public
7. Zoning:	PF, CC BR F1 F2 VOH – Public Facility with Coastal, Biotic Resources, Floodway 1, Floodway 2, and Valley Oak Habitat Combining Districts
8. Description of Project:	The Department of Parks and Recreation proposes to remove six channel-constricting culverts and to replace them with a single-span, precast concrete bridge to reestablish channel connectivity and fish passage, to allow natural channel development, to provide habitat connectivity, and to improve public access. The project is located on lower Willow Creek Road approximately two miles southeast of the community of Jenner in Sonoma County.
9. Surrounding Land Uses & Setting:	Refer to Chapter 3 of this document (Section X, Land Use Planning)
10. Approval Required from Other Public Agencies:	Refer to Chapter 2, Section 2.9

1. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact", as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils/Hazards
☐ Global Climate Change	☐ Hazardous Materials	☐ Hydrology/H_2O Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities/Service Systems	☐ Mandatory Findings of Significance
☒ None		

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 original scope of the proposed project **COULD** have had a significant effect on the environment, there **WILL NOT** be a significant effect because revisions/mitigations to the project have been made by or agreed to by the applicant. 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** or its functional equivalent will be prepared. ☐

I find that the proposed project **MAY** have a "potentially significant impact" or "potentially significant unless mitigated impact" on the environment. However, at least one impact has been adequately analyzed in an earlier document, pursuant to applicable legal standards, and has been addressed by mitigation measures based on the earlier analysis, as described in the report's attachments. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the impacts not sufficiently addressed in previous documents. ☐

I find that, although the proposed project could have had a significant effect on the environment, because all potentially significant effects have been adequately analyzed in an earlier EIR or Negative Declaration, pursuant to applicable standards, and have been avoided or mitigated, pursuant to an earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, all impacts have been avoided or mitigated to a less-than-significant level and no further action is required. ☐

_____ _____

Brendan O'Neil Date
Senior Environmental Scientist

EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers, except "No Impact", that are adequately supported by the information sources cited. A "No Impact" answer is adequately supported if the referenced information sources show that the impact does not apply to the project being evaluated (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on general or project-specific factors (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must consider the whole of the project-related effects, both direct and indirect, including off-site, cumulative, construction, and operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether that impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate when there is sufficient evidence that a substantial or potentially substantial adverse change may occur in any of the physical conditions within the area affected by the project that cannot be mitigated below a level of significance. If there are one or more "Potentially Significant Impact" entries, an Environmental Impact Report (EIR) is required.

4. A "Mitigated Negative Declaration" (Negative Declaration: Less Than Significant with Mitigation Incorporated) applies where the incorporation of mitigation measures, prior to declaration of project approval, has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact with Mitigation." The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level.

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR (including a General Plan) or Negative Declaration [CCR, Guidelines for the Implementation of CEQA, § 15063(c)(3)(D)]. References to an earlier analysis should:

   a) Identify the earlier analysis and state where it is available for review.

   b) Indicate which effects from the environmental checklist were adequately analyzed in the earlier document, pursuant to applicable legal standards, and whether these effects were adequately addressed by mitigation measures included in that analysis.

   c) Describe the mitigation measures in this document that were incorporated or refined from the earlier document and indicate to what extent they address site-specific conditions for this project.

6. Lead agencies are encouraged to incorporate references to information sources for potential impacts into the checklist or appendix (e.g., general plans, zoning ordinances, biological assessments). Reference to a previously prepared or outside document should include an indication of the page or pages where the statement is substantiated.

7. A source list should be appended to this document. Sources used or individuals contacted should be listed in the source list and cited in the discussion.

8. Explanation(s) of each issue should identify:
   a) the criteria or threshold, if any, used to evaluate the significance of the impact addressed by each question **and**
   b) the mitigation measures, if any, prescribed to reduce the impact below the level of significance.

ENVIRONMENTAL ISSUES

3.1 Aesthetics

ENVIRONMENTAL SETTING

The California Legislature initiated the California Scenic Highway Program in 1963, with the goal of preserving and protecting the state's scenic highway corridors from changes that would reduce their aesthetic value. The State Scenic Highway System consists of eligible and officially designate routes. A highway may be identified as eligible for listing as a state scenic highway if it offers travelers scenic views of the natural landscape, largely undisrupted by development. Eligible routes advance to officially designated status when the local jurisdiction adopts ordinances to establish a scenic corridor protection program and receives approval from the California Department of Transportation. (California Department of Transportation 2009) This project is on a county road.

Willow Creek Road is a narrow, rural route that is marginally maintained by the Sonoma County Department of Transportation and Public Works. The area of the 2nd crossing is a small stretch of road bordered on both sides by wildland trees and shrubs. The proposed project, will replace six culverts with a single-span bridge. No lighting is proposed for the bridge.

The proposed project is consistent with the Sonoma Coast State Park General Plan (DPR 2007) and the Sonoma County General Plan. The Sonoma Coast State Park General Plan identifies preserving scenic quality as a key issue. The plan provides a series of guidelines for managing and maintaining scenic quality (DPR 2007b), which are based on the consideration of three primary elements:

1) Scenic resources within the viewshed,
2) Public viewpoints, and
3) Proposals for new facilities in the landscape.

The Sonoma County General Plan's Open Space Element does not identify the project site as a scenic resource or Willow Creek Road as a scenic roadway. An adjacent parcel, Red Hill, is listed as a scenic resource in the County's Open Space Element. However, the project site is not visible from the scenic viewpoints atop Red Hill.

The project is intended to maintain the existing character of the road, which is located in the valley bottom within a willow and red alder riparian forest that screens views from ridge tops in the upper watershed.

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

AESTHETICS DISCUSSION

a) **Less-than-significant impact.** The project will take place within an existing rural road. The project will not result in a substantial adverse effect, but minor, short-term disturbance to the scenic vista may occur during construction activities due to the presence of construction materials and equipment. The area will be restored to its natural condition upon project completion.

b) **No impact.** The project is on a county road and not within view of a state scenic highway. The project will not damage scenic resources.

c) **Less-than-significant impact.** As stated in a) above, the project will not result in a substantial adverse effect, but minor, short-term disturbance to the existing visual character of the site may occur during construction activities.

d) **No impact.** The project will not create a new source of light.

3.2 Agricultural Resources

ENVIRONMENTAL SETTING

Historically, Willow Creek watershed was used for agricultural purposes. Lowland areas along the creek were converted from thick riparian forest to grasslands for crops and livestock by Russian settlers from nearby Fort Ross in the 1830s. Grazing of both sheep and cattle occurred, and grains and other crops were raised in the watershed during much of the 19th and 20th centuries. With the exception of grazing on remaining private lands, agricultural activities have been largely eliminated from the watershed since its inclusion in the State Parks' system in 1978. No agricultural activities occur in the vicinity of the 2nd crossing (PCI 2005b).

Farmland Mapping and Monitoring Program

Prime Farmland has the best combination of physical and chemical characteristics for crop production. Farmland of Statewide Importance is not as productive as prime soil, although it still has supported crop production for at least the three preceding years. Unique Farmland ranks below Prime and Statewide-important Farmlands, although it is still capable of producing "high economic value crops" such as olives, avocados, or grapes. Finally, Farmland of Local Importance ranks below the other three, yet "may be important to the local economy due to its productivity" (Department of Conservation, Important Farmland Map Categories). The project site is underlain by soils classified by the Natural Resource Conservation Service as Tidal Marsh.

The California Department of Conservation Farmland Mapping and Monitoring Program, Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Sonoma County do not include Tidal Marsh soils. The project site is not listed on the Sonoma County Important Farmland map as Grazing Land (2006).

Williamson Act

The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments that are lower than normal because they are based upon farming and open space uses as opposed to full market value. Sonoma County currently has 42,321 acres of prime agricultural land and 230,937 acres of non-prime land (Department of Conservation 2007). The proposed project is not located on or adjacent to Williamson Act agricultural land.

WOULD THE PROJECT*:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	☐	☒

* In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997), prepared by the California Department of Conservation as an optional model for use in assessing impacts on agricultural and farmland.

AGRICULTURAL RESOURCES DISCUSSION

a) **No impact.** The project is not located on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No farmland will be converted in the project.

b) **No impact.** The project does not change land use, which is a county road within a state park. The project is not located within a Williamson Act contract.

c) **No impact**. The project will not result in changes to the existing environment relevant to farm use.

3.3 Air Quality

ENVIRONMENTAL SETTING

The project site is located in the North Coast Air Basin (NCAB), which comprises Del Norte, Humboldt, Trinity, Mendocino, and northern Sonoma Counties, under jurisdiction of the Northern Sonoma County Air Pollution Control District (NSCAPCD) and the United States Environmental Protection Agency (USEPA) Region IX. Sonoma County is located within the southwestern portion of the NCAB.

Climate

Climate has a strong influence on both natural resources and recreational opportunities on the project site. Sonoma County has a Mediterranean climate with moderate temperatures, wet winters, and typically dry summers. The climate along the coast is heavily influenced by the Pacific Ocean, which brings summertime fog, low clouds, winter storms, and seasonally variable winds. Summer temperatures are mild (average 64º F), with frequent low clouds and fog that provide important moisture to vegetation during the dry season. Prevailing summer winds are from the northwest, averaging 10 to 15 miles per hour, with gusts as high as 50 to 60 miles per hour. Winter storms often batter the coastline with strong, moisture-laden, southerly winds. These winter storms, from November through April, account for nearly all the average annual rainfall, which varies between 30 and 38 inches. Winter temperatures are moderate, with averages ranging from highs in the 50s to lows in the 40s. (DPR 2008)

Air Quality Designations

The California Air Resources Board (CARB) makes state-area designations for ten criteria pollutants (an air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set): ozone, suspended particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and visibility reducing particles (VRPs). At the State level, ozone is designated as non-attainment/transitional; PM_{10} is designated in attainment; $PM_{2.5}$, carbon monoxide, hydrogen sulfide, and VRPs are designated unclassified; and nitrogen dioxide, sulfur dioxide, sulfates, and lead are designated in attainment.

If a pollutant concentration is lower than the standard, the area is classified as “attainment” for that pollutant. If an area exceeds the standard, the area is classified as “non-attainment” for that pollutant. If there are not enough data available to determine whether the standard is exceeded in an area, the area is designated “unclassified.” Non-attainment/transitional is a subcategory of the non-attainment designation; an area is designated non-attainment/ transitional to signify that the area is close to attaining the standard for that pollutant.

In contrast to the State-area designations, the USEPA makes national area designations for five criteria pollutants: ozone (8-hour standard; the national 1-hour standard was revoked in June 2005), particulate matter (PM_{10}), carbon monoxide, nitrogen dioxide, and sulfur dioxide. At the national level, ozone, carbon monoxide, $PM_{2.5}$, and nitrogen dioxide are designated unclassified/attainment; PM_{10} and sulfur dioxide are designated unclassified.

If an area does not meet (or contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant, it is

designated as non-attainment. If an area meets the national primary or secondary ambient air quality standard for the pollutant, it is designated in attainment. An area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant is designated unclassifiable (USEPA 2009)

Table 1 illustrates the criteria pollutant designations at both the State and federal levels.

Table 1. California and Federal Criteria Pollutant Designations

Criteria Pollutant	State	Federal
Ozone	Non-Attainment	Unclassified / Attainment
Suspended Particulates (PM_{10})	Attainment	Unclassified
Fine Particulates ($PM_{2.5}$)	Unclassified	Unclassified / Attainment
Carbon Monoxide	Unclassified	Unclassified / Attainment
Nitrogen Dioxide	Attainment	Unclassified / Attainment
Sulfur Dioxide	Attainment	Unclassified
Sulfates	Attainment	No Federal Standard
Lead (particulate)	Attainment	No Federal Standard
Hydrogen Sulfate	Unclassified	No Federal Standard
Visibility reducing particles	Unclassified	No Federal Standard

State designations were updated July 2007; National designations were current as of September 2006
Source: California Air Resources Board

Sources

During personal and business activities, Californians release thousands of tons of pollutants into the air every day. Although each of us may only produce a small amount of air pollution, the combined pollution from the 33 million Californians adds up to problems. Some air pollutants are formed and released during the combustion (burning) of petroleum-based products and other fuels such as wood. Examples include gasoline and diesel-powered vehicles and fireplaces, respectively. Many tons of pollutants also enter the air through evaporation, such as fuel from gasoline storage and dispensing facilities, car and truck gasoline tanks, and gasoline storage containers.

On hot, sunny days, pollutants emitted by vehicles, industry, and many products (nitrogen oxides and volatile organic compounds) react with each other to form ozone, the main ingredient of smog. During the winter, temperature inversions can trap tiny particles of smoke and exhaust from cars, trucks, fireplaces, and anything else that burns fuel. This keeps the pollution close to the ground—at the level where people are breathing.

Sonoma County experiences a combination of rural-type pollution (dust and smoke) and pollution transport. Such problems stem from the county's agricultural economy, which necessitates land cultivation and agricultural waste burning and from the prevailing wind patterns that transport pollutants from the San Francisco Bay Area air basin to the North Coast air basin. Sparsely populated on the coast, where prevailing winds blow clean air in from the Pacific Ocean, this basin enjoys some of the best air quality in California.

