UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

AUG 16 2017

In response refer to: WCR-2017-7603

Rick M. Bottoms, Ph.D.
Regulatory Branch Chief
Department of the Army
San Francisco District, Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Re: Endangered Act Section 7(a)(2) Biological Opinion for the 325 Kings Mountain Road Bank Stabilization Project within the Town of Woodside, San Mateo County, California (Corps File No. 2016-00264S)

Dear Dr. Bottoms:

Thank you for your letter of July 28, 2017, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS), pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 USC Section 1531 *et seq.*), for the proposed bank stabilization project on West Union Creek at 325 Kings Mountain Road in the Town of Woodside, San Mateo County, California (Project). The Corps of Engineers (Corps) proposes to provide authorization pursuant to Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*), to Mr. David Popowitz for construction of the Project.

The enclosed biological opinion is based on our review of the proposed Project and describes NMFS' analysis of the effects on threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and on designated critical habitat in accordance with section 7 of the ESA.

In the enclosed biological opinion, NMFS concludes the Project is not likely to jeopardize the continued existence of threatened CCC steelhead, nor is the Project likely to result in the destruction or adverse modification of critical habitat for CCC steelhead. However, NMFS anticipates take of CCC steelhead will occur as a result of project construction. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

Please contact Mr. Andrew Trent of the NMFS North-Central Coast Office in Santa Rosa, California at (707) 578-8553, or andrew.trent@noaa.gov if you have any questions concerning this section 7 consultation, or if you require additional information.

Sincerely,

for

Barry A. Thom
Regional Administrator

Enclosure

CC: Danielle Mullen, Corps of Engineers, San Francisco, CA
Copy to ARN File #151422WCR2017SR00210
Copy to Chron File

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Bank Stabilization Project at
325 Kings Mountain Road, Woodside, California

NMFS Consultation Number: WCR-2017-7603

Action Agency: U.S. Department of the Army, Corps of Engineers, San Francisco District

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Central California Coast steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	No

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By: for

Barry A. Thom
Regional Administrator

Date: AUG 16 2017

1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

NOAA's National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 *et seq.*), and implementing regulations at 50 CFR 402.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available through NMFS' Public Consultation Tracking System (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). A complete record of this consultation is on file at the NMFS North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2017SR00210).

1.2 Consultation History

On November 28, 2016, the Corps of Engineers (Corps) notified NMFS staff at the North-Central Coast Office in Santa Rosa by email of a proposed bank stabilization project by Mr. David Popowitz adjacent to West Union Creek at 325 Kings Mountain Road in Woodside, California. The Corps proposed the Project be covered under the August 13, 2013, programmatic determination of not likely to adversely affect select listed species in California (2013 NLAA Programmatic Consultation). By email on December 6, 2016, NMFS agreed with the Corps' inclusion of the Project under the 2013 NLAA Programmatic Consultation because the creek at the work site was anticipated to be dry.

As a result of very high flow conditions during the winter of 2016-17, a change in the condition of West Union Creek at the project site created a pool that has remained wet during the summer of 2017 and at least one juvenile steelhead was documented at the site on July 24, 2017. Therefore, the applicant has requested authorization to install a cofferdam/bladder across the creek to dewater the work site during construction. Dewatering and fish relocation are not covered activities under the 2013 NLAA Programmatic Consultation; thus, the Corps requested initiation of formal consultation with NMFS for the Project on July 28, 2017.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). The Corps proposes to provide authorization under Nationwide Permit 27 pursuant to Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*) (Corps File No. 2016-00264S) to David Popowitz

to stabilize the banks on both sides of a driveway bridge across West Union Creek at 325 Kings Mountain Road in Woodside, California.

1.3.1 Project Description

The project consists of stabilizing the right and left banks of West Union Creek at a driveway bridge that connects Kings Mountain Road with the private residence at 325 Kings Mountain Road. The driveway bridge spans West Union Creek, a tributary to Bear Creek and subsequently to San Francisquito Creek. The slope failure spans an area of approximately 15 feet high by 30 feet long. The bank stabilization will utilize bioengineering techniques to address erosion that is threatening the stability of the driveway bridge. The project involves using willow brush mattresses, willow fascines, willow stakes, native soil, and native shrub and tree plantings, and 18-24 inch rock rip-rap.

Additionally, a soldier beam retaining wall approximately 30 feet long and 10 feet tall will be installed on the northeast side of the driveway bridge where the highest intensity of flow of West Union Creek meets the bridge footings. Steel supports will be inserted by drilling and concrete poured to construct the retaining wall. The drilling, steel placement, and concrete placement for the soldier beam retaining wall will be performed from the top of bank.

Rip-rap will have minor keying into the soil and will be placed from the top of the bank with an excavator. A total of 45 cubic feet (1.7 cubic yards) of rip-rap is proposed. Placement of the wood lagging for the wall, installation of the willow brush mattress and willow fascines placement will be conducted by hand with laborers working on the creek bank. Heavy equipment will not enter or be working in the creek. One small dead valley oak (*Quercus lobata*) will be removed as part of the project.

