



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

September 6, 2019

Refer to NMFS No: WCRO-2018-00262

James Mazza
Acting Chief, Regulatory Division
Department of the Army
San Francisco District, Corps of Engineers
450 Golden Gate Avenue, 4th Floor
San Francisco, California 94102-3406

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the San Mateo Creek Bank Repair Projects at 212 El Camino Real (Corps File No. 2018-00110S and 773 El Cerrito Avenue (Corps File No. 2019-00502S) in San Mateo County, California

Dear Mr. Mazza:

Thank you for your letters of June 22, 2018, and April 4, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for two bank repair projects on San Mateo Creek in San Mateo County, California. One project is located at 212 El Camino Real in the City of San Mateo (Casa Baywood Apartments), and the second project at 773 El Cerrito Avenue in the Town of Hillsborough (private residence).

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

In the enclosed biological opinion, NMFS concludes the projects are not likely to jeopardize the continued existence of threatened CCC steelhead, nor are the projects likely to result in the destruction or adverse modification of its critical habitat. However, NMFS anticipates take of CCC steelhead will occur during construction as juvenile steelhead are likely to be present during dewatering of the work sites for the projects' implementation. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

We completed pre-dissemination review of this biological opinion 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 biological opinion will be available through the NOAA Institutional Repository (<https://repository.library.noaa.gov/>) after approximately two weeks. A complete record of this consultation is on file at the NMFS North-Central Coast Office in Santa Rosa, California.



Please contact 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,

A handwritten signature in blue ink, appearing to read "Alecia Van Atta".

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Gregory Brown, Corps of Engineers, San Francisco, California
Copy to ARN File # 151422WCR2018SR00128

**Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion
San Mateo Bank Repair Projects in San Mateo County, California**

NMFS Consultation Number: WCRO-2018-00262

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

Table 1. Affected Species and NMFS' Determinations:

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

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

Issued By: 

Alecia Van Atta
Assistant Regional Administrator

Date: September 6, 2019

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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 (ITS) 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 (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available through the NOAA Institutional Repository (<https://repository.library.noaa.gov/>) after approximately two weeks. A complete record of this consultation is on file at NMFS' North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2018SR00128).

1.2 Consultation History

On June 25, 2018, NMFS received a written request for initiation of formal consultation from the Corps of Engineers (Corps) regarding a proposal to stabilize the stream bank of San Mateo Creek at 212 El Camino Real (Casa Baywood Apartments) in San Mateo, California. NMFS reached out to the Corps and consultant via phone calls and emails in October and November, 2018, requesting more information regarding the basis for the proposed project design and requested the structure incorporate bio-engineered elements. NMFS also requested information regarding the extent of creek dewatering and construction equipment to be used. Due to a lack of response from the Corps and applicant, NMFS sent the Corps a letter dated December 14, 2018, informing the Corps that insufficient information was provided to initiate formal consultation.

On January 30, 2019, the Corps forwarded by email responses from the applicant to the questions posed by NMFS regarding the Casa Baywood Apartments bank stabilization design. The applicant indicated that a bioengineered approach would not be appropriate due to space constraints at the project site. The Corps resubmitted the project to NMFS on April 3, 2019, with an updated project description.

The Corps' April 3, 2019 submittal to NMFS also included a proposed second bank stabilization project on San Mateo Creek adjacent to the private residence at 773 El Cerrito Avenue in the Town of Hillsborough. A Biological Assessment for 773 El Cerrito Avenue was included. Additional information regarding duration of dewatering of both project sites was provided to NMFS by the Corps via email on June 10, 2019.

1.3 Proposed Federal 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. 2018-00110S) for construction of two bank stabilization projects on San Mateo Creek: (1) Applicant Paul Dumesnil to remove a dilapidated timber lagging and install stacked boulder bank protection and geoweb slope protection at 221 El Camino Real in San Mateo, California; and the Town of Hillsborough to repair 20 linear feet of eroded streambank with vegetated riprap in the Town of Hillsborough, California.