Air Monitoring Stations

The monitoring stations in the state are operated by CARB, by local Air Pollution Control Districts (APCD) or Air Quality Management Districts (AQMD), by private contractors, and by the National Park Service (NPS). These entities operate more than 250 air monitoring stations in California. CARB operates air monitoring stations throughout the State. Most of the local districts operate air monitoring stations within their jurisdictions. In some portions of the State, private contractors operate monitoring stations under contract with businesses that are required by permit conditions to conduct monitoring. NPS also operates a number of air monitoring stations in the National Parks and National Monuments throughout California (CARB 2008b). Six monitoring stations are located in Sonoma County: Cloverdale, Guerneville-1st & Church, Healdsburg-Limmerick Lane, Healdsburg-Matheson, Healdsburg-Municipal Airport, and Santa Rosa. The Cloverdale, Guerneville-1st & Church, Healdsburg-Limmerick Lane, and Healdsburg-Matheson stations monitor PM_{10}. The Healdsburg-Municipal Airport station monitors ozone. The Santa Rosa station monitors CO, NO_2, O_3, PM_{10}, $PM_{2.5}$, Toxics, Outdoor Temperature, Wind Direction, Horizontal Wind Speed, and Solar Radiation.

Health Hazards

Ozone and particulate matter are the most common air pollutants in California. Ozone, also known as smog, can irritate the respiratory system, causing coughing, irritation in the throat, or a burning sensation in the airways. It can reduce lung function, resulting in feelings of chest tightness, wheezing, or shortness of breath. Particle pollution, also known as particulate matter, is composed of microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. When exposed to these small particles, people with heart or lung diseases and older adults are more at risk of hospital and emergency room visits or, in some cases, even death from heart or lung disease.

Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. Sulfur dioxide causes a wide variety of health and environmental impacts because of the way it reacts with other substances in the air. Impacts include respiratory effects, visibility impairments, acid rain, plant and water damage, and aesthetic damage (building decay). People, animals, and fish are mainly exposed to lead by breathing and ingesting it in food, water, soil, or dust. Lead accumulates in the blood, bones, muscles, and fat. Nitrogen dioxide contributes to ozone; causes respiratory problems; contributes to the formation of acid rain; contributes to nutrient overload, which deteriorates water quality; contributes to atmospheric particles, which causes visibility impairment; reacts to toxic chemicals; and contributes to global warming (USEPA).

Sensitive Receptors

Sensitive receptors include individuals as well as groups relating to specific land uses. Some individuals are considered to be more “sensitive” than others to air pollutants. The reasons for greater sensitivity than average include age, health problems, proximity to the emission source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be sensitive receptors to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential uses are considered sensitive receptors because people in residential areas are often at home

for extended periods of time, so they can be exposed to pollutants for extended periods. Recreational areas are considered moderately sensitive to poor air quality because vigorous exercise associated with recreation places a high demand on the human respiratory function.

Sensitive receptors in the vicinity of the proposed project area are limited to recreational users. During construction, the project site will not be open to public use.

WOULD THE PROJECT*:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Conflict with or obstruct implementation of the applicable air quality plan or regulation?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations (e.g., children, the elderly, individuals with compromised respiratory or immune systems)?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

* Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make these determinations.

AIR QUALITY DISCUSSION

a) **No impact**. Proposed work would not conflict or obstruct implantation of any of the applicable air quality plan or regulation for the North Coast Air Basin.

b,c) **Less-than-significant impact.** Construction activities would not emit air contaminants at a level that by themselves violate any local, State, or federal ambient air quality standards or contribute to a long-term or permanent increase in any air contaminant. However, project implementation would generate short-term emissions of fugitive dust and involve the use of equipment and materials that would emit ozone precursors. Increased emissions of ozone precursors could contribute to existing non-attainment conditions, which could interfere with achieving the projected attainment standards. Integration of the following minimization measures into the project design will reduce potential impacts to a level of less than significant.

MINIMIZATION MEASURE AIR-1
• All construction areas (dirt/gravel roads and surrounding dirt/gravel area) will be watered at least twice daily during dry, dusty conditions. • All trucks hauling soil, sand, or other loose materials on public roads will be covered or required to maintain at least two feet of freeboard. • All construction-related equipment engines will be maintained in good condition, in proper tune (according to manufacturer's specifications), and in compliance with all State and federal requirements. • Earth or other material that has been transported onto paved roadways by trucks, construction equipment, erosion, or other project-related activity will be promptly removed.

d) **Less-than-significant impact.** As mentioned above, project construction would generate dust and equipment exhaust emissions for the duration of the project. Although sensitive receptors are limited in the area, there is the possibility that during construction, recreational users on adjacent property could be affected. However, members of the public with conditions that make them sensitive to these emissions would have the option of moving to areas further away and avoiding the area altogether or remaining in areas that would be upwind or protected from blowing dust or other emissions. Integration of **Minimization Measure Air-1** above will reduce potential impacts to less than significant.

e) **No impact.** The project is located in a rural area. Any odors (i.e. exhaust) would dissipate before reaching heavily populated areas.

Climate Change is discussed in section VII.

3.4 Biological Resources

ENVIRONMENTAL SETTING

The immediate area of the 2nd crossing has been identified as red alder woodland, while the areas to the west were labeled as the sedge series and to the east and north as the Douglas fir-tan oak series (DPR 2007a: Exhibit 2-6. Plant Communities). A full discussion of biological resources expected to occur at the project site is provided in the Biological Resources Evaluation and Preliminary Wetland Assessment, Willow Creek Road 2nd Bridge Area Fish Passage Project, Sonoma Coast State Park (PCI 2008), Appendix E.

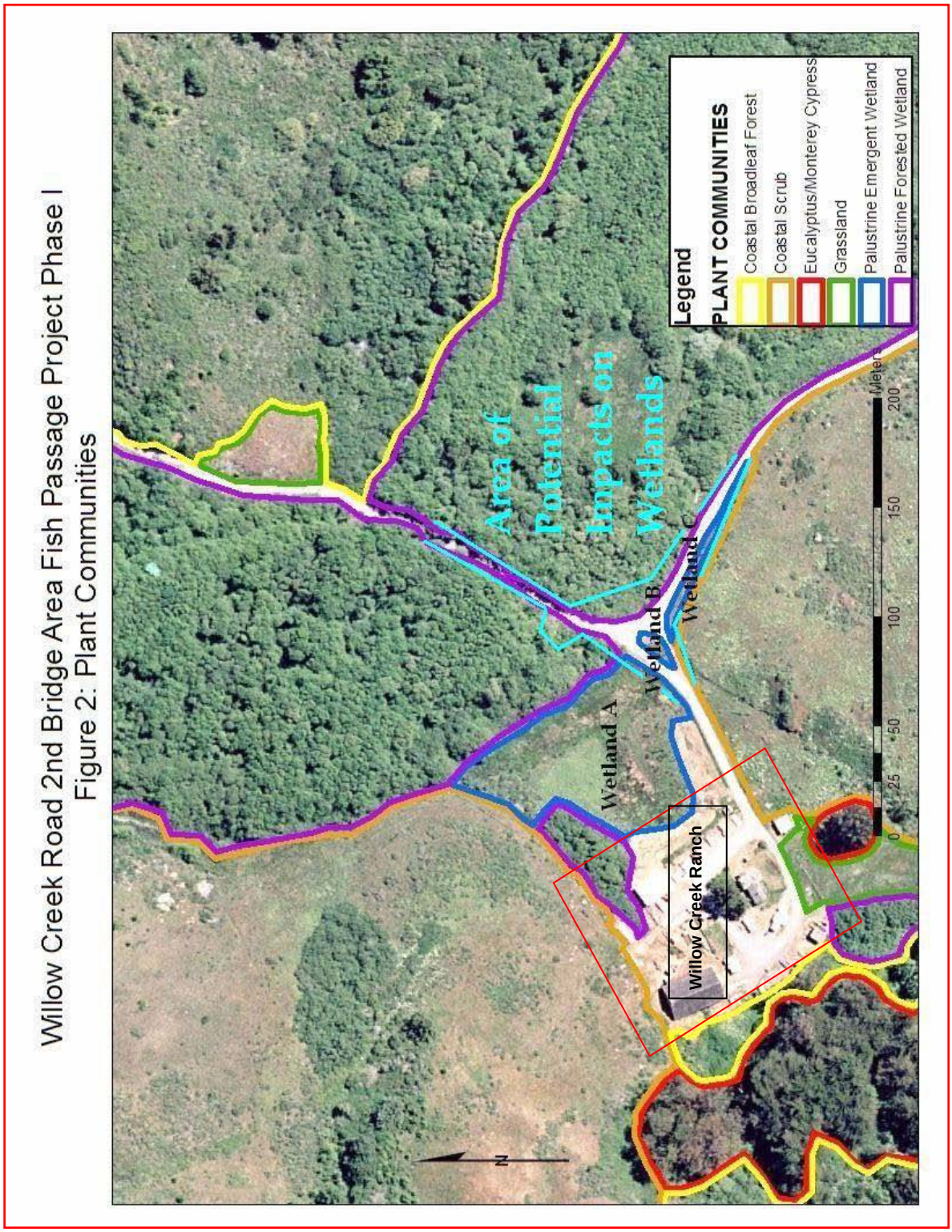
Within the project site and surrounding areas, the Willow Creek floodplain is characterized as palustrine, forested wetland. Tree canopy is dominated by arroyo willow and red alder with diverse riparian understory plants. In portions of the habitat that are very marsh-like, rushes and horsetails dominate the understory. Roadside berms are primarily dominated by weedy, opportunistic species with the occasional native plant.

The riparian corridors upstream and downstream of the 2nd bridge crossing are large palustrine forested wetlands. Three small emergent-dominated wetlands occur adjacent and within the project area (PCI 2008); see Figure 3. The largest of the emergent-dominated wetlands (A) occurs at the southwestern edge of the project site. A second, small, disturbed wetland (B) is an isolated feature between the existing access road to the maintenance yard and an adjacent pullout. The last is a narrow feature that runs in a northwest-southeast direction parallel to Willow Creek Road (Wetland C). All of the features are connected via underground culverts.

Wetland A is dominated by spikerush (*Eleocharis* sp., FACW to OBL), broadleaf cattail (*Typha latifolia*, OBL), smallfruit bulrush (*Scirpus microcarpus*, OBL), slough sedge (*Carex obnupta* OBL), and spreading rush (*Juncus patens*, FAC). Wetland B is highly disturbed and consists primarily of tall flatsedge (*Cyperus eragrostic*, FACW), smallfruit bulrush, and frequently mowed arroyo willow shrubs (*Salix lasiolepis*, FACW). Wetland C is dominated by California blackberry (FACW), slough sedge, rush (*Juncus* sp., FAC to OBL), and spreading rush, and additional cover is provided by pennyroyal (*Mentha pulegium,* OBL), Pacific cinquefoil (*Potentilla anserina*, OBL), curly dock (*Rumex crispus,* FACW-), arroyo willow, and black twinberry (*Lonicera involucrate,* FAC).

Historically, the area of the 2nd crossing provided habitat for both resident and migratory aquatic species, including salmonids. See discussion in Section 2.3 above and in the Willow Creek Watershed Management Plan (PCI 2005b). The densely forested, palustrine wetlands and adjacent emergent-dominated wetlands provide habitat for a rich array of bird, mammal, reptile, and amphibian species. Dusky-footed woodrat nests were observed in the project area during field reconnaissance for the Biological Resources Evaluation (PCI 2008). Other wildlife species that might be expected to occur in the vicinity of the 2nd crossing are multiple reptiles, including western pond turtles; many species of amphibians, including California red-legged frog; diverse small and large mammals, including multiple bat species; raptors, local and migratory song birds, swimming birds, and wading birds. See the Biological Resources Evaluation in Appendix E (PCI 2008) for further details.

Figure 3. Plant Communities and Willow Creek Ranch Location



3.4 Biological Resources (continued)

Plant surveys were conducted in the spring and summer of 2009 to California Native Plant Society (CNPS) protocols (DPR 2009). No state or federally listed species were noted to occur within the project limits. Gilia (*Gilia capitata* ssp. *tomentosa*) CNPS list 1B.1 and western dog violet (*Viola adunca*) the host larval plant for Myrtle's silverspot butterfly (federally endangered) were noted to occur just outside of the project limits. See the Vascular Plants of Willow Creek 2nd Bridge Project Area in Appendix F for the list of vascular plants present in the project vicinity.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a sensitive, candidate, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands, as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

BIOLOGICAL RESOURCES DISCUSSION

a) **Less-than-significant with mitigation.** The project site supports potential habitat for California red-legged frogs (federally listed as threatened, California Species of Special Concern), great blue herons (California Species of Special Concern), special-status and common bat species, Myrtle's silverspot butterfly (federally listed as endangered) and

northwestern pond turtles (California Species of Special Concern); it historically supported all three of the area's listed salmonids. It is moderately likely that central coast Evolutionary Significant Unit (ESU) steelhead (federally listed as threatened) and central coast ESU coho (federally and state-listed as endangered) are present when water is flowing in Willow Creek. Additionally, the project site supports breeding habitat for birds protected under the Migratory Bird Treaty Act (e.g., songbirds, etc.). Foothill yellow-legged frogs and California freshwater shrimp are unlikely, but measures will be taken to avoid impacts on these and other aquatic species. Project precautions, listed below, are included to avoid impacts on special-status species.