The disturbed impacted area is approximately 580 square feet and extends over a linear distance of 48 feet. Thirty square feet is comprised of rip-rap, and 550 square feet consists of revegetation with native riparian species. Project construction will take approximately three weeks to complete and would be performed between June 15 and October 15. Straw rolls will be installed between the work area and the wetted channel of the creek to keep any sediment from entering the creek.

1.3.1.1 Fish Relocation and Dewatering

To facilitate construction of the Project, the pool and adjacent shallow water areas in West Union Creek surrounding the existing bridge abutments would be dewatered. The total area of dewatering will be approximately 40 feet of channel length from the cofferdam to the block nets downstream. This area includes a 15-foot by 10-foot pool upstream of the bridge, a 12-foot by 10-foot pool under the bridge, and a 12-foot by 10-foot run downstream of the bridge. A cofferdam/ bladder will be installed across the creek channel after a preconstruction survey of the area by a qualified fisheries biologist. The location of the cofferdam will be in a shallow channel section that is approximately 5-feet wide, adjacent to a gravel bar. In total, it is estimated that an area of approximately 450 square feet of the West Union Creek channel will be dewatered.

A flow bypass pipe will be installed at the upstream cofferdam/bladder that will transport water 50-100 feet downstream of the work area. Water will flow through the pipe and the outlet will discharge downstream of the lower block net. The outlet of the pipe shall be placed in a rocky area where it will not erode the creek.

During dewatering of the construction site, fish within the footprint of the work area will be collected and relocated to suitable areas in West Union Creek adjacent to the Project site. A block net will be installed to prevent fish from getting back into the work area. A submersible pump equipped with a screened intake will be will be used to pump water from the work area into the downstream creek channel. Operation of the pump will be monitored for turbidity and will be modified to ensure all turbidity is minimized. Pumping will not be conducted without oversight to ensure that water levels do not draw down too fast, and there are no stranded fish. The contractor will pause pumping under the direction of the fisheries biologist as necessary for the biologist to successfully relocate any aquatic species.

During dewatering of the work site, a fisheries biologist will captured all fish by hand with dipnets or seine once water levels have receded low enough to capture fish. All fish will be temporarily placed in aerated buckets in the shade, and transported immediately downstream (or upstream) to designated relocation pools. Two suitable areas were identified for fish relocation. A mid-channel pool located approximately 500 feet downstream of the project site, and a lateral scour pool (rootwad enhanced) approximately 340 feet upstream of the project site.

After all fish have been relocated, the work area will be continually monitored for any seepage of water into the work area, and daily inspections of the cofferdam and block net will be conducted to ensure that fish do not return to the dewatered area for the duration of project construction. After work has been completed, all debris and loose dirt in the channel shall be removed and the cofferdam and pipes shall be removed and water will be allowed to gradually refill the creek area below the bridge. The downstream block net will then be removed.

2. ENDANGERED SPECIES ACT CONSULTATION: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, Federal agencies must ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitat. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an incidental take statement (ITS) that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of a listed species," which is "to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designation of critical habitat for CCC steelhead uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.
- Reach jeopardy and adverse modification conclusions.
- If necessary, define a reasonable and prudent alternative to the proposed action.

2.1.1 Use of Best Available Scientific and Commercial Information

To conduct the assessment presented in this opinion, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the listed species and critical habitat has been published in a number of documents including peer reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. Additional information regarding the potential effects of the

proposed activities at 325 Kings Mountain Road on the listed species in question, their anticipated response to these actions, and the environmental consequences of the actions as a whole was formulated from the aforementioned resources, and the following:

- Biological Resource Assessment. 325 Kings Mountain Road, Woodside California. Prepared for David Popowitz by Coast Ridge Ecology. October 2016.

Information was also provided by email and telephone conversations during November of 2016 and July 2017 between NMFS, the Corps, and the Coast Ridge Ecology biologist, Patrick Kobernus. For information that has been taken directly from published, citable documents, those citations have been reference in the text and listed at the end of this document. A complete administrative record of this consultation is on file at the NMFS North-Central Coast Office in Santa Rosa, California (Administrative Record Number 151422WCR2017SR00210).

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. Also, the opinion examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the PBFs that help to form that conservation value.

2.2.1 Listed Species

This biological opinion analyzes the effect of the proposed bank stabilization project at 325 Kings Mountain Road, Woodside, California on CCC steelhead in West Union Creek. CCC steelhead are listed as threatened under the ESA (71 FR 834, January 5, 2006). The CCC steelhead distinct population segment (DPS) includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun Bay, San Pablo Bay, and San Francisco Bay. In addition, this biological opinion analyzes the effects on designated critical habitat for threatened CCC steelhead (September 2, 2005; 70 FR 52488). West Union Creek in the action area is designated critical habitat for CCC steelhead.

2.2.1.1 Steelhead General Life History

Steelhead are anadromous fish, spending some time in both fresh- and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. General reviews for steelhead in California document much variation in life history (Shapovalov

and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Although variation occurs in coastal California, steelhead usually live in freshwater for 1 to 2 years in central California, then spend 2 or 3 years in the ocean before returning to their natal stream to spawn. Steelhead may spawn 1 to 4 times over their life. Adult steelhead which originate from the San Francisquito Creek watershed typically immigrate from the ocean to freshwater between December and April, peaking in January and February, and juveniles migrate as smolts to the ocean from January through June, with peak emigration occurring in April and May (Fukushima and Lesh 1998). Given the proposed construction period between June 1 and October 15, only juvenile steelhead are likely to be present in the action area during construction.

Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4 degrees Celsius (°C) and have an upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996). Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows, to the ocean to continue rearing to maturity.

Adults returning to spawn may migrate several miles, hundreds of miles in some watersheds, to reach their natal streams. Although spawning typically occurs between January and May, the specific timing of spawning may vary a month or more among streams within a region, and within streams interannually. Spawning (and smolt emigration) may continue through June (Busby *et al.* 1996). Female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years. The embryos incubate within the nest. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

2.2.1.2 Status of CCC Steelhead

Historically, approximately 70 populations of steelhead are believed to have existed in the CCC steelhead DPS (Spence *et al.* 2008). Many of these populations (approximately 37) were independent, or potentially independent, meaning they historically had a high likelihood of surviving for 100 or more years absent anthropogenic impacts (Bjorkstedt *et al.* 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their persistence (McElhaney *et al.* 2000, Bjorkstedt *et al.* 2005).

While historical and current data of abundance are limited, CCC steelhead DPS numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River – the largest population within the DPS (Busby *et al.* 1996). Near the end of the 20th century,

McEwan (2001) estimated that the wild steelhead population in the Russian River watershed was between 1,700 and 7,000 fish. Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels, with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vicente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). However, as noted in Williams *et al.* (2016) data for CCC steelhead populations remain scarce outside of Scott Creek, which is the only long-term dataset and shows a significant decline. Short-term records indicate the low but stable assessment of populations is reasonably accurate; however, it should be noted that there is no population data for any populations outside of the Santa Cruz Mountain stratum, other than hatchery data from the Russian River.

Although available time series data sets are too short for statistically robust analysis, the information available indicates CCC steelhead populations have likely experienced serious declines in abundance, and apparent long-term population trends suggest a negative growth rate. This would indicate the DPS may not be viable in the long term, and DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that could slow their decline relative to other salmonid DPSs or ESUs in worse condition. The 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good *et al.* 2005), a conclusion that was consistent with a previous assessment (Busby *et al.* 1996) and supported by the NMFS Technical Recovery Team work (Spence *et al.* 2008). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

Although numbers did not decline further during 2007/08, the 2008/09 adult CCC steelhead return data indicated a significant decline in returning adults across their range. Escapement data from 2009/2010 indicated a slight increase; however, the returns were still well below numbers observed within recent decades (Jeffrey Jahn, NMFS, personal communication, 2010).

In the Russian River, analysis of genetic structure by Bjorkstedt *et al.* (2005) concluded previous among-basin transfers of stock, and local hatchery production in interior populations in the Russian River likely has altered the genetic structure of the Russian River populations. Depending on how "genetic diversity" is quantified, this may or may not constitute a loss of overall diversity. In San Francisco Bay streams, reduced population sizes and fragmentation of habitat has likely led to loss of genetic diversity in these populations. More detailed information on trends in CCC steelhead DPS abundance can be found in the following references: Busby *et al.* 1996, NMFS 1997, Good *et al.* 2005, and Spence *et al.* 2008.

The status review by Williams *et al.* published in 2011 concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" as new information released since Good *et al.* 2005 did not appear to suggest a change in extinction risk. The most recent status review (Williams *et al.* 2016) reached the same conclusion. On May 26, 2016, NMFS affirmed no change to the determination that the CCC steelhead DPS is a threatened species (81 FR 33468), as previously listed (76 FR 76386).

2.2.1.3 CCC Steelhead Critical Habitat Status

Critical habitat was designated for CCC steelhead on September 2, 2005 (70 FR 52488). In designating critical habitat, NMFS considers, among other things, the essential PBFs within the designated area that are essential to the conservation of the species and that may require special management considerations or protection.

PBFs for CCC steelhead and their associated essential features within freshwater include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
2. Freshwater rearing sites with:
    a. water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    b. water quality and forage supporting juvenile development; and
    c. natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

The condition of CCC steelhead critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals, including unscreened diversions for irrigation.[1] Impacts of concern include alteration of streambank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased streambank erosion, loss of shade (higher water temperatures) and loss of nutrient inputs (Busby *et al.* 1996, 70 FR 52488). Water development has drastically altered natural hydrologic cycles in many of the streams in the DPS. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids. Overall, current condition of CCC steelhead

[1] Other factors, such as overfishing and artificial propagation have also contributed to the current population status of this species. All these human induced factors have exacerbated the adverse effects of natural factors such as drought and poor ocean conditions.

critical habitat is degraded, and does not provide the full extent of conservation value necessary for the recovery of the species.

2.2.2 Global Climate Change

One factor affecting the range-wide status of the CCC steelhead DPS, and aquatic habitat at large is climate change. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir *et al.* 2013). Snow melt from the Sierra Nevada has declined (Kadir *et al.* 2013). However, total annual precipitation amounts have shown no discernable change (Kadir *et al.* 2013). CCC steelhead may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local climate factors likely still drive most of the climatic conditions steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape. In addition, CCC steelhead are not dependent on snowmelt driven streams and thus not affected by declining snow packs.