The projects consist of the following elements:

1.3.1 Project Design

Casa Baywood Apartments, 212 El Camino Real

To stabilize the stream bank behind the Casa Baywood Apartments at 212 El Camino Real, the project proposes to remove failing wooden lagging that was constructed at the toe of the right bank of San Mateo Creek. The wood lagging will be replaced with a modern retaining wall using buried boulders at the toe of slope and beneath the channel bottom with geotextile fabric. Upslope of the boulder wall, double layered fabric with live willow poles will be installed on the slope of the bank. The bank stabilization structure will extend along 146 linear feet of the right bank of San Mateo Creek, extending from the toe of bank slope in the creek to the base of the existing apartment building.

Private Residence, 773 El Cerrito Avenue

Bank failure adjacent to the private residence at 773 El Cerrito Ave resulted from erosion during storm events in the winter of 2016/2017. Erosion is occurring on the left bank for a linear distance of approximately 18 feet along a pier wall. Erosion has exposed the bottom of the grade beam and the top 12 to 18 inches of a few of the cast-in-drilled-hole piers. The proposed action at this site involves placing approximately 40 cubic yards of 500-pound riprap at a 1H:1V slope following the California Department of Transportation (Caltrans) Placement Method A under Caltrans Standard Specifications Section 72-2.03B. The boulders will be planted with live willow poles harvested in the local watershed. Willow poles will also be planted in the disturbed areas just upstream and downstream of the boulder placement.

1.3.2 De-watering and Fish Relocation Activities

Casa Baywood Apartments, 212 El Camino Real

In-channel construction work will occur between June 1 and October 31. The project proposes to avoid operating equipment within the live stream by constructing a cofferdam in San Mateo Creek and de-watering the site. The contractor will construct sandbag cofferdam filled with clean gravel and measuring approximately 4 feet high and 4 feet out from the toe of the bank parallel along 175 linear feet of the creek. The cofferdam will not span the full channel width; they will be placed to isolate the work area on the right side of the bank from the rest of the stream channel. Creek flows will be directed around the work site to the left side of the channel by the cofferdams. By this means, only the right bank portion of the creek will be dewatered with flow continuing downstream around the cofferdam. During de-watering, pump intakes will be screened with a mesh in accordance with NMFS fish screening criteria for steelhead (NMFS, 1997).

Private Residence, 773 El Cerrito Avenue

In-channel work will occur between June 1 and October 31. As planned for the cofferdam at 212 El Camino Real, a cofferdam will be installed around the proposed work area on the left bank of the creek. The cofferdam will not span the full channel width and the dewatered area will be limited to the left bank where construction activities will occur. Streamflow in San Mateo Creek will be directed to the right side of the channel, allowing the creek to flow freely around the dewatered area. The cofferdam will be constructed with sandbags filled with clean gravel, with the dewatered area totaling approximately 29 linear feet of channel. During de-watering, pump intakes will be screened with a mesh in accordance with NMFS fish screening criteria for steelhead (NMFS, 1997). Water within the work area will be pumped out and pass through a filter system before returning to the creek.

Upon completion of the construction of the cofferdams at both project sites, a fisheries biologist will initiate a program to capture and relocate native vertebrates to a suitable location in San Mateo Creek upstream or downstream of the construction site. Fish will be collected using seining, dip netting or electrofishing. The biologist will minimize handling of salmonids, and when handling is necessary the biologist will always wet hands or nets prior to touching fish. Captured fish will be held in a container with a lid that contains cool, shaded water that will be continuously aerated with a battery-powered external bubbler. Fish will not be subjected to jostling or excess noise and will not be overcrowded in the containers. Two holding containers will be available to segregate young-of-the-year fish from larger fish to avoid predation. If fish are abundant, the biologist will periodically cease capture and relocate fish to the pre-selected release location. Fish will not be removed from the container until the time of release. Captured fish will be relocated to the nearest point immediately downstream or upstream of the dewatered area in a site with suitable habitat conditions. For all captured individuals the biologist will identify species, estimate year-classes, and record estimated numbers at the time of release. The fish will not be anesthetized or measured. A report summarizing the fish relocation activities will be submitted to NMFS on January 15th following the relocation effort.