The project site supports potential habitat for special-status plant species, although none were identified within the project limits during field surveys. Prior to construction, focused spring surveys will occur for the following species:

Sonoma alopecurus (*Alopecurus aequalis var. sonomensis*)
Swamp harebell (*Campanula californica*)
Sonoma white sedge (*Carex albida*)
Bristly sedge (*Carex comosa*)
Deceiving sedge (*Carex saliniformis*)
Gilia (*Gilia capitata* ssp. *tometosa*)
Pale yellow hayfield tarplant (*Hemizonia congesta* ssp. *congesta*)
Baker's goldfields (*Lasthenia californica* ssp. *bakeri*)
Point Reyes checkerbloom (*Sidalcea calycosa* ssp. *rhizomata*)
Saline clover (*Trifolium depauperatum* var. *hydrophilum*)
Western dog violet (*Viola adunca*)

MINIMIZATION MEASURE BIO-1

- If water is present during any part of project activities, and dewatering is deemed necessary, a dewatering and species protection plan will be developed by the project's biologist. The plan will be developed and implemented as described in the Biological Resources Evaluation recommendations (Appendix E; PCI 2008) by a qualified and permitted biologist. Appendix G contains specific details for dewatering techniques and species protection developed for the nearby Jenner Creek bridge replacement project that will be used in the unlikely event that dewatering is required for this project.
- To avoid impacts on aquatic and terrestrial species within the immediate work area, prior to disturbance of the stream channel and removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no special-status species are occupying the site. If special-status species are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the regulatory agencies. In addition, the site will be surveyed periodically during construction to ensure that no special-status species are being impacted by construction activities. The biologist will also monitor to ensure water quality standards are being met and sediment and/or debris are not entering downstream aquatic habitats.
- To avoid impacts on special-status and common bat species, prior to the removal of

any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. In addition, construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.

- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- To avoid potential impacts on special-status plants, a focused botanical survey will be completed during the appropriate blooming period for the above-mentioned species. If special-status plants are found occupying the site, avoidance measures will be in place during construction to minimize disturbance (e.g., temporary construction fencing around existing populations).
- If impacts to special status plants are unavoidable, appropriate mitigation measures will be implemented (e.g., seed collection and revegetation). Replacement to disturbance will occur at a 4:1 ratio.
- To avoid impacts to Myrtle's silverspot butterflies and their host plants, the following measures will be taken. Prior to construction, butterflies surveys will be completed within the project area to determine if adults or larvae are present. If adult or larvae are found to be present, additional protection measures may be necessary, and further consultation with U.S. Fish and Wildlife Service will be required. If not found, the following protection measures will be implemented. Existing populations of larval host plants [western dog violet (*Viola adunca*)] will be avoided, as feasible. Plants will be protected through the installation of temporary fencing around all known plants and these areas avoided. If western dog violets are found to be present within the area of impact, they will be transplanted to appropriate habitat off-site. As feasible, adult nectar plants [e.g., coyote mint (*Monardella villosa*), bull thistle (*Cirsium vulgare*)], will be flagged and avoided during construction.
- The project biologist will conduct a preconstruction training session for construction crew members. The training will include a discussion of the sensitive biological resources within the project area and the potential presence of special-status species, special-status species' habitats, protection measures to ensure species are not impacted by project activities, and project boundaries.

b) **Less-than-significant impact.** Under existing conditions at the project site, Willow Creek Road is located within sensitive riparian habitat on a berm across the floodplain of Willow Creek. The project will improve habitat values in the area. During project implementation and adaptive management, sensitive habitat will be protected by the following:

MINIMIZATION MEASURE BIO-2
▪ Hand labor will be used to control exotic and unwanted vegetation. The use of chemical agents and mechanical equipment within the stream channel will be avoided. ▪ During vegetation removal, large trees with extensive canopy will be maintained, as feasible, to preserve the existing cover over the stream channel. ▪ Proper erosion control and other water quality BMPs will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. Work in aquatic habitats will be scheduled to occur during the dry season, with work up on the elevated road surfaces scheduled toward the end of construction when rainfall becomes more probable. If work in wetted areas is necessary, they will be dewatered as described above. An erosion and sediment control plan will be developed and implemented for the project. ▪ Temporary wildlife exclusionary and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site once construction has commenced (following the preconstruction survey) and to protect riparian trees during construction activities.

c) **Less-than-significant with mitigation.** In order to raise the approaches to the new bridge the 4 feet necessary to achieve appropriate high flow capacity, the road edges will need to be widened, which will entail some very minor fill of wetlands (0.035 acres). The hydrology of Wetland A will be maintained by the replacement of the two culverts currently linking the emergent-dominated wetlands with a new, single culvert from the newly created wetland along the road. The new culvert will be placed underneath the new road junction in order to maintain drainage at the southern edge of the road as flow into Wetland A. Wetland A will remain largely undisturbed with the exception of a narrow band along the existing road that will be filled to allow the road to be properly side-sloped. Wetland B, a disconnected area between Willow Creek Road and the maintenance yard road, will be filled to allow for the realignment of the road. Wetland C, a narrow, disconnected swath along Willow Creek Road, will be partially filled to allow for side-sloping.

Wetland C, at the upstream end up the project, would not be impacted by alterations in existing hydrology. However, the work may change the hydrology at Wetlands A and B because road construction will eliminate the existing culverts that connect the three areas. To maintain hydrology in Wetland A, a new culvert will be installed to carry the outflow from Wetland C directly to Wetland A.

MITIGATION MEASURE BIO-3
▪ Net wetland loss (0.035 acres) will be compensated by wetland restoration elsewhere in the park at a 4:1 ratio through reconnection and enhancement of the old grist mill spring with the Willow Creek floodplain, which provides good quality existing wetland habitat 0.5 mile upstream of the project area.

d) **Less-than-significant impact.** The project as a whole will make movement under the road easier for aquatic species because it will occur through a natural channel rather than clogged culverts. There may be some reduction of movement through the area during

construction, although, in a normal year, movement would not occur in the late summer or early fall due to lack of water. The existing 2nd bridge will continue to allow as much passage past the road as it currently does. Therefore, the reduction in movement capacity for aquatic species is not considered significant. Movement of terrestrial species will not be constrained because of the relatively small project area.

e) **No impact.** The project will not conflict with any local policies or ordinances protecting biological resources.

f) **No impact.** The project is planned in accordance with the *Sonoma Coast State Park General Plan* (DPR 2008b); see further discussion in Section 3.10. Land Use and Planning. There are no habitat conservation plans or natural community conservation plans in place for the project area. The project takes place in the Coastal Zone. The Coastal Commission Strategic Plan (CCC 1997) calls for protecting and restoring "ecologically viable tidepools, kelp beds, streams, wetlands, riparian corridors, and marine and terrestrial environmentally sensitive habitat areas, including the habitats of rare or endangered organisms." Since this project will enhance the ecological health of stream, wetland, and riparian habitats, it is consistent with the strategic vision of the Coastal Commission.

3.5 Cultural Resources

ENVIRONMENTAL SETTING

The Willow Creek watershed has a long and diverse history of human habitation. Sonoma Coast State Park contains an array of prehistoric sites that date back as far as 9,000 years (DPR 2007a). Cultural resources in Willow Creek range from Native American sites to Russian farms associated with nearby Fort Ross to the remains of historic ranching complexes and logging operations from the 19th and 20th centuries.

Willow Creek includes ethnographic territories of two Native American groups, the Kashia Pomo (also known as the Southwestern Pomo) and the Coast Miwok. Willow Creek is considered an area of interface between the two tribes. Consultation with representatives of both Tribes has occurred in conformance with Sonoma Coast State Park General Plan Guideline CUL-1B to consult with local Native American people and groups who have traditional ties to resources within Sonoma Coast State Park to ensure productive, collaborative working relationships during the planning and implementation of specific development projects.

The Kostromitinov Ranch was established in the Willow Creek area in 1833 and operated until 1841 when the substantial decline of seal and otter populations resulted in an unprofitable fur trade economy. It was one of four main ranches in western Sonoma County that supplied fruits, grains, and livestock to Russian settlements in Alaska and up the coast at Fort Ross. The exact location of the Kostromitinov Ranch is unknown. Remnants of the Russian roads in Willow Creek may still exist today.

Euro-Americans arrived in Willow Creek by the mid-19th century. The first recorded commercial logging occurred in the Willow Creek watershed in the 1840s, and timber harvest activities continued throughout the 20th century. Similarly, grazing and other agricultural activities occurred during this time period, but have been discontinued since the inclusion in the State Parks' system. The Willow Creek Ranch is a remnant of this era. The ranch house is located approximately 500 feet to the southwest of the project site (Figure 3). A 1981 survey of the Willow Creek Ranch found that this structure is eligible for the National Register.

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Cause a substantial adverse change in the significance of a historical resource, as defined in §15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☒	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

CULTURAL RESOURCES DISCUSSION

a-c) **Less-than-significant impact.** The following minimization measures will be implemented to ensure that no significant adverse impacts on cultural resources occur. The project site was surveyed for cultural resources by the Anthropological Studies Center at Sonoma State University in conjunction with representatives from the Kashia Band of Pomo Indians of Stewarts Point Rancheria and the Federated Indians of Graton Rancheria in 2008 (ASC 2008). The project is limited to a small footprint of previously disturbed soils and alluvium. While multiple sites were recorded elsewhere on the Willow Creek property, no sites of record occur and no cultural resources were noted during surveys within the project site.

MINIMIZATION MEASURE CULT-1

- A preconstruction meeting will be held to acquaint project personnel with the possibility of encountering sensitive cultural resources. Prehistoric resources may include chert or obsidian flakes, projectile points, mortars, and pestles; dark friable soil containing shell and bone dietary debris; heat-affected rock; or human burials. Historic resources may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, often in old wells and privies.
- In the event that previously undocumented cultural resources (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic trash) are encountered during project construction by anyone, the state representative will temporarily halt work at that specific location and direct contractors to other project-related tasks. A DPR-qualified archaeologist will record and evaluate the find and work with the state representative to implement avoidance, preservation, or recovery measures as appropriate prior to any work resuming at that specific location.
- If the DPR-qualified archaeologist determines that the find(s) are significant, a qualified archaeologist, and/or Native American representative (if appropriate) will monitor all subsurface work including trenching, grading, and excavations in that area. If it is determined, the find indicates a sacred or religious site. Formal consultation with appropriate representatives will occur as necessary.
- In the event that human remains are discovered, work will cease immediately in the area of the find and the project manager/site supervisor will notify the appropriate DPR personnel. Any human remains and/or funerary objects will be left in place. The DPR Sector Superintendent (or authorized representative) will notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (NAHC) will be notified within 24 hours of the discovery if the Coroner determines that the remains are Native American. The NAHC will designate the “Most Likely Descendent” (MLD) of the deceased Native American. The MLD will recommend an appropriate disposition of the remains. If a Native American monitor is on site at the time of the discovery and that person has been designated the MLD by the NAHC, the monitor will make the recommendation of the appropriate disposition.

3.6 Geology, Soils, and Hazards

ENVIRONMENTAL SETTING

The proposed project is located within a small valley where Willow Creek flows towards the Russian River. An existing roadway that is essentially flat in the immediate vicinity of the planned improvements traverses through the valley. The area beyond the roadway is covered with dense riparian vegetation. Six culverts allow water to pass under the roadway. Natural drainage consists of sheet flow over the ground surface that concentrates in man-made surface drainage elements, such as culverts, and natural drainage elements, such as swales and creeks (RGH 2008).

Geology

The California Geologic Survey's (CGS) geologic maps (Huffman and Armstrong 1980) indicate the property is underlain by alluvium (Qal) that is flanked by hillsides underlain by conglomerate of the Great Valley Sequence (KJgvc) to the northeast and Franciscan Complex (KJfs) to the south and west. The alluvium is shown to comprise sand, gravel, silt, and clay. The Franciscan Complex is shown to comprise sheared shale and sandstone that contains generally resistant masses of chert, "high grade" metamorphic rock, variable shattered sandstone and greenstone, metagreenstone and generally less resistant serpentinite. Fault mapping by CGS indicates that a fault showing no evidence of Quaternary (within the last 5,000,000 years) displacement extends through the project site.