The threat to CCC steelhead from global climate change will increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley *et al.* 2007, Moser *et al.* 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe *et al.* 2004, Moser *et al.* 2012, Kadir *et al.* 2013). Total precipitation in California may decline; critically dry years may increase (Lindley *et al.* 2007, Schneider 2007, Moser *et al.* 2012). Wildfires are expected to increase in frequency and magnitude (Westerling *et al.* 2011, Moser *et al.* 2012).

In the San Francisco Bay region, warm temperatures generally occur in July and August, but as climate change takes hold, the occurrences of these events will likely begin in June and could continue to occur in September (Cayan *et al.* 2012). Climate simulation models project that the San Francisco region will maintain its Mediterranean climate regime, but experience a higher degree of variability of annual precipitation during the next 50 years and years that are drier than the historical annual average during the middle and end of the twenty-first century. The greatest reduction in precipitation is projected to occur in March and April, with the core winter months remaining relatively unchanged (Cayan *et al.* 2012).

Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al.* 2002, Ruggiero *et al.* 2010). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008, Feely 2004, Osgood 2008, Turley 2008, Abdul-Aziz *et al.* 2011, Doney *et al.* 2012). The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007, Santer *et al.* 2011).

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the project consists of the streambed and banks of West Union Creek at the bank stabilization sites, the streambed area to be dewatered, and fish relocation sites. In total, the action area includes approximately 850 linear feet of channel in West Union Creek.

2.4 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

West Union Creek is located in a Mediterranean climatic region, with over 90 percent of annual precipitation occurring between November and April. Cool, moist coastal fog generally alternates with clear, warm weather during the months of May through September, and significant rainfall during that time is rare. West Union Creek in the action area is an alluvial, low gradient stream flowing through a rural-residential landscape. The surrounding area consists primarily of single family, residential properties. Within the project reach, West Union Creek consists of sand, gravel and cobble substrate, with good sequences of riffles, runs, and pools. Significant erosion from high winter flows and sliding has occurred along the left bank of the creek adjacent to Kings Mountain Road.

2.4.1 Status of Steelhead and Critical Habitat in the Action Area

In the late 19th and early 20th centuries, San Francisquito Creek and its tributaries, including West Union Creek, were home to a steelhead sport fishing industry (San Francisquito Coordinated Resource and Management Plan 2001). Stanford University's Conservation Biology Center has conducted fisheries sampling throughout the watershed during the past 20 years and confirmed the presence of steelhead and their distribution throughout the watershed (Smith and Hardin 2001).

Few fish surveys have been performed in West Union Creek, but it is known that the stream supports an anadromous *O. mykiss* population (Leidy *et al.* 2005). Infrequent redd surveys conducted in 1999-2001 near the action area of this project compiled by Darren Fong for the Golden Gate National Recreation Area showed evidence of steelhead spawning (Fong 2001). Redd densities on West Union Creek were 2.9 redds/km in 1999, 2.2 redds/km in 2000, and 1.3 redds/km in 2001 (Fong 2004).

The dominant plant community within the action area is riparian woodland, which includes a mosaic of native trees, shrubs, and invasive species. The dominant tree species on site is white alder (*Alnus rhombifolia*), with blue elderberry (*Sambucus nigra ssp. Caerulea*), red willow (*Salix laevigata*), and big leaf maple (*Acer macrophyllum*). Instream habitat conditions for

steelhead are moderate to high quality, although habitat quality is diminished by a low amount of large woody debris and low/dry flow conditions during the summer and fall. Riffle and runs generally comprise streambed materials that are of sufficient size for quality spawning and rearing. Instream cover is provided by small boulders, large cobbles, undercut banks, woody debris, and riparian vegetation. Temperature data are sparse, but summer/fall temperature measurements in West Union Creek were within range of tolerance levels for steelhead growth (Fong 2004).

Overwinter habitat conditions may be limited by the presence of few secondary channels and backwater areas, but other features such as small boulders and undercut banks provide refugia from high velocity flow events. Based on current channel conditions, designated critical habitat within the action area is slightly degraded from properly functioning condition due to impacts from land-use in the watershed like residential and commercial development.

2.4.2 Factors Affecting the Species Environment in the Action Area

Aquatic habitat in West Union Creek has been moderately affected by human activities. The redwood trees in the watershed were logged during the 1800s, and second growth redwood now dominates more upstream portions of West Union Creek. The area of the creek adjacent to Kings Mountain Road is dominated by alder woodland. The surrounding area consists of single family residential properties and large residential/commercial complexes. The private residence at 325 Kings Mountain Road is only accessible via the bridge driveway over the creek in the center of the action area. The bridge is approximately one-lane wide and the abutments are large concrete structures located on both streambanks.

Residential development in the watershed has resulted in non-point source pollutant contamination, removal of riparian vegetation, and removal of large woody debris from the West Union Creek channel. Bank erosion is evident in some areas and private landowners have placed rip-rap, concrete walls, and other materials along the stream bank to curb erosion. Placement of these materials has confined the stream in some areas, and diminished natural geomorphic processes and associated biological functions. Increased impervious surfaces associated with roadways and private residences in the watershed have likely decreased rainfall infiltration rates in upland habitats, increased peak flood flows, and decreased summer flows in creeks.