1.3.3 Project Construction Activities

Casa Baywood Apartments, 212 El Camino Real

To remove the failed wooden lagging and construct the new retaining wall, the project will use a long reach excavator, a small trench digger, and hand tools. Approximately 189 cubic yards of existing bank fill would be removed and replaced with 189 cubic yards of boulders and earth backfill below the Ordinary High Water along the 146 linear feet of channel bank. This project will require approximately five weeks, including mobilization, construction, demobilization, and restoration.

Impact avoidance and minimization measures include the following:

- a) Work in the active creek channel will be conducted between June 1 and October 31 during the dry season during which flows are the lowest.
- b) Silt fencing or comparable sedimentation control fencing will be installed along the perimeter of the work areas parallel to the San Mateo Creek in all work areas within 100 feet of stream habitat.
- c) A spill prevention plan for potentially hazardous materials will be prepared and implemented that includes procedures for handling and storing potentially hazardous

materials, as well as clean-up and reporting of any spills. If necessary, containment berms will be constructed to prevent spilled materials from reaching the creek channel.

- d) No construction debris, spoils, or trash will be deposited within 50 feet of San Mateo Creek.
- e) Fueling, cleaning, storage, or maintenance of vehicles or equipment will not occur within 50 feet of San Mateo Creek. Inspection for leaks should take place on all equipment using fuel or requiring fluids on a daily basis.
- f) All temporarily disturbed areas will be restored, at a minimum, to pre-existing conditions using only native vegetation suitable for the area.

Private Residence, 773 El Cerrito Avenue

For construction, the project proposes to use a long-reach excavator equipped with a pneumatic thumb to construct this project. Equipment will operate from El Cerrito Avenue to minimize impacts to the creek bed and riparian areas. Stone will be placed from the roadway by the long-reach excavator to minimize unnecessary damage to the stream bed. Stone will be installed starting at the toe of slope and working upslope. Upon completion of stone installation, interstitial voids will be filled with native material excavated on site. Live willow poles harvested on the site or from a nearby location will be installed in joints between the boulders and in disturbed areas immediately upstream and downstream from the project area. This project will require approximately 30 to 45 days, including mobilization, construction, demobilization, and restoration

Impact and avoidance measures include the following:

- a) Work in the active creek channel will be conducted between June 1 and October 31, during the dry season during which flows are the lowest.
- b) Equipment will not be operated in wetted areas.
- c) Erosion protection shall be employed where necessary (certified weed-free straw, coconut fiber, or coir logs).
- d) A spill prevention plan will be employed.
- e) Prior to construction, a construction employee education program will be conducted to discuss listed steelhead on the site.

“Interrelated actions” are those that are part of a larger action and depend on the larger action for their justification. “Interdependent actions” are those that have no independent utility apart from the action under consideration (50 CFR 402.02). There are no interrelated or interdependent activities associated with the proposed actions.

2 ENDANGERED SPECIES ACT: 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, each Federal agency must ensure that its 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 habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an 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/or 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 designations of critical habitat for listed anadromous salmonids use 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 expected 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 by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a RPA 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 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:

- (1) Biological Assessment for 773 El Cerrito Avenue prepared by WRA Environmental consultants dated August, 2018.

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. The opinion also 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 essential PBFs that help to form that conservation value.

2.2.1 Listed Species

This opinion analyzes the effects of bank repairs on Central California Coast (CCC) steelhead in San Mateo Creek at two locations: (1) Casa Baywood Apartments 212 El Camino Real, San Mateo and (2) adjacent to the private residence at 773 El Cerrito Avenue, Town of Hillsborough. 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. San Mateo Creek is not designated as critical habitat for CCC steelhead or any other listed species under the jurisdiction of NMFS.

2.2.2 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 returning from the ocean to the San Mateo Creek watershed typically immigrate to freshwater between December and April, peaking in January and February. Juveniles migrate as smolts from the watershed 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 31, only juvenile steelhead are likely to be present in the action area during construction activities.

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.

2.2.3 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.* (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).