Seismicity

An unnamed fault that shows no evidence of Quaternary (last 5,000,000 years) displacement lies beneath the project site. No landforms within the project area are suggestive of active faulting, and the site is not within a current Alquist-Priolo Earthquake Fault Zone (RGH 2008). The San Andreas Fault (2.5 miles to the southwest), the Healdsburg - Rodgers Creek Fault (18.5 miles to the northeast), the Maacama Fault (23 miles to the northeast), and the West Napa Fault (39 miles to the east) are historically active. In the 1906 San Francisco earthquake, the North Coast segment of the San Andreas Fault generated an earthquake of magnitude 7.6 on the Richter Scale. Due to the proximity of the San Andreas Fault Zone, the area may be prone to ground-surface rupture, strong seismic shaking, and liquefaction. Along Willow Creek, liquefaction potential of the alluvium is considered moderate to high in the event of seismic activity (RGH 2008).

Based on analysis of historic events and seismic modeling, the Rogers Creek Fault has a 30-year probablity of 27% to 31% of generating a magnitude 6.7 or greater earthquake. The San Andreas Fault has a 30-year probability of 21% to 23% of generating a magnitude 6.7 or greater earthquake. While the Rogers Creek Fault has the higher probability, the San Andreas Fault has the greatest potental to generate damage or cause harm.

Landslides

The CGS maps of landslides indicate large-scale instability of the hillside south of the proposed improvements, including a large landslide that extends to the top of the ridge and one on the slope northeast of the project area. The proposed site is located in the alluvial soils

that make up the valley floor. It is possible that landslide debris could extend below the alluvium and below the proposed improvements. Movement of the landslides described would not only impact the planned improvements, but also the valley floor in general. Therefore, reactivation, although unlikely, would uniformly disrupt the bridge approaches, creek alignment and existing features (RGH 2008).

Soils and Erosion

Mapping by the U.S. Soil Conservation Service has classified the soil underlying the project site as belonging to the Tidal Marsh series. Tidal Marsh soils are nearly level marshlands that are underwater or extremely wet throughout the year. The Tidal Marsh series is shown to comprise variable soil textures, but it is generally fine textured and contains many strata of sandy or organic matter. Permeability in the project area is slow to very slow. Degree of plasticity, shrink-swell, and erosion potential are not described. The risk of corrosion is given as high for uncoated steel and high for concrete (RGH 2008).

There are no known paleontological resources or sites, or unique geologic features located in the project area.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area, or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable, as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1997), creating substantial risks to life or property?	☐	☐	☐	☒

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems, where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?	☐	☐	☐	☒

GEOLOGY, SOILS, AND HAZARDS DISCUSSION

a) i) **Less-than-significant impact.** The project is not in an Alquist Priolo Fault Zone. There is a fault underlying the valley that runs between the project area and the 2nd bridge. However, the fault has not moved in the last 5,000,000 years, and the chance of rupture is low (RGH 2008).

ii) **Less-than-significant.** The project site, along with the rest of the San Francisco Bay Area, is likely to experience strong shaking in the next 30 years from a magnitude 6.7 or greater earthquake. The San Andreas Fault is 2.5 miles away (RGH 2008). Thus, the project area would be subject to strong seismic shaking. The following **Minimization Measure – Geo-1** will keep the potential for adverse impacts from this project to a less-than-significant level.

MINIMIZATION MEASURE GEO-1
• Project design will take into account the following geotechnical considerations: weak surface soils to about 2 feet below the existing road, compressible soils to depths of 45 to 48 feet, potentially liquefiable soils, and predicted strong seismic shaking. • Topsoils containing organic matter will be removed and stockpiled for reuse in revegetation with native species. • Weak soils will be removed and replaced with engineered fill. • Fill will be free of organic material, have low expansion potential, and conform to the specifications in the geotechnical report; see Appendix C. • Seismic design will use Site Class E and all specified seismic design criteria from the geotechnical report.

iii) **Less-than-significant.** In February 2008, RGH performed test borings at the project site and subsequent laboratory testing of the samples retrieved. Using this data, they calculated critical blow count and peak ground acceleration to determine liquefaction potential at the project site. The alluvial soils at the site do have the potential for liquefaction. There are three possible consequences of liquefaction: bearing capacity failure, lateral spreading, and differential settlement (RGH 2008). Because of the depth at which alluvial layers with different liquefaction characteristics were found, bearing capacity failure and lateral spreading are unlikely. However, differential settlement is a potential problem. To avoid potential safety impacts from differential settling, the project will be designed with a deep foundation of driven piles using the specific design recommendations from the geotechnical report. A geotechnical engineering firm will provide construction oversight. The following **Minimization Measure – Geo-2** will keep the potential for adverse impacts from this project to a less-than-significant level.

MINIMIZATION MEASURE GEO-2
• The new bridge will be built on driven piles. The piles will be 16-inch diameter steel pipe. If other pilings are used, the geotechnical consultants will be contacted for additional design specifications. • Contractor will adhere to all specifications in the geotechnical report and will contact the geotechnical engineer prior to pile driving to obtain driving criteria based upon the hammer to be used. • Geotechnical engineers will review project plans and specifications to determine consistency with the geotechnical recommendations. • A preconstruction meeting will occur between the geotechnical engineer, general contractor, subcontractors, civil engineer, and other members of the design team to address design issues, clarify procedures, and construction coordination. • Critical construction steps, such as site excavation, fill compaction, and foundation installation, will be monitored by the geotechnical consultants.

iv) **No impact.** The hills surrounding the Willow Creek valley have landslide potential. There are mapped landslides in the vicinity of the project area. However, movement of these landslides would affect the valley floor generally. This project would have no impact on the likelihood or the effects of earth movement.

b) **Less-than-significant impact.** The project would include grading activities that have some erosion potential. However, the project area is small, standard construction BMPs will be in place, and the project will be done during the dry season to limit potential erosion. After construction, all disturbed areas, except the new channel bottom under the bridge, will be either planted or reinforced as part of bridge and bridge approach construction. The new channel bottom and up- and downstream areas where vegetation will be removed to promote channel formation are likely to undergo some erosion, which is desirable as part of reestablishing normal geomorphic processes in Willow Creek. If the project results in cut material that cannot be reused as fill for the project, the excess spoils will be taken to nearby Pomo Campground parking lot where the fill will be placed in six inch or less lifts, compacted and stabilized in accordance with the specific BMPs listed below.

Specific BMPs that may be implemented during construction to minimize impacts from erosion and loss of topsoil include (Caltrans 2003; CSQA 2003):

- Scheduling (EC-1, SS-1)
- Preservation of Existing Vegetation (EC-2, SS-2)
- Straw Mulch (EC-6, SS-6)
- Geotextiles and Mats (EC-7, SS-7)
- Velocity Dissipation Devices (EC-10, SS-10)
- Streambank Stabilization (EC-12, SS-12)
- Silt Fence (SE-1, SC-1)
- Fiber Rolls (SE-5, SC-5)
- Street Sweeping and Vacuuming (SE-7, SC-7)

c) **Less-than-significant impact.** The project site is subject to liquefaction, as described a)(iii) above. Mitigation for this circumstance at the project site is included above. However, this project will neither create or enhance seismic hazards relating to liquefaction or landslides, nor will it cause any area to become less stable.

d) **No impact.** The alluvial deposits at the project site have been tested and are not expansive. Hazards from the soil at the site are addressed above.

e) **No impact.** The project will generate no wastewater and need no septic tanks or alternate disposal systems. Construction worker wastes will be collected in porta-potties and trucked off site to appropriate disposal facilities.

f) **No impact.** There are no unique paleontological or geological resources at the project site.

3.7 Global Climate Change

ENVIRONMENTAL SETTING

As humans contribute certain gases, chiefly carbon dioxide, to the atmosphere above the naturally occurring range, the average temperature of the earth is increasing. This, in turn, causes changes in weather patterns that generate a set of conditions referred to as global climate change. Collectively, these gases are referred to as "greenhouse gases" or GHGs.

As mentioned in Section III: Air Quality above, AB 32 requires that statewide GHG emissions in California be reduced to 1990 levels by the year 2020 and requires CARB to adopt rules and regulations to achieve this goal. The following discussion of global climate change in relation to this project addresses three fundamental questions:

- How would the project affect climate change?
- How would the project be affected by climate change?
- If the project contributions to climate change are considered a significant impact on the environment, what constitutes feasible "fair share" mitigation?

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Affect climate change by altering the earth's radiative ability through direct emissions of GHGs; indirect emissions of GHG; alteration of sinks of GHG; or changes in land albedo (reflectivity)?	☐	☐	☒	☐
b) Result in a change in water availability and quantity; an increase in the frequency and severity of extreme weather events; changes in cloud cover and rainfall patterns; increases in frequency of ozone exceedances; or sea level rise?	☐	☐	☐	☒
c) Result in contributions to climate change that are considered a significant impact on the environment?	☐	☐	☐	☒

GLOBAL CLIMATE CHANGE DISCUSSION

a) **Less-than-significant impact.** Projects affect global climate change in four ways: direct emissions of GHGs, indirect emissions of GHGs, changes in the reflectivity of the earth's surface (albedo) that can affect the amount of light and heat absorbed, and changes in carbon sequestration. This project would not substantially affect either albedo or carbon sequestration, but it would generate GHGs.

Direct emissions are those generated during project operations, such as burning fuel in construction vehicles or to get employees to work, and indirect emissions are those generated in the production of things used by the project, such as Portland cement for the pilings and bridge. To avoid additional direct emissions, construction equipment will be stored in the project area or in the adjacent State Parks maintenance yard. Cement will be obtained from the company located as close as possible to the project site.

Construction equipment emission calculation assumptions are shown in Table 2 below. Project implementation will occur over an approximately 3-month period. Equipment generating carbon dioxide (CO_2) may include a crane, an excavator, a loader, trucks, and a pile driver. In order to ensure environmental impacts are anticipated, the estimate of total CO_2 generated includes more equipment than is likely to be needed. During project implementation, the site inspector may substitute equivalent pieces of equipment. The number of days for each piece of equipment is estimated from the percentage of time during construction in which that equipment may be necessary. In some cases, the number of days exceeds the estimated time of construction because more than one of that type of equipment may be necessary. The total CO_2 emission from construction equipment for the project is estimated to be 54 metric tons.

Table 2. Construction Equipment Emissions

Vehicle	Hp	Days of construction	Hours/day	Hp*hr	CO_2 grams/hp* hr	Total metric tons (MT) CO2
Crane	175	5	8	7,000	530	3.7
Excavator	300	20	8	48,000	536	25.7
Loader	100	30	8	8,000	691	5.5
Truck	300	10	8	24,000	536	12.9
Pile Driver	375	3	8	9,000	643	5.8

Construction for the road is calculated separately because past experience with road construction has generated simple road distance-to-CO_2 emission calculations. For this estimate, we used 1,400 tons CO_2/mile of road (Williams-Derry 2007). The project will require approximately 6,367 tons of concrete. Concrete for precast bridge structures is generally about 12 % Portland cement (California DOT 2009; Iowa DOT 2003). The ratio for traditional cement is ±1 ton of CO_2 equivalent per ton of cement. Thus, the 6,367 tons of concrete is estimated to produce 764 metric tons of CO_2. Steel produces about 2 tons of CO_2 per ton of steel (Blue Scope Steel 2005). The project will use fourteen 70-foot steel H piles (weighing 42 lbs. per foot), which works out to 18.7 tons of steel and 37 metric tons of CO_2. Estimates of total project emissions are shown in Table 3 below.

Table 3. Construction Emissions of GHGs

Construction Emissions Source	CO_2 Equivalent (MT)
Construction Equipment	54
Construction Supplies	801
Trips Generated for Construction	<1
Road Construction	210
Total GHGs from Construction	1,065

Thus, the project may generate up to 1,065 metric tons of CO_2. The regulatory community is currently developing thresholds for what constitutes a significant impact. Many proposals focus on efficiency or percent reduction from a baseline. Proposals that give amounts are in terms of emissions per year. Since all emissions from this project happen at construction, the construction emissions are calculated over the life of the project to generate emissions per year. The bridge is likely to last more than 50 years, but the design specification is 20 to 50 years. The construction emissions spread over 20 years generate an emission rate of 53 metric tons of carbon dioxide equivalent (MT CO_2 E) per year. CARB has proposed a significance threshold at 7,000 MT CO_2 E per year, while the Center for Biological Diversity has proposed a significance threshold at 900 MT CO_2 E per year. Thus, by conservative standards, this project would make a less-than-significant contribution to GHGs driving the warming of the earth's atmosphere (radiative forcing).

b) **No impact.** The potential for the project to result in radiative forcing, which warms the atmosphere giving rise to the effects listed in Question b), is assessed in Discussion a) above. Below are evaluations of the project's potential to cause those effects to be more severe and the impact of those effects on the project. There are two impact areas relevant to this project:

Changes in Water Availability and Increases in Extreme Weather Events

Models for climate change are not yet specific enough to make predictions on a local scale, but weather patterns in northern California are likely to generate more intense storms over a shorter rainy season. It is not yet known whether total rainfall will increase slightly, decrease slightly, or stay the same on average. However, more intense storms over a shorter period will likely produce greater peak flows, leading to more frequent flooding. These changes in precipitation timing will probably reduce groundwater infiltration since a larger proportion of rain will fall when the ground is already saturated. Coupled with a longer, drier summer, this will likely lead to increasingly severe water shortages. California is already experiencing a measurable decrease in soil moisture.

