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

July 21, 2023 **Refer to NMFS No:** WCRO-2023-01018

Dr. Sarah Firestone
Senior Project Manager, Regulatory Division
U.S. Department of the Army
Corps of Engineers, San Francisco District
450 Golden Gate Avenue, 4th Floor
San Francisco, California 94102

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Meadowgreen #2 Homeowners Association Bank Stabilization Project in Santa Rosa, Sonoma County, California (Corps File No. SPN-2019-00097)

Dear Dr. Firestone:

Thank you for your letter of May 24, 2023, 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 the Meadowgreen #2 Homeowners Association (HOA) Bank Stabilization Project. The HOA has applied for a Nationwide permit from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act of 1972, as amended, 33 U.S.C. § 1344 et seq., and Section 10 of the Rivers and Harbors Act (RHA) of 1899, as amended, 33 U.S.C. § 403 et seq., to stabilize a section of Oakmont Creek's stream bank and to create two off-channel fish habitat areas. The proposed project is located on Oakmont Creek behind several homes on Meadowgreen Place in the City of Santa Rosa, Sonoma County, California.

In this biological opinion, we conclude that the proposed action is not likely to jeopardize the continued existence of the federally threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*). However, NMFS anticipates that incidental take of CCC steelhead is reasonably certain to occur as a result of the proposed action. Therefore, an incidental take statement with terms and conditions is included with the enclosed biological opinion.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)] for this action. Based on NMFS' review of the likely effects of the proposed action on EFH, the proposed action will occur within an area identified as EFH managed under the Pacific Coast Salmon Fishery Management Plan. The proposed action includes measures to avoid or minimize potential adverse effects to EFH. Thus, no additional EFH conservation measures are provided.

Please contact Lu Wang, North Coast Branch, Santa Rosa Office at 707-575-6077 or via email at lu.wang@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

A. Catherine Marcinkevage

for Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: F. Kelly Finn, U.S. Army Corps of Engineers, Eureka, California
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Copy to E-file FRN 151422WCR2023SR00142

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Meadowgreen #2 Homeowners Association Bank Stabilization Project

NMFS Consultation Number: WCRO-2023-01018
Action Agency: U.S. Army Corps of Engineers

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?
Central California Coast (CCC) steelhead DPS (*Oncorhynchus mykiss*)	Threatened	Yes	No	No	No

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon Fishery Management Plan	Yes	No

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

Issued By: A. Catherine Marcinkevage for

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: July 21, 2023

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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 U.S.C. 1531 et seq.), as amended, and implementing regulations at 50 CFR part 402. We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR part 600.

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 within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS' North-Central Coast Office in Santa Rosa, California.

1.2. Consultation History

NMFS has been in technical assistance with the Meadowgreen #2 HOA Bank Stabilization Project (Project) since 2019. On September 3, 2019, the U.S. Army Corps of Engineers (Corps) requested information regarding section 7 consultation with NMFS. On September 24, 2019, NMFS responded to the Corps' consultation request, and did not concur with the Corps' not likely to adversely affect determination. NMFS determined the proposed Project was likely to adversely affect CCC steelhead because the project requires dewatering the creek and translocating fish. On March 11, 2020, NMFS staff met with a homeowner and LACO Associate engineers to discuss dewatering issues and fish rescue, construction techniques, and project timing, and permitting pathways. On July 14, 2022, the homeowners, LACO, and NMFS met on-site to review the bank stabilization sites and discuss issues relating to dewatering and fish rescue, bank stabilization techniques, project timing, and permitting pathways.

On May 24, 2023, NMFS received an email from the Corps requesting formal section 7 consultation. The email included the following consultation documents: Biological Assessment for Meadowgreen Bank Stabilization Project, Sonoma County, California, prepared by Stillwater Sciences for the HOA, dated February 2023, an enclosure from LACO Associates with a revised project description dated May 11, 2023, and a technical memorandum from Stillwater Sciences detailing the Project's aquatic species translocation plan. On June 15, 2023, the Corps sent via email an enclosure from LACO Associates titled Description of Habitat Creation for Meadowgreen #2 HOA Bank Stabilization, detailing the creation of the two small alcoves, dated May 23, 2023. NMFS received sufficient information on June 15, 2023, to initiate consultation.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). Under the MSA, "Federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal agency (see 50 CFR 600.910). We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