2.2.4 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. 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 critical habitat is degraded, and does not provide the full extent of conservation value necessary for the recovery of the species. San Mateo Creek is not designated as critical habitat for CCC steelhead.

A final recovery plan for CCC steelhead was completed by NMFS in October 2016 (NMFS 2016). The plan describes key threats, actions needed to achieve recovery, and measurable criteria by which NMFS will determine when recovery has been reached. Recovery plan actions are primarily designed to restore ecological processes that support healthy steelhead populations,

and address the various activities that harm these processes and threaten the species' survival. The recovery plan calls for a range of actions including the restoration of floodplains and channel structure, restoring riparian conditions, improving streamflows, restoring fish passage, protecting and restoring estuarine habitat, among other actions.

2.2.5 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 21st 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 *et al.* 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 projects consists of the bed and banks in two areas of San Mateo Creek, in the cities of San Mateo and Hillsborough, California, respectively. Each action area site is described below:

2.3.1 Casa Baywood Bank Stabilization, 212 El Camino Real, San Mateo

The action area at the Casa Baywood Apartments consists of the streambed and banks of San Mateo Creek extending for a distance of approximately 500 linear feet. This reach of San Mateo Creek is located immediately upstream of creek’s crossing of El Camino Real in the City of San Mateo and directly behind a large apartment complex. The action area includes the footprint of the proposed 146-foot long retaining wall, streambed area to be dewatered, fish relocation sites, equipment staging areas, and the channel downstream for a distance of 100 feet to include the length of waterway in which any temporary disruption to habitat (e.g., fine sediment plume) might be detectable.

2.3.2 Town of Hillsborough adjacent to Private Residence, 773 El Cerrito Avenue

The action area adjacent to the private residence at 773 El Cerrito Avenue consists of the streambed and bank of San Mateo Creek extending for a distance of approximately 400 linear feet. This reach of San Mateo Creek is located within a residential area of large homes. The action area includes the footprint of the bank stabilization structure, streambed area to be dewatered, fish relocation sites, equipment staging areas, and the channel downstream for a distance of 100 feet to include the length of waterway in which any temporary disruption to habitat (e.g., fine sediment plume) might be detectable.

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).

2.4.1 Action Area Overview

The San Mateo Creek watershed is located in a Mediterranean climatic region, with over 95 percent of annual precipitation occurring between October and April. Average annual rainfall over the watershed ranges from 25 to 40 inches, with more rainfall at the higher elevations. 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. San Mateo Creek flows easterly from an elevation of almost 2,000 feet into South San Francisco Bay.

Streamflow above the action area sites is continuously monitored at US Geological Survey (USGS) Gage #11162753 (San Mateo Creek below Lower Crystal Springs Reservoir). Streamflow is typically limited to the amount of water released by the San Francisco Public

Utilities Commission (SFPUC) from Lower Crystal Springs Reservoir which typically ranges from 3 to 17 cfs when the reservoir is not releasing for flood control. Water temperatures in San Mateo Creek have been measured year-round by the SFPUC since 2015 and these results indicate temperatures typically range from a low of 9°C in the winter to a high of approximately 19°C in the fall months.

2.4.2 Status of Steelhead in the Action Area

Although populations of *O. mykiss* occur both upstream and downstream of Lower Crystal Springs Dam (Leidy *et al.* 2005), the dam upstream of the project site is a barrier to anadromy and threatened CCC steelhead are currently limited to the lower 5 miles of San Mateo Creek. The overall steelhead population within the San Mateo Creek watershed was substantially affected by the construction of Upper Crystal Springs Dam in 1877 and Lower Crystal Springs Dam in 1888. Since the late 1800s, Lower Crystal Springs Dam has prevented anadromous fish from accessing over 80 percent of watershed.

Redd surveys conducted by the SFPUC in 2015, 2016, and 2018 confirmed the presence of adult CCC steelhead spawning upstream of the action area in San Mateo Creek. All redds were observed in January, February and early March.