Streams will have lower flow or standing water in the summer. For aquatic species, this leads to increased risk of stress and stranding. Channels and deep pools will be important, and this project should help to locally ameliorate changing climate for aquatic species.

During the winter, when more severe storms occur, peak flows will likely be higher. The new bridge is designed to pass more water than the existing culverts and, therefore, should not exacerbate flooding as the hydrology changes. In what are currently normal winters, all water will pass under the bridge. The bridge will likely flood in large storm events but will be designed to withstand short-term flooding. Since the project will locally ameliorate changes in precipitation patterns both during dry and wet season, and will not intensify these effects, no adverse impact is anticipated.

Changes in Sea Level

Sea level is rising, primarily as a result of the warming of the earth that results in thermal expansion of seawater. There is also some contribution from melting land ice (glaciers). By 2100, sea level is likely to rise between 20 – 55 inches. A Joint Policy Committee of the San Francisco Bay Conservation and Development Commission (BCDC), together with the Association of Bay Area Governments (ABAG), the Bay Area Air Quality Management District (BAAQMD), and the Metropolitan Transit Commission (MTC) have agreed that three feet of sea level rise by 2100 is a reasonable and prudent planning prediction.

At high tide, the Russian River is brackish past the mouth of Willow Creek, and the lower creek has tidal influence at least 0.3 mile upstream from the mouth (SCWA 2001). With three feet of sea level rise, brackish water will likely progress further up Willow Creek, gradually extending tidal marsh into the existing freshwater wetlands. This project will not impact the ability of biological systems in the watershed to adapt to changing circumstances.

c) **Less-than-significant impact**. Since the project has a less-than-significant impact on radiative forcing and does not have an impact on the severity of climate change effects, its overall climate change impact is less than significant.

3.8 Hazardous Materials

ENVIRONMENTAL SETTING

The roadway across the valley floor and floodplain at the 2nd bridge crossing acts as a low-head dam, trapping streamflow and sediment and restricting fish passage up- and downstream during spring and winter base-flow conditions. The 24-inch culverts at the west end of the valley crossing are often blocked with debris during annual high flows. The streamflow slows and spreads across the floodplain, overtopping the roadway during most high flows.

Hazardous Materials

The project site is located within an existing roadway and is surrounded by riparian habitat. The site is rural, and there is no evidence of industrial use in the project area. The closest cleanup site listed by the California Department of Toxic Substance Control (CDTSC) is located in Cotati, approximately 28.5 miles away (CDTSC 2008; Google Maps).

Schools and Airports

The closest school is Monte Rio Elementary School, located approximately 4.5 miles northeast of the project site (Google Maps 2008). Sonoma County has one airport, the Charles M. Schultz Airport, which is located over 16 miles to the east of the project area.

Fire Hazards

The California Department of Forestry and Fire Protection (CalFire) has developed methods to assess fire danger throughout California. CalFire bases their zones on estimated fire fuel potential over a 30 to 50-year time horizon based on the probability of a burn and potential vegetation exposure to new construction (CalFire 2007). CalFire has three severity classifications: moderate, high, and very high. The project area is situated within a high fire severity zone that has been designated as a State Responsibility Area (CalFire 2007). Fire protection for the property is available from CalFire's Cazadero station, approximately 5.5 miles from the project area, and the Russian River Fire Protection District, located in Monte Rio, approximately 5 miles from the project area. Additionally, Sonoma Coast State Park is outfitted with fire suppression materials.

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials, substances, or waste into the environment?	☐	☐	☒	☐

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5, and, as a result, create a significant hazard to the public or environment?	☐	☐	☐	☒
e) Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport? If so, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) Be located in the vicinity of a private airstrip? If so, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death from wildland fires, including areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

HAZARDOUS MATERIALS DISCUSSION

a-b) **Less than significant impact**. Construction activities would require the use of powered equipment that use potentially hazardous materials such as fuels, oils, and solvents. These materials are generally contained within vessels engineered for safe storage. Large quantities of these materials would not be stored at or transported to the construction site. Spills, upsets, or other construction-related accidents could result in a release of fuel or other hazardous substances into the environment. **Minimization Measure – Hazmat-1** will keep the potential for adverse impacts from these incidents to a less-than-significant level.

MINIMIZATION MEASURE – HAZMAT-1
• All equipment will be inspected for leaks immediately prior to the start of construction and regularly inspected thereafter until equipment is removed from the project site. • A designated staging area will be identified where equipment refueling may occur. A spill kit will be maintained on-site throughout the duration of the project. • Equipment will be cleaned and repaired (excepting emergency repairs) in the maintenance shop, away from the project site. Any contaminated water, sludge, spill residue, or other hazardous compounds will be disposed of outside park boundaries at a lawfully permitted or authorized destination.

c) No impact. There are no schools in the general vicinity of the project or within one-quarter mile of the proposed project site.

d) **No impact**. The project area is not on a list of hazardous materials sites and is over 24 miles from the nearest listed site (CDTSC 2008).

e-f) **No impact**. The project area is not located within an airport land use plan, within two miles of a public airport, or in the vicinity of a private airstrip.

g) **Less-than-significant impact.** The construction activities associated with the proposed project would block access to Willow Creek Road, however, two alternative routes are available. The following **Minimization Measure – Hazmat-2 Construction Fire Management** will keep the potential for adverse impacts from this project to a less-than-significant level.

MINIMIZATION MEASURE HAZMAT-2
▪ Two alternative routes will be designated by DPR to allow access during construction.

h) **Less-than-significant impact.** The project area contains grasses and shrubs that can become highly combustible during the dry season (June to October). The use of equipment for construction may be in close proximity to vegetation. Improper exhaust systems on equipment and friction between metal and rocks could generate sparks. Due to these uses, there is some risk of accidental wildfire ignition. The following **Minimization Measure – Hazmat-3 Construction Fire Management** will keep the potential for adverse impacts from this project to a less-than-significant level.

MINIMIZATION MEASURE HAZMAT-3
• Prior to the beginning of construction, DPR will develop a Project Fire Safety Plan. The Plan will include emergency calling procedures to dispatch the Monte Rio Fire Protection District. All employees working on site will receive safety trainings regarding these procedures. • Spark arrestors will be required for all motorized equipment. • Construction crews will be required to park vehicles away from flammable material such as dry grasses and brush. • DPR staff will be required to have a State Park radio on site, which allows direct contact to a centralized dispatch, CalFire, or Russian River Fire Protection District.

3.9 Hydrology and Water Quality

ENVIRONMENTAL SETTING

Willow Creek flows from an 8.7-square mile watershed into the Russian River. The watershed area at the 2nd bridge crossing is approximately 8.2 square miles. The stream flows in a northwest trending valley between two steep ridges of the Coast Range, and watershed elevations range from 0 feet at the confluence to 1,481 feet at Koerber Peak.

Streamflow patterns in Willow Creek are typical of small coastal watersheds in temperate climates. Peak flows are flashy and occur during large winter storms, usually in December through March. Between storms, subsurface runoff produces a raised winter base-flow from November through April. During the summer dry season (April through October/November), streamflow fed by springs and groundwater steadily decreases. In late summer, flow often becomes intermittent, and pools become disconnected.

The flows of interest in this project are the channel-forming and maintenance flows and the daily averaged base flows that are sustained during the fish migration period. Table 4 presents the discharges used in this study to assess channel capacity and flooding potential at the project site under existing and proposed project conditions. These discharges were used to evaluate the hydraulic conveyance capacity of the existing (Figure 4) and design conditions at the 2nd bridge crossing.

Table 4. Flood Flow Rates Used for Hydraulic Analysis at the Project Site

Willow Creek Flood Recurrence Interval (years)	Q2	Q5	Q10	Q25	Q50	Q100
Discharge (cfs)	730	1110	1450	1815	2200	2460

Hydraulic analyses of the existing site conditions indicate that the culverts and road are overtopped when flows are in the range of 200-250 cubic feet per second (cfs), which corresponds to a water surface elevation of 16.9 feet on the upstream side of the culverts, assuming the culverts are in a clean condition. Most of the culverts contain a residual amount of sediment, and the inlets are partially occluded with vegetation and debris, causing the culverts to overtop when flow is less than 200 cfs. In general, the road has a tendency to be overtopped at the culverts at least once each year.

Based on the results from the hydraulic analyses, the proposed bridge crossing and approaches will allow all Willow Creek flood flows less than Q100 to be contained within the new channel crossing (Figure 5).

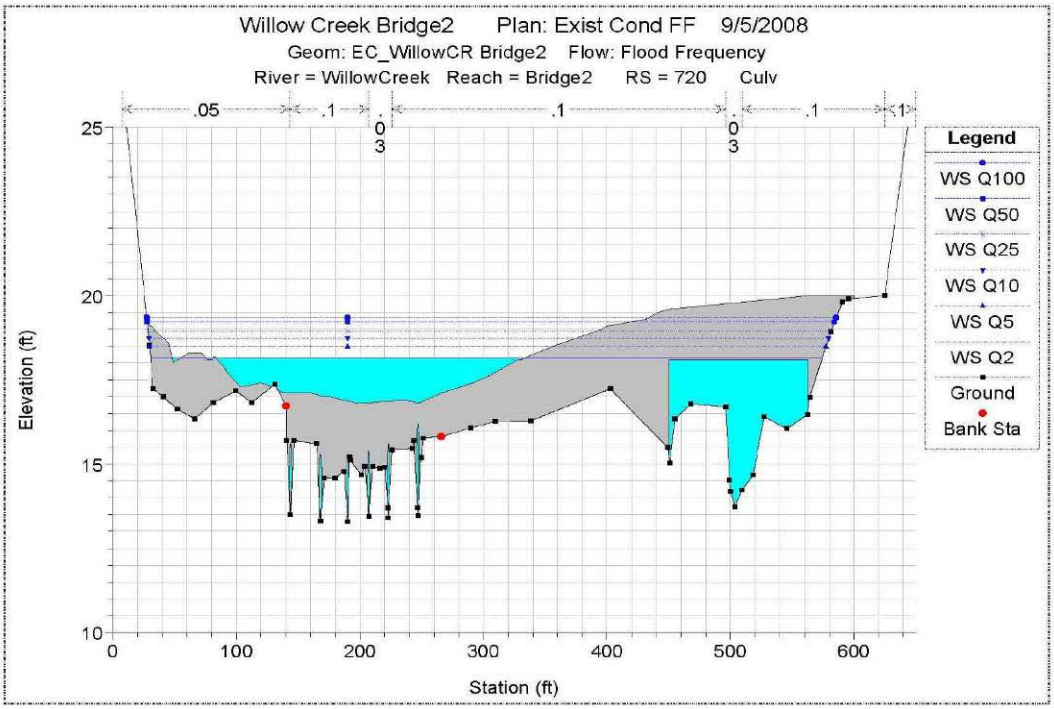


Figure 4. Hydraulic Model Results of Existing Conditions at 2nd Bridge Crossing
View is looking downstream at the road (dark grey is the road fill). *Note that all flood flows overtop the road at the culverts on left side of the image.*

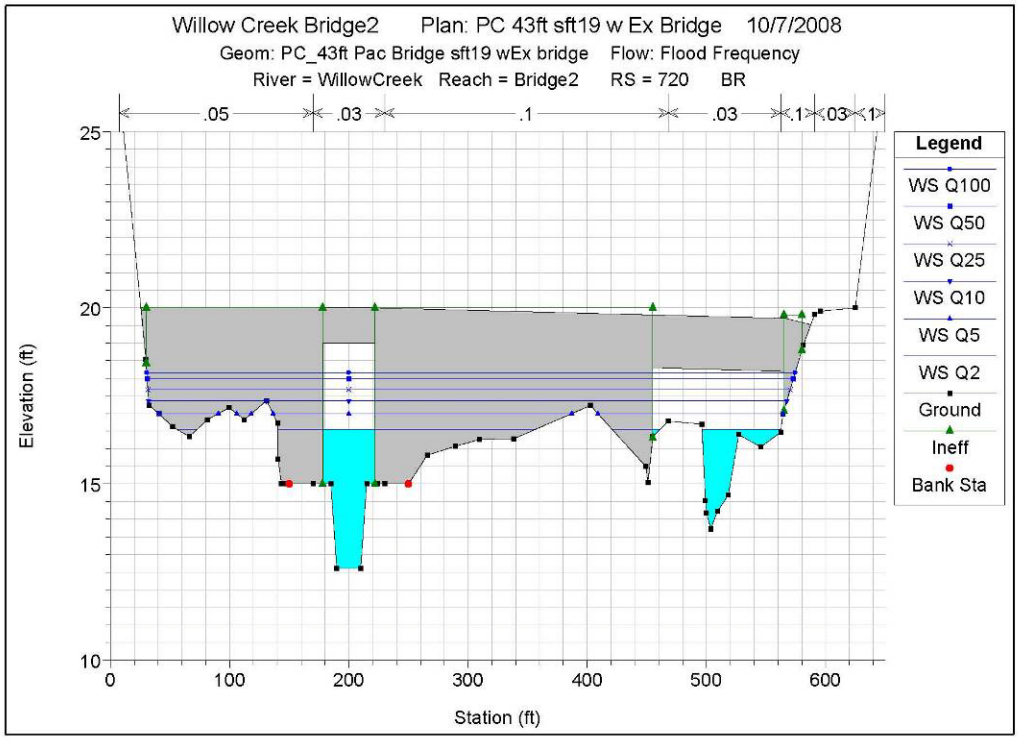


Figure 5. Hydraulic Model Results of Preferred Structure at 2nd Bridge Crossing
View is looking downstream at the road (dark grey is the road fill).