The long-term effects of climate change have been presented under the Rangewide Status of the Species and Critical Habitat section of this biological opinion (Section 2.2.2). These include changes in streamflow regimes, water temperatures, and rainfall patterns. Climate change poses a threat to CCC steelhead within the action area. The current climate in the action area is generally warm, and modeled regional average air temperatures show an increase in summer (Lindley *et al.* 2007) and greater heat waves (Hayhoe *et al.* 2004). The likely change in amount of rainfall in Northern and Central Coastal streams under various warming scenarios is less certain, total rainfall across the state is expected to decline. For the California North Coast, some models show large increases (75 to 200 percent) in precipitation while other models show decreases of 15 to 30 percent (Hayhoe *et al.* 2004).

Steelhead rearing and migratory habitat are most at risk to climate change. Increasing water temperatures, and changes in the amount and timing of precipitation will impact water quality, streamflow levels, and steelhead migration. Low and warm summer flow conditions will negatively affect juvenile steelhead growth and survival. The upstream migration of adult steelhead will be impeded by low stream conditions during winter months, as well as, excessively high streamflows during large winter precipitation events. Smolt outmigration may be constrained by fewer or lower spring high flow events.

2.4.3 Previous Section 7 Consultations Affecting the Action Area

Although no previous individual section 7 consultations with NMFS have occurred within the action area of the Project, NMFS has completed programmatic consultations that include the action area of this Project. Habitat restoration actions covered under existing programmatic Section 7 consultations could occur in the action area. These programmatic consultations include the NOAA Restoration Center's restoration program and the Corps' Regional General Permit #12 programmatic consultation. Both of these consultations authorize a limited amount of take for juvenile salmonids during instream work conducted in the summer months.

Section 10(a)(1)(A) research and enhancement permits and section 4(d) limits or exceptions could potentially occur in the West Union Creek watershed. Salmonid monitoring approved under these programs includes carcass surveys, smolt outmigration trapping, and juvenile density surveys. In general, these activities are closely monitored and require measures to minimize take during the research activities. Through July 2017, no research activities authorized by these NMFS programs have occurred in West Union Creek.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

2.5.1 Fish Relocation Activities

Fish collection and relocation will be performed in coordination with dewatering prior to construction. The dewatered area under and downstream of the bridge will be approximately 450 square feet. Coast Ridge Ecology employed by landowner David Popowitz proposes to collect and relocate fish to minimize the effects of dewatering the stream channel on steelhead. Before and during dewatering of the construction site, juvenile steelhead and other fish will be captured and relocated away from the work area to avoid direct mortality and minimize the possible stranding of fish in isolated pools. Fish in the immediate project area will be captured by seine and/or dip net, and then transported and released to suitable instream locations outside the work area by a qualified fisheries biologist.

Steelhead relocation activities will occur during the summer low-flow period after emigrating smolts and kelts (post-spawned adults) have left the creek. Construction would also occur outside the adult migration and spawning season. Therefore, NMFS expects the CCC steelhead that will be captured at the 325 Kings Mountain Road construction site during relocation activities will be limited to young-of-the-year and pre-smolting juveniles. Data to precisely quantify the amount of steelhead that will be relocated prior to construction are not available. Juvenile steelhead and other fish species have been observed in West Union Creek, but their numbers have not been established at the Project site. However, based on typical densities of fish reported in area streams, it is unlikely that more than 50 juvenile steelhead will be captured and relocated.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities will be conducted by qualified and NMFS-approved fisheries biologists, direct effects to and mortality of juvenile steelhead during capture will be minimized.

Although sites selected for relocating fish should have similar water temperature as the capture sites and are expected to have adequate habitat available, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may have to contend with other fish causing increased competition for available resources such as food and habitat area. Frequent responses to crowding by steelhead include emigration and reduced growth rates (Keeley 2003). Some of the fish released at the relocation sites may choose not to remain in these areas and move either upstream or downstream to areas that have more vacant habitat and a lower density of steelhead. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS does not expect impacts from increased competition would be large enough to adversely affect the survival chances of individual steelhead, or cascade through the watershed population based on the small area that would likely be affected and the relatively small number of individuals likely to be relocated (particularly when compared with the remainder of individuals throughout the drainage not affected by the project). As described above, sufficient habitat appears to be available West Union Creek to sustain fish relocated without crowding of other juvenile steelhead.

Based on information from other relocation efforts, NMFS estimates injury and mortalities would be less than three percent of those steelhead that are relocated. Data on fish relocation efforts since 2004 shows most mortality rates are below three percent for steelhead (Collins 2004, CDFG 2005, 2006, 2007, 2008, 2009, 2010a, 2010b). Fish that avoid capture during relocation efforts may be exposed to risks described in the following section on dewatering. NMFS expects no more than three percent of steelhead would be will be injured or killed during fish capture, and relocation activities.