The HOA has applied for a Nationwide permit with the Corps to repair the failing stream bank along an unnamed tributary to Santa Rosa Creek that threatens the adjacent properties at 6510, 6512, 6514, and 6516 Meadowgreen Place, in the Oakmont Village within the City of Santa Rosa. The unnamed tributary is known locally by the City of Santa Rosa as Oakmont Creek, and will be referred to as Oakmont Creek throughout the Biological Opinion. The proposed Project consists of stabilizing four locations totaling approximately 325 linear feet (LF) along the stream bank, which has been actively eroding during periods of high flows, resulting in over-steepened banks approximately four to twelve feet in height. Access to the project site will be provided via two access (40 ft long by 16 ft wide) points located southwest from the bank of Oakmont Creek, with a temporary staging area located on the field between Oakmont Creek and Timber Springs Drive. The two construction access points will be graded and revegetated to widen the stream channel to avoid constricting stream flows and create two alcove habitat features. In total, approximately 0.738 acres of the project area will be replanted with native vegetation obtained from local sources.

Temporary impacts below the Ordinary High Water Mark (OHWM) total 0.102 acres from dewatering, and temporary impacts above OHWM total 0.022 acres. Post construction, permanently impacted areas below OHWM include 0.041 acres of bioengineered stream bank, and 0.010 acres due to construction access grading, while permanently impacted areas above OHWM include 0.015 acres of bioengineered stream bank and 0.054 acres of construction access grading. In total, 443 cubic yards of rip rap and 505 cubic yards of cut soil will be used for this project. Equipment likely to be used for this project includes the following: front-end loader, motorized hand tamp, excavators, survey equipment, hand tools, flatbed trucks, dump truck, backhoe, pickup trucks, pumps, and crane mats. Construction is anticipated to take place between June 15 and October 15. Construction activities would occur during daylight hours.

Streambank stabilization
Planted rock slope protection will occur at the four treatment sites for a total of 325 LF within about 370 LF of the right (looking downstream) streambank. A mix of one- and two-ton rock lifts (first lift keyed into the stream substrate) will be installed along the eroding banks. Willow (*Salix spp.*) and dogwood (*Cornus spp.*) cuttings will be planted between boulders within the rock slope protection. The ¾- to 1½-inch diameter poles will be set 8 inches on center within 6 inches of river run growing medium that will be installed between the rock lifts. Disturbed areas along the top of the bank and in temporary access areas will be revegetated with staggered plantings (not in rows) of native trees and shade tolerant plants, including big leaf maples (*Acer macrophyllum*), coast live oaks (*Quercus agrifolia*) and black oaks (*Q. kelloggii*) as well as California blackberries (*Rubus ursinus*), honeysuckle (*Lonicera hispidula*), California rose (*Rosa californica*) and other native shrubs, Santa Barbara sedge (*Carex barbarae*) and rushes (*Juncus patens*). Areas of temporary construction disturbance containing grasses and bushes will be reseeded with a native seed mix. Plantings will receive scheduled watering throughout the duration of the construction contract. The plantings will then be watered regularly during the following dry season and monitored and maintained throughout the following five-year term. Any identified unstable areas will require appropriate erosion control measures, including but not limited to netting, vegetation, silt fencing, and straw. All areas where erosion control fabric is not installed shall be seeded and mulched.

Diversion and dewatering
Work within the project channel will require dewatering, water diversion, and fish capture and relocation. Work within areas of shallow groundwater will also require dewatering.
The entire 370-foot project reach will be dewatered for the duration of the construction period, totaling 0.102 acres. Dewatering will be accomplished by installing a temporary gravel bag/impermeable lining cofferdam at the upstream end of the work area to impound instream flow. A second cofferdam will be placed near the downstream end of the work area. A screened pump or gravity intake pipe will be installed within the upstream cofferdam to divert water into a pipe that runs around the project reach for discharge downstream. If pumps are used to divert water around the construction area, they would be screened in accordance with Juvenile Fish Screen Criteria for Pump Intakes developed by NMFS (NMFS 1996). The pump should be placed in a large basin with holes to allow water to be drawn into the pump. Both the outside of the basin and the pump should be screened with 3/32-inch mesh to ensure aquatic species do not get sucked into the pumps. The diversion system will be in place for the entire work period.