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner which would result in substantial on- or off-site erosion or siltation?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding?	☐	☐	☐	☒
e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or other flood hazard delineation map?	☐	☐	☐	☒
h) Place structures that would impede or redirect flood flows within a 100-year flood hazard area?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury, or death from flooding, including flooding resulting from the failure of a levee or dam?	☐	☐	☐	☒
j) Result in inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

HYDROLOGY & WATER QUALITY DISCUSSION

a) **Less than significant impact.** All project work will receive Clean Water Act §401 Certification from the North Coast Regional Water Quality Control Board that will include conditions to protect water quality standards.

b) **No impact.** The project will not substantially deplete groundwater supplies or interfere substantially with groundwater recharge.

c) **Less than significant impact.** All project work will receive Clean Water Act §401 Certification from the North Coast Regional Water Quality Control Board that will include conditions to protect water quality standards

d) **No impact.** Most of the existing culverts contain a residual amount of sediment, and the inlets are partially occluded with vegetation and debris, causing the culverts to overtop when flow is less than 200 cfs. Replacing the culvert system with a single-span, precast concrete bridge will allow for natural stream flow and sediment deposition.

e) **No impact.** The project would not substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial on- or off- site erosion or siltation. Replacement of the in-stream culverts with a free-span bridge will reestablish historic drainage patterns at the project site and allow natural channel development and maintenance to occur. Road drainage patterns from the hillside to the wetlands would not be altered.

f) **Less-than significant impact.** The project will have no long-term impacts on water quality. The following **Minimization Measure – Hydro-3** will keep the potential for adverse impacts from this project to a less-than-significant level.

MINIMIZATION MEASURE HYDRO-1
• If the excavation sites must be dewatered, the water will be discharged in a manner that will cause no substantial increase in stream turbidity or discharge of fine sediment to the stream channel. • All appropriate BMPs will be implemented as needed to ensure that there is no discharge of fine sediment, concrete, concrete wash water, or roiled water to the creek. • Building materials and/or construction equipment will not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation. • Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from project related activities that could be hazardous to aquatic life will be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials placed within or where they may enter a stream or lake will be removed immediately. • All debris and waste will be picked up daily and properly disposed of at an appropriate site.

Specific BMPs that may be implemented during construction to minimize impacts to the water quality of Willow Creek include (Caltrans 2003; CSQA 2003):

- Water Conservation Practices (NS-1)
- Dewatering Operations (NS-2)
- Paving and Grinding Operations (NS-3)
- Illicit Connection/Discharge (NS-6)
- Vehicle and Equipment Cleaning (NS-8)
- Vehicle and Equipment Fueling (NS-9)
- Vehicle and Equipment Maintenance (NS-10)
- Pile Driving Operations (NS-11)
- Concrete Curing (NS-12)
- Concrete Finishing (NS-13)
- Demolition Adjacent to Water (NS-15)
- Material Delivery and Storage (MW-1)
- Stockpile Management (WM-3)
- Spill Prevention and Control (WM-4)
- Solid Waste Management (WM-5)
- Contaminated Soil Management (WM-7)
- Concrete Waste Management (WM-8)
- Sanitary/Septic Waste Management (WM-9)

g) **No impact.** The project does not involve housing.

h) **Less-than-significant impact.** The new bridge is within the 100-year flood zone but is designed to allow, not impede or redirect flood flows. The existing culvert system will be replaced with a single-span, precast concrete bridge that will have significantly more conveyance capacity than the existing culverts.

i) **No impact.** The project will not expose people or structures to a significant risk of loss, injury, or death from flooding, including flooding from the failure of a levee or dam.

j) **No impact.** The project will not result in inundation by seiche, tsunami, or mudflow.

3.10 Land Use and Planning

ENVIRONMENTAL SETTING

The project will occur on Willow Creek Road, in a rural area of the Sonoma Coast, 2 miles upstream of the river's mouth at Jenner; see Figure 1 for Project Location Map. Located on the western edge of the Coast Range, Willow Creek flows in a northwesterly direction following an inactive fault trace. Most of its watershed is part of the 10,286-acre Sonoma Coast State Park.

The project area is the 2nd Willow Creek Road crossing of the channel where the road berm and buried culverts block passage for resident and migratory aquatic species, including listed salmonids. The road is owned and marginally maintained by the Sonoma County Department of Transportation and Public Works. It leads to state park facilities and the upper watershed, but the road currently is closed to through traffic to Occidental to the east.

The project site is located on Assessor's Parcel Numbers 097-160-003, 097-160-002, 099-070-006, and 099-070-010. The current land use and zoning designations are Public Quasi Public - PQP with Coastal combining zone as well as various combining districts. The following combining districts are applicable to the project site. Their provisions govern the management, activities and facilities at the site (Sonoma County):

- Biotic Resources Combining District
- Floodplain 1 Combining District
- Floodplain 2 Combining District

Land uses on the adjacent parcels (surrounded by Sonoma Coast State Park) are public parklands. Beyond the park boundaries, adjacent uses include scattered residential, agriculture, and timber to the north (David Ranch, Jenner Headlands); timber to the east (Mendocino Redwood Company); timber and agriculture to the east (Poindexter Ranch, Mendocino Redwood Company); and the Pacific Ocean to the west. Land use designations and zoning in the area are consistent with current uses on surrounding lands. These zoning designations are: Public Facilities (PF) on parklands, Land Extensive Agriculture (LEA160/640 with Coastal combining district) on agricultural lands, and Rural Residential (RRD160/640) on scattered residential and timber lands.

Pertinent Planning Documents

Sonoma County General Plan and Local Coastal Plan

The county's General Plan and Local Coastal Plan contain the following combining districts: Biotic Resources on the Willow Creek property, Willow Creek as a Floodplain 1, and Floodplain 2.

In addition to land use and zoning, the Local Coastal Plan (LCP) contains policies and guidelines for implementing the California Coastal Act with respect to public access, recreation, environmental resources, natural resources, transportation, and development (Sonoma County 2001b).

Sonoma Coast State Park General Plan

A Sonoma Coast State Park General Plan and Final Environmental Impact Report (General Plan/EIR) was approved in May 2007. This Plan identifies existing conditions, needs, and issues at the park unit and makes management recommendations for responding to those needs and issues.

The project is consistent with the *Sonoma Coast State Park General Plan* (DPR 2007b), which contains the following vision statement: "The integrity of natural ecosystems may be protected by the control of exotic species, if necessary, and by habitat restoration where appropriate and feasible." This restoration action is designed in accordance with the guiding principle of preservation, support, or reestablishment of physical and biological processes. This action implements the following specific guidelines from the General Plan:

- Guideline FAC-1F: Design culverts placed beneath roads and trails to accommodate 100-year storm and fish passage.
- Guideline FAC-1M: Conduct project-specific geotechnical evaluations prior to preparation of final plans for development on sites that would subject property or persons to significant risks from geologic hazards. Site mitigation, if necessary, shall conform to the recommendations in the geotechnical evaluations.
- Guideline INLAND-2B: Support and implement the Willow Creek Watershed Management Plan in a manner that is consistent with this General Plan.
- Guideline NAT-1D: When implementing habitat restoration projects and landscaping around facilities, use native species that are appropriate to the site and that are obtained from native plant species within Sonoma Coast SP boundaries or from within 5 miles of Sonoma Coast SP. This includes transplanted cuttings and rootstocks or seedlings and saplings grown from collected seed that are genetically compatible. Ensure that all mulches are free of foreign seed.
- Guideline NAT-2H: Remove barriers to fish passage where feasible to provide habitat linkages to existing resources within the Sonoma Coast SP.

Coastal Commission Strategic Plan

The Coastal Commission Strategic Plan (CCC 1997) calls for protecting and restoring streams, wetlands, riparian corridors, and environmentally sensitive terrestrial habitat areas, including habitats of rare or endangered organisms, such as salmonids. The proposed project will enhance the ecological health of stream, wetland, and riparian habitats and is consistent with the strategic vision of the California Coastal Commission.

Other Conservation Plans

The *Willow Creek Watershed Management Plan* (PCI 2005b), the Department of Fish and Game's 2002 Draft Russian River Basin Fisheries Restoration Plan (CDFG 2002), and the unpublished 2008 Draft NOAA National Marine Fisheries Service's Recovery Plan for the Evolutionary Significant Unit of Central California Coast Coho Salmon (NMFS 2008) list the removal of the fish barrier at the 2nd crossing as a high priority project for the restoration of anadromous fisheries.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with the applicable land use plan, policy, or regulation of any agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

LAND USE AND PLANNING DISCUSSION

a) **No impact.** Willow Creek Road was closed at the top of the watershed between the coast and Occidental by Sonoma County in 2007 due to health and safety issues. Currently, residents of the upper watershed may either go east through Occidental or south along Joy Road to Highway 12. While the construction will temporarily prevent the general public from driving from the coast to the upper watershed, work will occur after peak tourist season, and there will be no long-term effects on public access. Private residents and park employees may use alternative, gated roads to access the upper watershed from either upper Willow Creek Road or from Freezeout Creek.

b) **No impact.** This project is consistent with the Sonoma County General Plan, the Local Coastal Program, the General Plan for Sonoma Coast State Park and other local conservation plans.

c) **No impact.** No habitat conservation plan or natural community conservation plan is currently in place for the area.

3.11 Mineral Resources

ENVIRONMENTAL SETTING

Mineral resource extraction is not permitted under the Resource Management Directives of DPR.

All construction activities associated with the project will take place within the boundaries of Sonoma Coast State Park, Sonoma County.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Result in the loss of availability of a known mineral resource that is or would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

MINERAL RESOURCES DISCUSSION

a) No impact. The project will not result in the loss of availability of known minerals because extraction is not permitted under DPR's Resource Management Directives; no known mineral resources exist within the project area.

b) No impact. No loss of availability of locally important mineral resource recovery sites will occur because none are known to exist within the project area.

3.12 Noise

ENVIRONMENTAL SETTING

The Willow Creek property is located in a very sparsely populated area in Sonoma Coast State Park. Vehicle traffic from Willow Creek Road, a 1.5-lane, rural county road is the primary source of noise in the area. Common noises heard at the proposed project site include birds, wind in the trees, and flowing water from the Willow Creek.

Table 5. Construction Equipment Noise at 50 Feet

Equipment	Noise Level at 50 Feet
Earthmoving	**dB**
Front Loaders	75-79
Backhoes	75-85
Dozers	75-80
Tractors	75-80
Graders	75-85
Pavers	80-89
Pile Driver	82-105
Material handling	
Concrete Mixers	75-85
Crane	75-83
Concrete Crushers	75-85
Stationary	
Pumps	75-76
Generator	75-78
Compressors	75-81
Other	
Saws	75-78
Vibrators	75-76

Source: U.S. EPA

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects from noise, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain activities.

Noise is commonly described in “Ldn,” which expresses average sound level over a 24-hour period in decibels (dB), the standard measure of pressure exerted by sound. Ldn includes a 10dB penalty for sounds between 10 pm and 7 am when background noise is lower and people are most sensitive to noise. Because decibels are logarithmic units of measure, a change of 3dB is hardly noticeable, while a change of 5dB is quite noticeable, and an increase of 10dB is perceived as a doubling of the noise level. A change from 50dB to 60dB increases the percentage of the population that is highly annoyed at the noise source by about 7 percent, while an increase from 50dB to 70dB increases the annoyed population by about 25 percent. Sounds as faint as 10dB are barely audible, while noise over 120dB can be painful or damaging to hearing.

The Sonoma County General Plan provides standards for exterior noise levels. For non-transportation noise sources, such as this project, the daytime (7 am to 10 pm) noise level standard is 50dB. The nighttime standard is 45dB.

The project site will not be accessible to the public during construction. Adjacent land uses include recreational activities, timber, and scattered residential. Project construction is anticipated to use equipment with noise levels similar to those listed in the Table 5.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Generate or expose people to noise levels in excess of standards established in a local general plan or noise ordinance, or in other applicable local, state, or federal standards?	☐	☐	☒	☐
b) Generate or expose people to excessive groundborne vibrations or groundborne noise levels?	☐	☐	☒	☐
c) Create a substantial permanent increase in ambient noise levels in the vicinity of the project (above levels without the project)?	☐	☐	☐	☒
d) Create a substantial temporary or periodic increase in ambient noise levels in the vicinity of the project, in excess of noise levels existing without the project?	☐	☐	☒	☐
e) Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport? If so, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) Be in the vicinity of a private airstrip? If so, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

NOISE DISCUSSION

a) Less-than-significant impact. As noted above, for non-transportation noise sources, the County daytime (7 am to 10 pm) noise level standard is 50dB. The construction site will not be open to the public during construction. The nearest residence is less than 1 mile away from the project site and nearby recreation sites exist. Although no impacts on these potential receptors are expected, integration of **Minimization Measure Noise-1** into construction plans will reduce temporarily increased noise to a less-than-significant level. Measures to minimize impacts to wildlife, including bats and breeding birds are included.