2.5.2 Dewatering

The Project proposes to isolate the work area with cofferdams/bladder and bypass streamflow around the construction by gravity feed around the work area. Bypass piping will be installed to divert streamflow around the project site. Dewatering of the channel would affect up to 100 linear feet of West Union Creek which is designated as critical habitat for CCC steelhead. NMFS anticipates only minor temporary changes to instream flow outside of the dewatered construction area within the action area during the dewatering process prior to construction. These fluctuations in flow are anticipated to be small, gradual, and short-term. Once the cofferdams and pipeline bypass are installed and operational, stream flow above and below the work site should be the same as the pre-project conditions except within the dewatered work areas where stream flow is bypassed. The dewatering of up to 100 feet of channel is expected to cause a temporary reduction in the quantity of aquatic habitat. Juvenile steelhead that avoid capture in the project work area following relocation efforts may die due to desiccation, thermal stress, or by being crushed by equipment or foot traffic if not found by biologists while water levels within the reach recede. However, due to fish relocation efforts, NMFS expects the number of juvenile steelhead that would die as a result of stranding during dewatering activities would be less than one percent of the steelhead within the action area prior to dewatering.

The temporary cofferdams and water diversion structures in the creek at the construction site are not expected to impact juvenile steelhead movements in West Union Creek beyond typical summer low-flow conditions. Steelhead experience intermittent conditions in many streams of the CCC DPS during summer, and the limited duration of this project's water diversion is unlikely to adversely affect individual steelhead rearing upstream or downstream of the dewatered reach.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates (a salmonid prey item) within the construction site may be killed or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from the construction streamflow bypass and dewatering will be temporary because construction activities would be relatively short-lived and the dewatered reach is relatively small (approximately 40 linear feet of channel). Rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following channel re-watering (Cushman 1985, Thomas 1985, Harvey 1986). Based on the foregoing, NMFS does not expect the loss of aquatic macroinvertebrates as a result of dewatering activities would adversely affect CCC steelhead during and after project implementation. Because of the rapid recolonization by macroinvertebrates of the dewatered sections, NMFS does not expect the dewatering will have any lasting effects on critical habitat, thus does not anticipate that critical habitat will be adversely affected by the Project's temporary dewatering.

2.5.3 Increased Mobilization of Sediment in the Stream Channel and Water Quality

During construction, activities at 325 Kings Mountain Road would result in minor disturbance of the creek bed and banks for equipment access, construction activities, and for the placement/removal of the cofferdams. Disturbed soils may become mobilized when fall and winter storms increase stream flow levels post-construction. NMFS anticipates these activities

would affect water quality and critical habitat in the action area in the form of small, short-term increases in turbidity during re-watering and subsequent higher flow events during the first winter storms post-construction. Instream and near-stream construction activities have been shown to result in temporary increases in turbidity (reviewed in Furniss *et al.* 1991, Reeves *et al.* 1991, Spence *et al.* 1996).

Increases in sediment may affect fish in a variety of ways. High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordon and Kelley 1961, Bjornn *et al.* 1977, Berg and Northcote 1985), reduce growth rates (Crouse *et al.* 1981), and increase plasma cortisol levels (Servizi and Martens 1992). High and prolonged turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al.* 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water can cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival. Increased sediment deposition can fill pools thereby reducing the amount of potential cover and habitat available, and smother coarse substrate particles which can impair macroinvertebrate composition and abundance (Sigler *et al.* 1984, Alexander and Hansen 1986).

Although chronic elevated sediment and turbidity levels may affect steelhead and critical habitat as described above, sedimentation and turbidity levels associated with this Project during cofferdam construction and removal, and the subsequent rewetting of the construction site within the action area and during subsequent rainfall events are not expected to rise to the levels discussed in the previous paragraph because the project proposes soil and channel stabilization measures to prevent the mobilization of sediment. Due to the Project's proposed use of straw rolls throughout the construction phase, NMFS anticipates any resulting elevated turbidity levels would be small and only occur for a short time, well below levels and durations shown in the scientific literature as causing injury or harm to salmonids (see for example Sigler *et al.* 1984 or Newcombe and Jensen 1996) or to salmonid prey species. NMFS expects any sediment or turbidity generated by the project would not extend more than 100 feet downstream of the work sites based on the site conditions (low flows) and methods used to control sediment and turbidity (*i.e.*, straw rolls). NMFS does not anticipate harm, injury, or behavioral impacts to CCC steelhead associated with exposure to the minor elevated suspended sediment levels that would be generated by the Project. Because of the small scale of the project and heavy equipment will not be used inside the channel, NMFS does not expect adverse effects from increased sedimentation and turbidity generated by Project activities.

2.5.4 Effects on Critical Habitat

As discussed above, project construction activities are expected to result in short-term disturbance to the channel and the adjacent streambank areas. Localized impacts to water quality may occur in the form of increased levels of turbidity and suspended sediment, but these effects are expected to be minor, localized, and short-term. Given the small amounts of sediment and turbidity generated by the project, NMFS expects PBFs of critical habitat for CCC steelhead in the action area are unlikely to be adversely affected. Any sediment and turbidity generated downstream during diversion installation will be dissipated downstream in West Union Creek or

removed during high flows during the next rainy season. Any sediment and turbidity generated from the project site during the next rainy season will likely be miniscule compared to the sediment and turbidity generated in West Union Creek during winter rains, making any impairment of critical habitat highly unlikely.

PBFs of juvenile rearing habitat in the action area will be temporarily lost by dewatering approximately 450 square feet of West Union Creek. Once the project is complete, the diversion will be removed and rearing habitat will return in improved condition due to the removal of the center pier and the relocation of the abutments upslope of their current location, which will increase available stream habitat and improve hydraulic conveyance. During the summer construction season, the water diversion will prevent juvenile movement through the action area. However, this restriction will be limited to the duration of water diversion (approximately three weeks).