The initial fish removal efforts will occur one day prior to installation of the upstream and downstream cofferdams. A block net will be installed at the upstream end of the work area, and several feet upstream of the cofferdam footprint. Aquatic species will be herded downstream of the project area using small seines, D-frame dip nets, or other suitable equipment. A block net will also be installed at the downstream end of the project reach to keep organisms from reentering the reach. Herding passes will be conducted through the project reach for at least three times, or until it appears that all fish and amphibians have been removed. It is not expected that electrofishing will be necessary for the initial clearing of the work area. However, if electrofishing is used, trained and experienced biologists will conduct the effort, and the captured fish and amphibians shall be segregated by size to minimize predation, and maintained in cool,

well-oxygenated water until released to suitable habitat outside the construction impact area. A NMFS- and CDFW-approved biologist will be retained to monitor the dewatering operations and remove/relocate any steelhead or other aquatic species that may become stranded. A second fish removal effort will take place during dewatering. Fish and amphibians exposed as water levels drop will be captured using hand and dip net capture methods, segregated by size, and placed in cool, well-oxygenated water until released to suitable habitat upstream and downstream of the project area. Further fish relocation information can be found in LACO's Aquatic Species Translocation Plan.

Groundwater dewatering, if necessary, will be completed by excavating sumps in the stream substrate into which submersible pumps would be placed. Groundwater will be discharged into upland areas, Baker Tanks® (or equivalent), or downstream of the cofferdam in accordance with federal and state water quality regulations and permit requirements.

Construction access
Construction equipment and material will be staged on the field between the left bank of Oakmont Creek and Timber Springs Drive. Two temporary access ramps will be constructed that enter the channel from the left bank by excavating a portion of the streambank with a bulldozer, backhoe, or other heavy equipment. The access ramps will be constructed outside of the low-flow channel from the top of bank to the streambed (approximately 40 feet long by 16 feet wide) and will involve grading the existing bank to provide a gradually sloped ramp into the channel. Equipment will then move within the channel up and downstream to access construction sites. Crane mats and other isolation materials (e.g., silt fences, construction fencing, etc.) will be used to cover and protect any isolated pools that may remain following dewatering activities.

Alcove construction
Access to the project site will be provided via two access points located southwest from the bank of Oakmont Creek, with a temporary staging area located on the field between Oakmont Creek and Timber Springs Drive. The two construction access points will be graded and revegetated to widen the stream channel and create two alcove habitat features. The two small alcoves will be carved out of the left bank (looking downstream). These alcoves will create areas of slower velocities during larger storm events which steelhead and other aquatic species can use for high-flow refugia. The alcove slopes will be planted with sedge and rush, and the alcove placements will avoid disturbing the roots of mature native oak and bay trees.

During construction, the alcoves will be used to access the channel for the construction of the rock slope protection and willow and dogwood plantings on the opposite (right) bank. The alcoves will be excavated into the existing near-vertical lower streambank and laid back to a stable slope. At the lowest elevation, the slope will be 5:1 for the first 2 feet of elevation, before transitioning to a 2:1 slope that will extend to the top of bank. This slope transition zone will be lined with willow wattles to protect the slope and to increase the tree canopy for cooler water temperatures during the summer months.

After construction, the slopes of the alcoves will be seeded with a native perennial grass mix and covered with a biodegradable coir erosion control blanket. A straw wattle will be placed mid-slope to break up runoff and capture sediment during seed establishment. The top half of the

slope will be revegetated with native shrubs and trees to fill in gaps in the existing riparian vegetation. The plants will be watered and maintained with a temporary drip irrigation system for a 5-year establishment period.