Sampling and surveys conducted by SFPUC of juvenile *O. mykiss* are used to generate annual abundance and density estimates for San Mateo Creek upstream of the action area, in a 2.3-mile long reach immediately downstream from Lower Crystal Springs Dam. Densities of juvenile *O. mykiss* have been estimated at 18.3, 19.2, 38.0 and 43.0 fish per 100 feet for years 2015, 2016, 2017, and 2018, respectively (A. Brinkerhoff, personal communication, 2018).

2.4.3 Status of Habitat in the Action Area

Stream habitat in the action area has been highly modified by water development and urbanization. Creek flow through the action area has been impaired by Crystal Springs Reservoir for the past 130 years. The lack of winter high flow events has resulted in the accumulation of fine sediment, encroachment of riparian vegetation, and channel simplification. San Mateo Creek in the action area has been constrained and encroached by urban development. At the Casa Baywood Apartments, the apartment building extends as close as 20 feet from the top of bank at one site while the opposite bank is constrained by additional structures and a parking area. At 773 El Cerrito Avenue, a bridge has been constructed over the creek channel for access between the private residence and El Cerrito Avenue.

In-stream habitat quality for steelhead has been diminished by low quantities of gravel and cobble substrate, lack of sinuosity, and narrow floodplain. Boulders, large woody debris and other forms of instream cover are lacking in many areas. Well-developed riparian vegetation within the channel and along the banks provides significant shading and an insulating canopy that moderates water temperatures. SFPUC (2017) reports coarse sediment entering San Mateo Creek from an eroding slope at one of the Interstate 280 bridge abutments has significantly increased the amount of sand and gravel in the channel in recent years.

2.4.4 Factors Affecting the Species Environment in the Action Area

For more than 130 years the presence and operation of Lower Crystal Springs Dam and urbanization have significantly affected the environment of the action area. The dam was completed in 1888 and has precluded access by steelhead to more than 80 percent of the San Mateo Creek watershed. Streamflow in San Mateo Creek has been impaired since creation of Lower Crystal Springs Dam as the facility intercepts all of the upper watershed flows

For approximately 130 years, flow in San Mateo Creek below Lower Crystal Spring Dam consisted of approximately 0.66 cfs release to the creek originating from leaky valves and pipes at the dam. Releases of water from the reservoir in excess of the 0.66 cfs leakage were rare and primarily occurred when the reservoir spilled. Beginning in 2015, the SFPUC initiated releases from the reservoir ranging from 3 to 17 cfs to maintain suitable conditions in lower San Mateo Creek for steelhead migration, spawning and rearing. Due to the large upstream water impoundment (Lower Crystal Springs Reservoir), the stream channel in the action area has experienced a lack of high flow events that would naturally occur during most rainy seasons. As a response to the curtailment of peak flows, the channel has accumulated an excessive amount of fine sediment, channel width has narrowed, sinuosity has decreased, riparian vegetation has encroached, and there is a lack of gravel bars and other depositional features.

In the action area, urban development adjacent to San Mateo Creek extends to the top of bank. Large buildings, private residences, and associated roadways are present immediately adjacent to the creek. Storm drains are present that lead to the creek from roadways and paved areas. This development contributed to increased erosion, channel simplification, chemical toxicity from stormwater discharges, and concentrated surface runoff following precipitation events.

2.4.5 Previous Section 7 Consultations Affecting the Action Area

In October 2010, NMFS and the Corps completed formal section 7 consultation for the SFPUC's Lower Crystal Springs Dam Improvement Project (Corps File #30317S) and the Crystal Springs/San Andreas Transmission System Upgrade (Corps File #400143S) (NMFS PCTS SWR-2010-749). The Lower Crystal Springs Improvement Project consultation addressed the effects of SFPUC improvements to Lower Crystal Springs Dam and its associated water transmission system. Construction impacts and the future operation of the reservoir were evaluated in the NMFS opinion issued on October 29, 2010. The October 29, 2010, opinion concluded the Lower Crystal Springs Dam Improvement Project was not likely to jeopardize the continued existence of CCC steelhead, or adversely modify or destroy designated critical habitat. Temporary effects of construction were anticipated in the area immediately below the dam as well as the permanent loss of some pool habitat at the base of the dam. Incidental take of steelhead was anticipated related to fish capture and relocation efforts during construction, and subsequent fish surveys of San Mateo Creek. Upon completion of construction in 2014/2015, the new operations plan for Lower Crystal Springs Dam significantly improved streamflow conditions for all freshwater life stages of steelhead in San Mateo Creek downstream. To evaluate the long-term operation of Lower Crystal Springs Dam, the opinion and incidental take statement provides for a monitoring program that involves steelhead spawning surveys, fall juvenile fish sampling, downstream migrant trapping of smolts, and water quality monitoring.