MINIMIZATION MEASURE NOISE-1
• Construction activities will be limited to the daylight hours between Monday and Friday; however, weekend work could be implemented to accelerate construction or address emergency or unforeseen circumstances. If weekend work is necessary, no work will occur on Saturday or Sunday before 8 am or after 7 pm. • Internal combustion engines used for any purpose at the job site will be equipped with a muffler of a type recommended by the manufacturer. • Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., engine enclosures, acoustically-attenuating shields, or shrouds, intake silencers, ducts, etc.) whenever feasible and necessary.

- To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. Construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.
- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- Should work occur during the breeding season a qualified biologist will survey the area to ensure that no nesting activity is occurring in the project area. Should nesting activity be observed the area will be avoided until nesting birds have fledged.

b) **Less-than-significant impact.** Construction activity would involve the use of an impact hammer and pile driving or other intensive construction techniques that could generate significant ground vibration or noise. The property will not be open to the public during construction. The nearest residence is less than 1 mile away from the project site and nearby recreation sites exist. Although no impacts to these potential receptors are expected, integration of **Minimization Measure Noise-1** into construction plans will reduce temporarily increased noise to a less-than-significant level.

c) No impact. Upon completion of the proposed project, construction-related noise would cease. Nothing within the scope of the proposed project would result in a substantial permanent increase in ambient noise levels.

d) **Less-than-significant impact.** Construction activities utilizing heavy and motorized equipment would result in a temporary increase in ambient noise levels. This would occur only during the initial construction of proposed facilities. The application of **Minimization Measure Noise-1** will ensure that ambient noise remains at a less-than-significant level.

e-f) **No impact.** There is one Public General Aviation Airport located within Sonoma County, the Sonoma County Airport in northern Santa Rosa. The airport is more than 23 miles from the project site. This project is not located within an airport land use plan, within two miles of a public airport, or in the vicinity of a private airstrip.

3.13 Population and Housing

ENVIRONMENTAL SETTING

Between 2000-2008, the County's population grew at a rate of 4.7%, and the County's population reached 484,470 in 2008 with the largest contribution to growth in the City of Santa Rosa (Sonoma County 2008a). According to the Sonoma County General Plan 2020 housing element, housing development has not kept pace with population growth, creating intensified need for housing (Sonoma County 2008b). However, the project area is designated as public or quasi-public land and is, therefore, not identified as a potential development area in the County General Plan. The Sonoma Coast State Park General Plan (DPR 2007) outlines planned improvements, including expansion of the existing Willow Creek Maintenance Yard. The EIR states that development of the park, including upgrades to roads, parking, existing campgrounds, and the visitor center, will not generate a significant need for housing.

The 2nd bridge crossing currently serves as access to a DPR maintenance facility, four private residences, and Pomo Campground. The potential impact of the project on visitation to Pomo Campground is evaluated in Section XV: Recreation. The project will create improvements in the road that may facilitate winter access to the existing maintenance area and private residences during flood events by changing the base elevation of the road. However, the residences and the maintenance yard can also be accessed by other roads.

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

POPULATION AND HOUSING DISCUSSION

a) **No impact.** The project will be conducted within the existing footprint of an existing road. It will not affect the use of the existing road except during extreme storm events. During these events, residents and Park staff that need to move in and out of the area can already do so by existing roads but the main road may be more convenient after project implementation. This small change in road use will not induce any population growth either directly or indirectly.

b) **No impact.** In the long term, the project will not substantially alter use of the road or access to existing houses. No housing will be displaced by the project.

c) **No Impact**. The project will not displace people, even during construction, because residents will be able to use existing alternate access routes exist.

3.14 Public Services

ENVIRONMENTAL SETTING

The 2nd bridge currently serves as access to a state park maintenance facility, residences, and a Pomo Campground. The entire area surrounding the road is state park. No police or fire facilities, schools, or other public facilities are present in the area.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Result in significant environmental impacts from construction associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:	☐	☐	☐	☒
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

PUBLIC SERVICES DISCUSSION

a) **No impact.** The replacement of the existing culvert system with a precast concrete bridge will not affect public services within the area, and implementation will not result in the need for new or physically altered government facilities. The road will continue to provide reasonable access by emergency and service vehicles. It is anticipated that the road will experience a decrease in overtopping during storm events to some extent, allowing an increase in access for emergency vehicles.

3.15 Recreation

ENVIRONMENTAL SETTING

Willow Creek Road is used for both active and passive recreation. The road is a popular but undesignated bikeway from Bridgehaven in the western part of the watershed to Willow Creek's headwaters above Occidental. It is also used as a hiking path and provides bird watching opportunities and access to two environmental campgrounds as well as various trails. Within Sonoma Coast State Park, ranch roads and trails provide for hiking, horseback riding, and mountain biking. DPR's mission is to "provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation" (DPR 2007b).

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

RECREATION DISCUSSION

a) **No impact.** One of the major concerns of the TAC in approving the Willow Creek 2nd bridge area improvements was to maintain the current character of the park. Because Pomo Environmental Campground is up the road from the project site, concern was expressed that major road improvements would increase visitation to the campground, thus overtaxing the facilities and causing physical deterioration. To prevent this, one of the design constraints for the project was to maintain the character of the road and its current carrying capacity. The project was designed to maintain the existing road width. Summer driving conditions will be substantially unaltered. The project will provide a road that is less susceptible to flooding at the project site, but this is unlikely to increase campground use as the improved conditions will only apply during the worst weather of the year when Pomo Environmental Campground is closed (Nov. 1 through March 31).

b) **No impact.** The General Plan for Sonoma Coast State Park requires any development and improvement of bikeways to be done in collaboration with the County and/or Caltrans (DPR 2007a). While implementation of this project will result in a smoother surface for a short distance in the area of the 2nd crossing, it is not the intent of this project to result in the development or improvement of recreational facilities.

3.16 Transportation and Traffic

ENVIRONMENTAL SETTING

The project will occur on Willow Creek Road downstream of Pomo Environmental Campground and adjacent to the road to the park maintenance facility. There are a few homes at the base of the road near Highway 1. In addition to local traffic, Willow Creek Road provides access to the park and four residences.

WOULD THE PROJECT:	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
a) Cause a substantial increase in traffic, in relation to existing traffic and the capacity of the street system (i.e., a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☒
b) Exceed, individually or cumulatively, the level of service standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Cause a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	☐	☐	☐	☒
d) Contain a design feature (e.g., sharp curves or a dangerous intersection) or incompatible uses (e.g., farm equipment) that would substantially increase hazards?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

TRANSPORTATION AND TRAFFIC DISCUSSION

a) **No Impact.** Construction activities would not likely result in a significant increase in traffic levels. No long-term increase in traffic will occur as a result of the culvert replacement. Equipment and materials will be delivered to the site, and workers will drive to and from the work area during the week. Increased traffic on Highways 1 and 116 will be insignificant compared to the existing traffic load. Construction-related traffic on lower Willow Creek Road itself would result in insignificant delays to residents because construction vehicles would not need to stop in the residential area.

b) Less than significant Impact. In assessing traffic impacts, current and potential future conditions are described by the level of service (LOS), which represents the speed and travel time, traffic interruptions, predictability of flow, and freedom to maneuver for a particular road. LOS A represents virtually free-flow conditions, with unrestricted ability to maneuver. Levels B, C, D, E, and F represent decreasing flow rates with correspondingly more interference from other vehicles in the traffic stream. Both Highway 1 and Highway 116 typically operate at LOS A, except on the busiest holiday weekends. Willow Creek Road has no LOS designation due to its low usage (less than 400 vehicles per day). The project will maintain the existing character of the road. However, Willow Creek Road would need to be completely closed during working hours in the project area for a period of approximately 3 months. Two alternative routes will be provided for staff, residents, and emergency response vehicles. Peak visitation to Pomo Environmental Campground is during the summer months. Project construction will be scheduled after Labor Day to reduce impacts to a level of insignificance.

MINIMIZATION MEASURE TRAFFIC-1
▪ Project construction will be scheduled after Labor Day. ▪ Signage will be provided to redirect traffic at logical turnaround areas in advance of the construction zone.

c) **No impact.** The project area is not located within an airport land use plan, within two miles of a public airport, or in the vicinity of a private air strip.

d) **No impact.** The road will remain in the same place with no changes to public access. The turn from the new bridge area toward Pomo Environmental Campground will be similar to existing conditions but slightly further south. The entry into the State Parks' maintenance road from Pomo Environmental Campground will be less sharp and, therefore, easier for the large maintenance trucks.

e) **Less-than-significant impact.** Although the road will be closed to through traffic during construction activities, there are two alternative routes that will be available for staff, residents, and emergency vehicles. These routes will generally increase trip time, but in some circumstances may decrease trip time depending upon the departure location.

MINIMIZATION MEASURE TRAFFIC-2
▪ Two alternate routes will be designated by DPR to allow access during construction.

f) **No impact.** The project will not eliminate any parking spaces and will add a few spaces in the grassy area at the corner with the maintenance road.

g) **No impact.** The only form of alternative transportation available on Willow Creek Road is use of bicycles. The project will not change bicycle access except as noted for car access in b) above.

3.17 Utilities and Service Systems

ENVIRONMENTAL SETTING

Currently, the existing roadway across the valley floor and floodplain at the 2nd bridge crossing acts as a low-head dam, trapping stream flow and sediment and restricting fish passage upstream and downstream during spring and winter base-flow conditions. The 24-inch culverts at the west end of the valley crossing are often blocked with debris during annual high flows.

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
a) Exceed wastewater treatment restrictions or standards of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities?			☐ Yes	☒ No
Would the construction of these facilities cause significant environmental effects?	☐	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities?			☐ Yes	☒ No
Would the construction of these facilities cause significant environmental effects?	☐	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination, by the wastewater treatment provider that serves or may serve the project, that it has adequate capacity to service the project's anticipated demand, in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes, and regulations as they relate to solid waste?	☐	☐	☐	☒

UTILITIES AND SERVICE SYSTEMS DISCUSSION

a) **No impact.** The project will not result in the discharge of wastewater.

b) **No impact.** The project will not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities.

c) **No impact.** The project will not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities.

d) **No impact.** The project will not require expanded entitlements.

e) **No impact.** The project will not result in an increase of wastewater discharge.

f) **No impact.** Asphalt, concrete, and metal will be recycled at local facilities. If the project results in cuts that cannot be reused as fill, the excess spoils will be placed at a maximum 3:1 slope on the hillside at a nearby borrow site. The spoils will be covered in erosion control fabric, staked to promote stability, and planted with native vegetation in accordance with the specific BMPs listed in Section VI. Geology, Soils, and Hazards.

g) No impact. The project will comply with all federal, state, and local statutes and regulations as they relate to solid waste.

4 MANDATORY FINDINGS OF SIGNIFICANCE

	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
WOULD THE PROJECT:				
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?	☐	☐	☐	☒
b) Have the potential to eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
c) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means the incremental effects of a project are considerable when viewed in connection with the effects of past projects, other current projects, and probably future projects?)	☐	☐	☐	☒
d) Have environmental effects that will cause substantial adverse effects on humans, either directly or indirectly?	☐	☐	☐	☒

MANDATORY FINDINGS OF SIGNIFICANCE DISCUSSION

a) **Less than significant impact.** The project will result in improvement of the local environment by creating fish passage, restoring the natural hydrologic and geomorphic processes of Willow Creek, and improving aquatic and floodplain habitat. It will not restrict the range of any species. While narrow slices of wetland habitat will be eliminated along the edge of the road at the bridge approach, it is an insignificant portion of the total wetland in the area. Further, it will not reduce the number or restrict the range of any rare or endangered plants or animals. Construction related mitigation and minimization measures have been included in the project to reduce impacts to less than significant.

b) **No impact.** The project will occur within the existing footprint of Willow Creek Road. A preconstruction training will acquaint construction crew members with articles to avoid and measures to take in the unlikely event that artifacts are discovered. There are no known examples of California history or prehistory at the project site.

c) **No impact.** The project does not pose any cumulative impacts in conjunction with past, current, and future projects. As outlined in the *Willow Creek Watershed Management Plan* (PCI 2005b), the 2nd Bridge Area Fish Passage Project is part of a multifaceted watershed management plan that has been developed through a cooperative effort with a Technical Advisory Committee and other stakeholders, including the public.

d) **No impact.** Creating fish passage and restoring the hydrologic and geomorphic processes of Willow Creek will neither directly nor indirectly cause substantial adverse effects on humans.

5 SUMMARY OF CONDITIONS AND MITIGATION MEASURES

The following conditions and mitigation measures will be implemented by State Parks as part of the Willow Creek Road 2nd Bridge Area Fish Passage Project at Sonoma Coast State Park:

AESTHETICS

No mitigation measures necessary.