Protective measures
The proposed action includes the following Avoidance and Minimization Measures (AMMs):

- All work will be conducted within the in-channel construction window of June 15 to October 15.
- All spill kits will be on-site and that all fuel and hydraulic lines on heavy equipment are in good working order.
- Conduct all fueling and lubrication operations at the designated out-of-channel laydown site.
- No fuel storage facilities within the banks of the channel.
- All equipment will be serviced on an as-needed basis with the necessary fueling and lubrication conducted at the designated locations daily prior to start of work.
- All tires, auto body debris, large metal debris, and trash will be removed from the construction area and disposed of properly.
- All construction personnel shall attend an environmental education program delivered by a qualified biologist prior to working in the project area.
- Construction personnel shall not feed or otherwise attract any wildlife.
- Storage of construction and excavated material will occur outside of the active channel.
- Fill, spoils stockpiles, and soil disturbed during construction will be protected with silt fences, straw wattles, and other standard erosion control measures.
- Implementation of a Stormwater Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs) to control erosion including silt fences, straw wattles, seed-free mulching, revegetation, and the spoil laydown areas outside of the channel.

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 to 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 provide 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 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 "jeopardize the continued existence

of" a listed species, which is "to engage in an action that reasonably 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 also relies on the regulatory definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation of critical habitat for CCC steelhead uses the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced 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.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion, we use the terms "effects" and "consequences" interchangeably.

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their critical habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly 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; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

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 effects of the project's actions on the listed species in question, their anticipated response to these actions, and the

environmental effects of the actions as a whole was formulated from the aforementioned resources and the BA (Stillwater Sciences 2023) for this project. 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.

The issues NMFS is obliged to address in this opinion are wide-ranging, complex, and often not directly referenced in scientific literature. We base many of our conclusions on explicit assumptions informed by the available evidence. By this, we mean to make a reasonable effort to compile the best scientific and commercial empirical evidence related to the analysis and to then apply general and specific information on salmonid biology from the published literature to make inferences and establish our conclusions. In some cases, we have used the results of recent project specific studies or analyses conducted in the action area. In other situations, only more general local data are available on species presence or absence, and habitat condition. Where necessary, we have used this information and combined it with more general information from the scientific literature to infer salmonid response to the proposed action. In several instances, we make reasonable inferences that rely mainly on information in the scientific literature, because local data are not available.

2.2. Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that is likely to 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' "reproduction, numbers, or distribution" for the jeopardy analysis. 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 function of the PBFs that are essential for the conservation of the species.

NMFS assesses four population viability[1] parameters to discern the status of the listed Distinct Population Segment (DPS) and to assess each species' ability to survive and recover. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany *et al.* 2000). While there is insufficient data to evaluate these population viability parameters quantitatively, NMFS has used existing information to determine the general condition of the populations in the CCC steelhead DPS and the factors responsible for the current status of these listed species.

We use these population viability parameters as surrogates for "reproduction, numbers, and distribution" in the regulatory definition of "jeopardize the continued existence of" (50 CFR 402.02). For example, abundance, population growth rate, and distribution are surrogates for numbers, reproduction, and distribution, respectively. The fourth parameter, diversity, is related to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when

[1]NMFS defines a viable salmonid population as "an independent population of any Pacific salmonid (genus *Oncorhynchus*) that has a negligible risk of extinction due to threats from demographic variation, local environmental variation, and genetic diversity changes over a 100- year time frame" (McElhany *et al*. 2000).

genetic or life history variability is lost or constrained, resulting in reduced population resilience to environmental variation at local or landscape-level scales.

This opinion analyzes the effects of the proposed action on the CCC steelhead DPS:

CCC steelhead DPS
Threatened (71 FR 834; January 5, 2006).

2.2.1. CCC Steelhead Status

CCC steelhead was listed as federally threatened in 1996 and updated in 2006 and critical habitat was designated in 2005. This DPS includes all naturally spawned steelhead from the Russian River in Sonoma County to Aptos Creek in Santa Cruz County as well as the drainages of San Francisco, Suisun, and San Pablo Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. Historically, approximately 70 populations[2] of steelhead existed in the CCC steelhead DPS (Spence *et al.* 2008, Spence *et al.* 2012). About 37 of these were considered independent, or potentially independent (Bjorkstedt *et al.* 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhaney *et al*. 2000, Bjorkstedt *et al*. 2005).