NMFS has completed programmatic consultations for salmonid habitat restoration actions that include the action area of these projects. To date, no habitat restoration actions covered under existing programmatic Section 7 consultations have occurred 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 San Mateo Creek watershed, including the action area of these projects. 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 August 2019, no research activities authorized by these NMFS programs have occurred in San Mateo Creek.

2.4.6 Climate Change Impacts in the Action Area

Information discussed above in the Range-wide Status of the Species and Critical Habitat section of this opinion (Section 2.2) indicates that CCC steelhead in the action area may have already experienced some detrimental impacts from climate change. These detrimental impacts across the action area are likely to be minor because natural and local climate factors continue to drive most of the climatic conditions steelhead experience. These natural factors are likely less influential on fish abundance and distribution than anthropogenic impacts across the action area. However, in the future impacts in the action area from climate change are likely to increase as air and water temperatures warm, and precipitation rates change.

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.

Construction activities associated with the bank stabilization at the two project sites will be limited to a single work season between June 15 and October 31. Effects to threatened CCC steelhead are expected during fish relocation, during work site dewatering, and from degraded water quality.

2.5.1 Fish Relocation Activities

Fish collection and relocation will be performed in coordination with dewatering prior to construction. The dewatered area at the Casa Baywood Apartments site will be four feet out from the toe of the east bank of San Mateo Creek for approximately 175 linear feet. The dewatered area for the bank repair project adjacent to 773 El Cerrito Avenue will be approximately four feet out from the toe of the bank for a channel distance of approximately 29 linear feet. Before and during dewatering of the construction sites, 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 areas will be captured using dip nets, seines, and/or an electrofisher 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 and prior to the adult migration and spawning season. Therefore, NMFS expects the CCC steelhead that will be captured at the Casa Baywood site and 773 El Cerrito Avenue site 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, but estimates can be made from available information. SFPUC (2015, 2016, 2017, 2018) report observations of juvenile *O. mykiss* from various surveys of San Mateo Creek. The estimated density of *O. mykiss* ranged from 18 to 43 *O. mykiss* per 100 linear feet of channel. Based on the highest densities of 43 *O. mykiss* per 100 linear feet of stream, the Casa Baywood site may support as many as 75 juvenile steelhead in the 175 linear feet of channel to be dewatered. At the 773 El Cerrito Avenue site, as many as 12 juvenile steelhead may be present in the 29 linear feet of channel to be dewatered. This is expected to be the maximum numbers that would be captured and relocated at each project site.

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 fisheries biologists, direct effects to and mortality of juvenile steelhead during capture will be minimized.

Sites selected for relocating fish are expected to have similar and ample aquatic habitat as in the capture sites. 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 in San Mateo Creek adjacent to both project sites 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 captured and relocated. Data on fish relocation efforts in California streams 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 the steelhead captured by the projects for dewatering will be injured or killed during relocation activities.

2.5.2 Dewatering Activities

The projects propose to isolate the work area with cofferdams and bypass streamflow around the construction sites. The extent of channel that will be dewatered for construction will be approximately 175 linear feet (700 square feet) at the Casa Baywood site, and approximately 29 linear feet (72 square feet) at the 773 El Cerrito Avenue site. Clean gravel bags will be installed longitudinally in the channel approximately four feet from the toe of bank. With the cofferdams not spanning the full channel width, the streamflow of San Mateo Creek will continue to pass downstream along the bank opposite the cofferdams.