AGRICULTURAL RESOURCES

No mitigation measures necessary.

AIR QUALITY

MINIMIZATION MEASURE AIR-1

- All construction areas (dirt/gravel roads and surrounding dirt/gravel area) will be watered at least twice daily during dry, dusty conditions.
- All trucks hauling soil, sand, or other loose materials on public roads will be covered or required to maintain at least two feet of freeboard.
- All construction-related equipment engines will be maintained in good condition, in proper tune (according to manufacturer's specifications), and in compliance with all State and federal requirements.
- Earth or other material that has been transported onto paved roadways by trucks, construction equipment, erosion, or other project-related activity will be promptly removed.

BIOLOGICAL RESOURCES

MINIMIZATION MEASURE BIO-1

- If water is present during any part of project activities, and dewatering is deemed necessary, a dewatering and species protection plan will be developed by the project's biologist. The plan will be developed and implemented as described in the Biological Resources Evaluation recommendations (PCI 2008) by a qualified and permitted biologist. See Appendix E.
- To avoid impacts on aquatic and terrestrial species within the immediate work area, prior to disturbance of the stream channel and removal of vegetation, a qualified biologist will conduct a preconstruction survey to ensure no special-status species are occupying the site. If special-status species are observed within the project site or immediate surroundings, these areas will be avoided until the animal(s) has (have) vacated the area, and/or the animal(s) have been relocated out of the project area by a qualified biologist, upon approval by the regulatory agencies. In addition, the site will be surveyed periodically during construction to ensure that no special-status species are being impacted by construction activities. The biologist will also monitor to ensure water quality standards are being met and sediment and/or debris are not entering downstream aquatic habitats.
- To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. In addition, construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.

- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- To avoid potential impacts on special-status plants, a focused botanical survey will be completed during the appropriate blooming period for the above-mentioned species. If special-status plants are found occupying the site, avoidance measures will be in place during construction to minimize disturbance (e.g., temporary construction fencing around existing populations).
- If impacts to special status plants are unavoidable, appropriate mitigation measures will be implemented (e.g., seed collection and revegetation). Replacement to disturbance will occur at a 4:1 ratio.
- To avoid impacts to Myrtle's silverspot butterflies and their host plants, the following measures will be taken. Prior to construction, butterflies surveys will be completed within the project area to determine if adults or larvae are present. If adult or larvae are found to be present, additional protection measures may be necessary, and further consultation with U.S. Fish and Wildlife Service will be required. If not found, the following protection measures will be implemented. Existing populations of larval host plants [western dog violet (*Viola adunca*)] will be avoided, as feasible. Plants will be protected through the installation of temporary fencing around all known plants and these areas avoided. If western dog violets are found to be present within the area of impact, they will be transplanted to appropriate habitat off-site. As feasible, adult nectar plants [e.g., coyote mint (*Monardella villosa*), bull thistle (*Cirsium vulgare*)], will be flagged and avoided during construction.
- The project biologist will conduct a preconstruction training session for construction crew members. The training will include a discussion of the sensitive biological resources within the project area and the potential presence of special-status species, special-status species' habitats, protection measures to ensure species are not impacted by project activities, and project boundaries.

MINIMIZATION MEASURE BIO-2

- Hand labor will be used to control exotic and unwanted vegetation. The use of chemical agents and mechanical equipment within the stream channel will be avoided.
- Proper erosion control and other water quality BMPs will be implemented to avoid sedimentation and disturbance into downstream and adjacent aquatic habitats. Work in aquatic habitats will be scheduled to occur during the dry season, with work up on the elevated road surfaces scheduled toward the end of construction when rainfall becomes more probable. When work in wetted areas is necessary, they will be dewatered as described above. An erosion and sediment control plan will be developed and implemented for the project.
- Temporary wildlife exclusionary and tree protection fencing will be installed around the work area in sensitive wetland and riparian habitats to preclude animals from entering the work site once construction has commenced (following the preconstruction survey) and to protect riparian trees during construction activities.
- During vegetation removal, large trees with extensive canopy will be maintained, as feasible, to preserve the existing cover over the stream channel.

MITIGATION MEASURE BIO-3

- Net wetland loss (0.035 acres) will be compensated by wetland restoration elsewhere in the park at a 4:1 ratio through reconnection and enhancement of the old grist mill spring with the Willow Creek floodplain, which provides good quality existing wetland habitat 0.5 mile upstream of the project area.

CULTURAL RESOURCES

MINIMIZATION MEASURE CULT-1

- A preconstruction meeting will be held to acquaint project personnel with the possibility of encountering sensitive cultural resources. Prehistoric resources may include chert or obsidian flakes, projectile points, mortars, and pestles; dark friable soil containing shell and bone dietary debris; heat-affected rock; or human burials. Historic resources may include stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, often in old wells and privies.
- In the event that previously undocumented cultural resources (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic trash) are encountered during project construction by anyone, the state representative will temporarily halt at that specific location and direct contractors to other project-related tasks. A DPR-qualified archaeologist will record and evaluate the find and work with state representative to implement avoidance, preservation, or recovery measures as appropriate prior to any work resuming at that specific location.
- If the DPR-qualified archaeologist determines that the find(s) are significant, a qualified historian, archaeologist, and/or Native American representative (if appropriate) will monitor all subsurface work including trenching, grading, and excavations in that area. If it is determined, the find indicates a sacred or religious site. Formal consultation with appropriate representatives will occur as necessary.
- In the event that human remains are discovered, work will cease immediately in the area of the find and the project manager/site supervisor will notify the appropriate DPR personnel. Any human remains and/or funerary objects will be left in place. The DPR Sector Superintendent (or authorized representative) will notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (NAHC) will be notified within 24 hours of the discovery if the Coroner determines that the remains are Native American. The NAHC will designate the “Most Likely Descendent” (MLD) of the deceased Native American. The MLD will recommend an appropriate disposition of the remains. If a Native American monitor is on-site at the time of the discovery and that person has been designated the MLD by the NAHC, the monitor will make the recommendation of the appropriate disposition.

GEOLOGY, SOILS, AND HAZARDS

MINIMIZATION MEASURE GEO-1

- Project design will take into account the following geotechnical considerations: weak surface soils to about 2 feet below the existing road, compressible soils to depths of 45 to 48 feet, potentially liquefiable soils, and predicted strong seismic shaking.
- Topsoils containing organic matter will be removed and stockpiled for reuse in landscaping.
- Weak soils will be removed and replaced with engineered fill.

- Fill will be free of organic material, have low expansion potential, and conform to the specifications in the geotechnical report; see Appendix C.
- Seismic design will use Site Class E and all specified seismic design criteria from the geotechnical report.

MINIMIZATION MEASURE GEO-2

- The new bridge will be built on driven piles. The piles will be either 12-inch square precast concrete or 16-inch diameter steel pipe. If other pilings are used, the geotechnical consultants will be contacted for additional design specifications.
- Contractor will adhere to all specifications in the geotechnical report and will contact the geotechnical engineer prior to pile driving to obtain driving criteria based upon the hammer to be used.
- Geotechnical engineers will review project plans and specifications to determine consistency with the geotechnical recommendations.
- A preconstruction meeting will occur between the geotechnical engineer, general contractor, subcontractors, civil engineer, and other members of the design team to address design issues, clarify procedures, and construction coordination.
- Critical construction steps, such as site excavation, fill compaction, and foundation installation, will be monitored by the geotechnical consultants.

HAZARDOUS MATERIALS

MINIMIZATION MEASURE HAZMAT-1

- All equipment will be inspected for leaks immediately prior to the start of construction, and regularly inspected thereafter until equipment is removed from the project site.
- A designated staging area will be identified where equipment refueling may occur. A spill kit will be maintained on-site throughout the duration of the project.
- Equipment will be cleaned and repaired (excepting emergency repairs) in the maintenance shop, away from the project site. Any contaminated water, sludge, spill residue, or other hazardous compounds will be disposed of outside park boundaries at a lawfully permitted or authorized destination.

MINIMIZATION MEASURE HAZMAT-2

- Two alternative routes will be designated by State Parks to allow access during construction.

MINIMIZATION MEASURE HAZMAT-3

- Prior to the beginning of construction, DPR will develop a Project Fire Safety Plan. The Plan will include emergency calling procedures to dispatch the Monte Rio Fire Protection District. All employees working on site will receive safety trainings regarding these procedures.
- Spark arrestors will be required for all motorized equipment.
- Construction crews will be required to park vehicles away from flammable material such as dry grasses and brush.
- DPR staff will be required to have a State Park radio on site, which allows direct contact to a centralized dispatch, CalFire or Russian River Fire Protection District.

HYDROLOGY AND WATER QUALITY

MINIMIZATION MEASURE HYDRO-1

- If the excavation sites must be dewatered, the water will be discharged in a manner that will cause no substantial increase in stream turbidity or discharge of fine sediment to the stream channel.
- All appropriate BMPs will be implemented as needed to ensure that there is no discharge of fine sediment, concrete, concrete wash water, or roiled water to the creek.
- Building materials and/or construction equipment will not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.
- Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from project related activities that could be hazardous to aquatic life will be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials placed within or where they may enter a stream or lake will be removed immediately.
- All debris and waste will be picked up daily and properly disposed of at an appropriate site.

LAND USE PLANNING

No mitigation measures necessary.

MINERAL RESOURCES

No mitigation measures necessary.

NOISE

MINIMIZATION MEASURE NOISE-1

- Construction activities will generally be limited to the daylight hours between Monday and Friday; however, weekend work could be implemented to accelerate construction or address emergency or unforeseen circumstances. If weekend work is necessary, no work will occur on Saturday or Sunday before 8 am or after 7 pm.
- Internal combustion engines used for any purpose at the job site will be equipped with a muffler of a type recommended by the manufacturer.
- Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., engine enclosures, acoustically-attenuating shields, or shrouds, intake silencers, ducts, etc.) whenever feasible and necessary.
- To avoid impacts on special-status and common bat species, prior to the removal of any trees, a qualified biologist will survey for roosting bats. If occupied roosts are identified, removal of the roost trees will not occur until the roost is unoccupied. Construction will be limited to daylight hours to avoid interference with the foraging abilities of bats.
- To avoid potential losses of breeding birds, construction activities will occur outside of the critical breeding period, typically mid-March to mid-August in the Willow Creek area.
- Should work occur during the breeding season a qualified biologist will survey the area to ensure that no nesting activity is occurring in the project area. Should nesting activity be observed the area will be avoided until nesting birds have fledged.

POPULATION AND HOUSING

No mitigation measures necessary.

PUBLIC SERVICES

No mitigation measures necessary.

RECREATION

No mitigation measures necessary.

TRANSPORTATION/TRAFFIC

MINIMIZATION MEASURE TRAFFIC-1

- Project construction will be scheduled after Labor Day.
- Signage will be provided to redirect traffic at logical turnaround areas in advance of the construction zone.

MINIMIZATION MEASURE TRAFFIC-2

- Two alternative routes will be designated by DPR to allow access during construction.

UTILITIES AND SERVICE

No mitigation measures necessary.

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7 REPORT PREPARATION

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APPENDIX A
30% Design and the Preferred Alternative

APPENDIX B
Project Plans and Specifications

APPENDIX C
Geotechnical Study Report

APPENDIX D
Adaptive Geomorphic Plan

APPENDIX E
Biological Resources Evaluation and Preliminary Wetland Assessment

APPENDIX F
Vascular Plants of Willow Creek 2nd Bridge Project Area

APPENDIX G
Typical Dewatering and Species Protection Plan

APPENDIX H
Acronyms

ACRONYMS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
APCD	Air Pollution Control District
AQMD	Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
CalEPA	California Environmental Protection Agency
CalFire	California Department of Forestry and Fire Protection
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish & Game
CDP	Coastal Development Permit
CDTSC	California Department of Toxic Substance Control
cfs	cubic feet per second
CGS	California Geologic Survey
CO	carbon monoxide
CO_2	carbon dioxide
Corps	U.S. Army Corps of Engineers
dB	decibels
DPR	California Department of Parks and Recreation
EIR	Environmental Impact Report
ESU	evolutionarily significant unit
GHG	greenhouse gas
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
LCP	Local Coastal Plan
LOS	level of service
MBTA	Migratory Bird Treaty Act
MLD	most likely descendant
MND	Mitigated Negative Declaration
MT	metric ton
MT CO_2 E	metric tons of carbon dioxide equivalent
MTC	Metropolitan Transit Commission
NAHC	Native American Heritage Commission
NCAB	North Coast Air Basin
NMFS	NOAA's National Marine Fisheries Service
NO_2	nitrogen dioxide

ACRONYMS
(continued)

NPS	National Park Service
NSCAPCD	North Sonoma County Air Pollution Control District
O_3	ozone
$PM_{2.5}$	fine particulate matter
PM_{10}	suspended particulate matter
PRC	Public Resources Code
PRMD	Sonoma County Permit and Resource Management Department
RWQCB	Regional Water Quality Control Board
SCDTPW	Sonoma County Department of Transportation and Public Works
TAC	Technical Advisory Committee
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VRPs	visibility reducing particles