Juvenile rearing PBFs may also experience temporary reduced food supply even after the diversion is removed. Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates within the Project site may be killed or their abundance reduced when stream habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from streamflow diversion and dewatering would be temporary because construction activities would be relatively short-lived, the dewatered reach is relatively small and rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). In addition, the effect of macroinvertebrate loss on juvenile steelhead would likely be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flow would be bypassed around the project work site. Steelhead food sources (insects falling into the water) derived from the riparian zone may be affected by the project because some riparian vegetation will be removed. However, riparian vegetation will be replanted as part of the Project. Based on the foregoing, NMFS expects the loss of habitat space and aquatic macroinvertebrates as a result of dewatering activities would result in only minor and temporary adverse effect to rearing PBFs for steelhead in the action area.

The temporary water diversion is not expected to adversely affect the critical habitat PBF of adult or smolt steelhead migration in the action area because the diversion will not be in place during periods of adult and smolt steelhead migration West Union Creek. Water diversion around the worksite will be limited to the period between June 1 and October 15 when adults and smolts are no longer migrating and will cease prior to the beginning of adult or smolt migration during the rainy season (November – May).

The Project proposes to place 1.7 cubic yards of 18-24 inch rock rip-rap (*i.e.,* boulders) and vegetation over the unstable streambank adjacent to the driveway bridge to protect the banks from further slippage and erosion during high flows events. In combination with the existing concrete bridge abutments on either side of the creek channel, this action is anticipated to effect the channel by maintaining the current alignment and precluding lateral movement of the channel. Natural fluvial and geomorphic processes at the bridge site have been compromised by this stabilization of the channel. Streams transport water and sediment from upland sources to the ocean and, generally speaking, the faster the streamflow, the greater the erosive force. A few

natural mechanisms constrain and moderate these erosive forces, such as the slowing of streamflow (and by extension its erosive force) resulting from complex structure both within (*e.g.*, boulders or woody debris) and adjacent (*e.g.*, riparian vegetation) to the stream channel (Knighton 1998). A stream channel will also naturally "meander", eroding laterally to create a sinuous longitudinal course. Stream meandering efficiently regulates the erosive forces by lengthening the channel and reducing stream gradient, thus controlling the ability of the stream to entrain and transport available sediment. Meandering streams also create and maintain both hydraulic and physical instream habitat used by fish and other aquatic species. For instance, specific to salmon and steelhead, a meandering, unconstrained stream channel sorts and deposits gravel and other substrate necessary for optimal food production and spawning success, maintains a healthy and diverse riparian corridor, and allows floodplain engagement during appropriate winter flows (Spence *et al.* 1996).

By design, streambank stabilization projects prevent lateral channel migration, effectively forcing streams into a straight, linear simplified configuration that, without the ability to move laterally, instead erodes and deepens vertically (Leopold *et al.* 1968, Dunn and Leopold 1978). The resulting "incised" channel fails to create and maintain aquatic and riparian habitat through lateral migration, but instead disconnects flow, natural processes and channel function from adjacent floodplain and riparian habitat, creating a simplified stream reach with poor food production and little functional habitat for summer and winter rearing salmonids (Pollock *et al.* 2007, Florsheim *et al.* 2008). In the action area of this project, the bridge's existing concrete abutments are designed to withstand high streamflow caused by large, infrequent storm events and these abutments inhibit natural channel function and evolution, preventing creation and maintenance of natural habitat features which can provide complex fish habitat (*e.g.*, undercut banks, submerged rootwads, *etc.*) (Fischenich and Copeland 2001). Although the linear channel length affected by the proposed Project is less than 50 feet, by stabilizing the streambanks of West Union Creek with rock rip-rap in combination with the existing concrete bridge abutments, the Project will continue to maintain the currently compromised conservation value of critical habitat at the driveway bridge. The stabilized channel at the bridge abutments and immediately adjacent to the abutments limits salmon and steelhead habitat creation at the site for the foreseeable future. However, the use of willow brush mattresses and other native vegetation plantings are expected to benefit critical habitat through the creation of shade and stabilization of the streambank.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). 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 ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of

the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminishes the value of designated or proposed critical habitat for the conservation of the species.

CCC steelhead are listed as threatened. Based on the extensive loss of historic habitat due to dams, forestry practices, and urban and agricultural land development, and the degraded condition of remaining spawning and rearing habitats, CCC steelhead have experienced severe declines. The project proposes to dewater a relatively small sections of West Union Creek (up to 100 feet total). The project is scheduled to be completed during the dry season and therefore it is anticipated that low numbers of steelhead are expected to be present 50 or fewer juvenile CCC steelhead). Due to the timing of construction, no adult or smolt life stages of steelhead would be affected by the project.