This approach to dewatering only a portion of the channel width is expected to create only minor temporary changes to the streamflow during the cofferdam construction process. These fluctuations in flow are anticipated to be small, gradual, and short-term. Once the cofferdam is installed and operational, streamflow will flow around the work sites. The dewatering of a portion of the channel width for a distance of up to 175 feet and 29 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 be 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 work site prior to dewatering.

The temporary cofferdams in the creek at the construction site are not expected to impact juvenile steelhead movements in San Mateo Creek beyond typical summer low-flow conditions. Steelhead experience intermittent conditions in many central California coastal streams during summer which impede upstream and downstream movements by juveniles. Since both projects allow flow around the cofferdams on the opposite side of the creek, the temporary cofferdams will not impede individual steelhead movements in San Mateo Creek.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates (a salmonid prey item) within the dewatered areas inside the cofferdams may be killed or their abundance reduced when creek habitat is dewatered and disturbed (Cushman 1985, Thomas 1985, Harvey 1986). However, effects to aquatic macroinvertebrates are expected to be temporary and minor due to the relatively small area of dewatering (approximately 175 and 29 linear feet of channel). Rapid recolonization (typically one to two months) by macroinvertebrates is expected following removal of the cofferdams and channel re-watering. Based on the foregoing, NMFS does not expect the loss of aquatic macroinvertebrates as a result of dewatering activities by the projects would adversely affect CCC steelhead foraging during and after project implementation.

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

During construction, project activities at Casa Baywood Apartments and 773 El Cerrito Avenue would result in disturbance of the creek bed and banks for equipment access, bank and channel contouring, placement of boulders, and for the placement/removal of the cofferdams. While the cofferdams are in place, construction activities are not expected to degrade water quality in San Mateo Creek because the work area will be dewatered and isolated from the flowing waters of the creek. Post-construction, NMFS anticipates disturbed soils could affect water quality and critical habitat in the action area in the form of small, short-term increases in turbidity during re-watering (*i.e.*, cofferdam removal) and subsequent higher flow events during the first winter storms post-construction. Disturbed soils on the creek bank are easily mobilized when late fall and winter storms increase streamflow levels. 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 as described above, sedimentation and turbidity levels associated with these projects during cofferdam construction and removal, the subsequent rewetting of work sites, 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 use of erosion control measures throughout the construction phase and the post-construction planting of native vegetation, NMFS anticipates there will be minimal area of disturbed, exposed soils remaining post-construction. Therefore, any resulting mobilization of sediment is expected to be minor, and elevated turbidity levels would be small, only occur for a short period, and be 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). 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 and methods used to control sediment. 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 projects.

2.5.4 Effects on Habitat

Juvenile steelhead rearing habitat in the action area will be temporarily impacted by dewatering approximately 175 and 29 linear feet of channel respectively. The amount of physical habitat available for rearing juveniles will be reduced by this amount for a period of up to five weeks at the Casa Baywood site and up to 45 days at 773 El Cerrito Avenue site. During this period, food supplies within the dewatered reach will be temporarily reduced. Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates 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 is expected to be short-term. Because construction activities will be short-lived and the dewatered reaches are relatively small, 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 streamflow would be bypassed around the construction work sites. Based on the foregoing, NMFS expects the temporary loss of habitat space and impacts to aquatic macroinvertebrates as a result of dewatering activities would result in only minor adverse effect to rearing juvenile steelhead in the action area.

The temporary cofferdams are not expected to adversely affect steelhead migration because the dams will not be in place during periods of adult and smolt steelhead migration in San Mateo Creek. Construction activities will be limited to the period between June 1 through October 31 when adults and smolts are not actively migrating and cofferdams will be removed prior to the beginning of the adult migration season.

The projects propose to place rock rip-rap and a retaining wall over unstable, eroding banks at two locations to protect the banks from further slippage and erosion during high flows events. In combination with existing bank stabilization in San Mateo Creek, these actions are anticipated to effect the channel by maintaining the current alignment and precluding lateral movement of the channel. Natural fluvial and geomorphic processes in San Mateo Creek have been compromised by 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, existing bank stabilization structures have inhibited 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.*). Although the linear channel length affected by the proposed projects is 166 feet combined (146 feet at Casa Baywood Apartments and 18 feet at 773 El Cerrito Avenue), by stabilizing the streambanks of San Mateo Creek with rock rip-rap and replacement of a retaining wall, the projects will continue to maintain the currently compromised conservation value of steelhead habitat in the action area. However, the use of willow clippings are expected to benefit 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 bank stabilization projects at two sites on an Mateo Creek proposes to dewater small sections and will not span the full channel width (approximately 175 linear feet at Casa Baywood Apartments and approximately 29 linear feet at 773 El Cerrito Avenue). Construction activities will be limited to the dry season (between June 1 and October 31). Therefore, it is anticipated that only rearing juvenile steelhead will be present in the action area during construction and no adult or smolt life stages of steelhead would be affected by proposed activities. NMFS estimates up to 75 juvenile CCC steelhead may be present at the Casa Baywood site, and 12 juvenile CCC at the 773 El Cerrito Avenue site that will be dewatered prior to construction.

As described in the Effects of the Action section above, NMFS identified dewatering and fish relocation as the adverse effects on CCC steelhead that would result from the proposed projects. Prior to dewatering the sites for construction, fish would be collected and relocated from the work areas. Juvenile steelhead present in the immediate project work areas 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 streamflow.

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 these projects. 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 75 and 12 juvenile steelhead at Casa Baywood and 773 El Cerrito Avenue, respectively, are expected to be present, NMFS expects no more than three (3) juvenile steelhead at Casa Baywood, and one juvenile steelhead at 773 El Cerrito Avenue 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 Mateo watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the project sites due to relocation and dewatering. Thus, it is unlikely that the small potential loss of up to four (4) juvenile steelhead during the duration of activities for these projects will impact future adult returns.

Dewatering of approximately 175 and 29 linear feet of creek channel to construct the bank stabilization structures will result in temporary and minor impacts aquatic macroinvertebrates. These 175- and 29-foot long reaches of stream will be dewatered up to five weeks at Casa Baywood and 45 days at 773 El Cerrito Avenue during one summer season. Macroinvertebrate populations subjected to dewatering are expected to recover within one to two months after construction. The planting of native vegetation is expected to create shade, produce allochthonous food and shelter, and assist with stabilizing bank sediments.

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 streamflow 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 these projects, in-water activities will occur for up

to five weeks in 2019 or 2020, and the above effects of climate change will not be detected within that time frame. If the effects of climate change are detected over the short term, 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 section of this opinion (Section 2.4) and annual variations. CCC steelhead 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' opinion that the proposed actions are 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 of 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 repair projects at Casa Baywood Apartments, 212 El Camino Real in the City of San Mateo, and 773 El Cerrito Avenue in the Town of Hillsborough 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.

During fish relocation and dewatering of the 175-foot long reach at Casa Baywood Apartments, up to 75 juvenile steelhead may be collected, and of those 75 fish, three may be injured or killed. During fish relocation and dewatering of the 29-foot long reach at 773 El Cerrito Avenue, up to 12 juvenile steelhead may be collected, and of those 12 fish, one may be injured or killed.

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 alternatives” refer to alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency’s legal authority and jurisdiction, that are economically and technologically feasible, and that would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat (50 CFR 402.02).

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 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) 575-6050. 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 31
- d) All pumps used to divert live streamflow will be screened and maintained throughout the construction period to comply with NMFS' Fish Screening Criteria for Anadromous Salmonids. See: https://www.westcoast.fisheries.noaa.gov/publications/hydropower/southwest_region_1997_fish_screen_design_criteria.pdf

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

The Corps or applicants 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.

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 are the U.S. Army Corps of Engineers and the applicants for the Casa Baywood project and the 773 El Cerrito Avenue project. Other interested users could include the Town of Hillsborough and WRA Environmental Consultants, as well as citizens of affected areas, or others interested in the conservation of CCC steelhead. This opinion was provided to the Corps and opinion will be available through the NOAA Institutional Repository (<https://repository.library.noaa.gov/>), after approximately two weeks. 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 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, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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4.2 Personal Communication

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