As described in the Effects of the Action section above, NMFS identified dewatering and fish relocation as the adverse effects on CCC steelhead in the action area that would result from the proposed project. Prior to dewatering the site for construction, fish would be collected and relocated from the work area. Juvenile steelhead present in the immediate project work area will be subject to capture, relocation, and related short-term effects. Fish that elude capture and remain in the project area during dewatering may die due to desiccation or thermal stress, or be crushed by equipment or foot traffic if not found by biologists during the drawdown of stream flow. Based on the low mortality rates for similar relocation efforts, NMFS anticipates few juvenile steelhead would be injured or killed by fish relocation and construction activities during implementation of this project. Anticipated mortality from relocation is expected to be less than three percent of the fish relocated, and mortality expected from dewatering is expected to be less than one percent of the fish in the area prior to dewatering (combined mortality to not exceed four percent). Because no more than 50 juvenile steelhead are expected to be present, NMFS expects no more than two juvenile steelhead would be injured or killed by fish relocation and dewatering. Due to the relatively large number of juveniles produced by each spawning pair, steelhead spawning in the San Francisquito watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the project site due to relocation and dewatering. Thus, it is unlikely that the small potential loss of juveniles during the duration of the project will impact future adult returns.

Dewatering of up to 100 linear feet of creek channel to construct the bank stabilization structures will result in temporary and minor impacts to critical habitat. This 100-foot long reach of stream will be dewatered for only three weeks during one summer season and then will cease. Macroinvertebrate populations are expected to recover within a month or two at the construction site after being re-watered. The overall riparian vegetation of site will be increased due to bioengineering methods including live willow brush mattresses, fascines, cuttings, stakes, and other native shrub and tree plantings.

Regarding future climate change effects in the action area, California could be subject to higher average summer air temperatures and lower total precipitation levels. Reductions in the amount of snowfall and rainfall would reduce stream flow levels in Northern and Central Coastal rivers. Estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. For this Project, in-water activities will occur in 2017 or 2018, and the above effects of climate change are not likely to be detected within that time frame. If the effects of climate change are detected, they will likely materialize as moderate changes to the current climate conditions within the action area. These changes may place further stress on CCC steelhead populations. The effects of the proposed action combined with moderate climate change effects may result in conditions similar to those produced by natural ocean-atmospheric variations (as described in the Environmental Baseline) and annual variations. The species are expected to persist throughout these phenomena, as they have in the past, even when concurrently exposed to the effects of similar projects.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CCC steelhead or destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take would occur. NMFS anticipates that take of threatened CCC steelhead associated with the bank stabilization project at 325 Kings Mountain Road, Woodside, San Mateo County, California will be associated with fish collection and relocation during stream dewatering for construction.

The number of threatened steelhead that may be incidentally taken during project activities is expected to be small, and limited to the juvenile (pre-smolt) life stage. Take is anticipated to occur during fish relocation and dewatering of the 40-foot long reach of West Union Creek within the action area between June 15 and October 15. The number of juvenile steelhead relocated during project construction is anticipated to be no more than 50 fish, and no more than two juvenile steelhead are expected to be injured or killed during fish relocation and dewatering activities.

2.9.2 Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02). NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CCC steelhead:

1. Undertake measures to ensure that harm and mortality to listed steelhead resulting from fish relocation and dewatering activities is low.

2. Prepare and submit reports which summarize the effects of construction, fish relocation, and dewatering activities, and post-construction site performance.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:

a. Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which habitat condition are present to allow for adequate survival of transported fish and fish already present.

b. If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Andrew Trent by phone immediately at (707) 578-8553 or the NMFS North Central Coast Office at (707) 387-0737. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the Supervisor of our North Central Coast Office. Any such transfer will be subject to such conditions as NMFS deems appropriate.

c. All cofferdams, pumps, pipes and other diversion materials will be removed from the stream upon work completion and no later than October 15.

d. All pumps used to divert live stream flow will be screened and maintained throughout the construction period to comply with NMFS' Fish Screening Criteria for Anadromous Salmonids. See:

www.habitat.noaa.gov/pdf/salmon_passage_facility_design.pdf

2. The following term and condition implements reasonable and prudent measure 2:

The Corps or applicant must provide a written report to NMFS by January 15 of the year following construction of the proposed action. The report must be provided to NMFS North-Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report must contain, at a minimum, the following information:

i. **Construction related activities --** The report must include the dates construction began and was completed, a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any effect on ESA-listed fish, the number of

salmonids killed or injured during the project action, and photographs taken before, during, and after the activity from photo reference points.

ii. **Fish Relocation** -- The report must include a description of the location from which fish were removed and the release site including photographs, the date and time of the relocation effort, a description of the equipment and methods used to collect, hold, and transport salmonids, the number of fish relocated by species, the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities, and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS has no conservation recommendations for this Project.

2.11 Reinitiation of Consultation

This concludes the formal consultation for the bank stabilization project on West Union Creek at 325 Kings Mountain Road in Woodside, California.

As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the incidental take statement 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.

3. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

3.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion is the U.S. Army Corps of Engineers. Other interested users could include the landowner of the project property David Popowitz, California Department of Fish and Wildlife, citizens of Woodside, California, and others interested in the conservation of threatened steelhead. Individual copies of this opinion were provided to the Corps. This opinion will be posted on the Public Consultation Tracking System web site (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). The format and naming adheres to conventional standards for style.

3.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

3.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 *et seq*., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA implementation and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

4. REFERENCES

4.1 Literature Cited

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4.2 Personal Communications

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