While historical and present data on abundance are limited, CCC steelhead 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). Though still below historic levels, the trend of adult returns to the Warm Springs and Coyote Valley fish facilities on the Russian River has improved since the 1980s and '90s. 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, Pudding, Caspar creeks) of individual run sizes of 500 fish or less (62 FR 43937; August 18, 1997). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). In San Francisco Bay streams, reduced population sizes and fragmentation of habitat has likely also led to loss of genetic diversity in these populations.

A 2008 viability assessment of CCC steelhead concluded that populations in watersheds that drain to San Francisco Bay are highly unlikely to be viable, and the limited information available did not indicate that any other CCC steelhead populations were demonstrably viable (Spence *et al*. 2008). Although there were average returns (based on the last ten years) of adult CCC steelhead during 2007/08, research monitoring data from the 2008/09 and 2009/10 adult CCC steelhead returns show a decline in returning adults across their range compared to the previous ten years. The lack of adequate spawner surveys within the Russian River precludes the estimation of wild steelhead escapement within the basin; however, hatchery returns suggest the vast majority of returning fish are of hatchery origin. Information from years of the Coastal

[2] Population as defined by Bjorkstedt *et al.* 2005 and McElhaney *et al.* 2000 as, in brief summary, a group of fish of the same species that spawns in a particular locality at a particular season and does not interbreed substantially with fish from any other group. Such fish groups may include more than one stream.

Monitoring Program in the Santa Cruz Mountains suggests that population sizes there are higher than previously thought. However, the long-term downward trend in the Scott Creek population, which has the most robust estimates of abundance, is a source of concern. Population-level estimates of adult abundance are not available for any of the seven independent steelhead populations (i.e., Novato Creek, Corte Madera Creek, Guadalupe River, Saratoga Creek, Stevens Creek, San Francisquito Creek, and San Mateo Creek) inhabiting the watersheds of the coastal strata.

The most recent status update concludes that steelhead in the CCC DPS remain "likely to become endangered in the foreseeable future", as new and additional information does not appear to suggest a change in extinction risk (Howe 2016). NMFS concluded that the CCC steelhead DPS shall remain listed as threatened (81 FR 33468; May 26, 2016). While data availability for this DPS remains generally poor, the new information for CCC steelhead available since the previous viability assessment (2016) indicates that overall extinction risk is moderate and has not changed appreciably since the prior assessment (Spence 2022).

2.2.2. Additional Threats to Listed Species

Another factor affecting the rangewide status of steelhead is climate change. Impacts from global climate change are already occurring in California and listed salmonids here may have already experienced some detrimental impacts. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir *et al.* 2013). California has a history of episodic droughts. However, the state has experienced a two-decade period of persistently warm and dry conditions. The five-year period from 2012 to 2016 was the driest since record keeping began (Williams *et al.* 2016). The extreme drought conditions for most of California from January 2020 through October 2021 resulted from the lowest total precipitation and near-highest temperatures recorded since 1895 (Mankin *et al.* 2021).

The threat to salmonids from global climate change will continue to 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 be comprised of higher temperatures (Hayhoe *et al.* 2004, Moser *et al.* 2012; Kadir *et al.* 2013). Total precipitation in California will likely decline and critically dry years may increase (Lindley *et al.* 2007; Schneider 2007; Moser *et al.* 2012). Although wildfires are an integral ecological feature in California, they are expected to increase in frequency and magnitude (Westerling *et al.* 2011, Moser *et al.* 2012, Goss *et al.* 2020).

For Northern California, most models project heavier and warmer precipitation. Extreme wet and dry periods are projected, increasing the risk of both flooding and droughts. Many of these changes are likely to further degrade salmonid habitat by reducing stream flow during the summer and raising summer water temperatures. For example, 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 will also experience a higher degree of variability of annual precipitation during the next 50 years.

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).

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 this project includes a 370-feet long reach within Oakmont Creek where dewatering would occur, and the two associated access areas. Oakmont Creek flows into Santa Rosa Creek, a tributary to Mark West Creek. The Mark West Creek watershed encompasses the City of Santa Rosa, California, and flows into the Russian River.

The action area is located behind the residences of 6510, 6512, 6514, and 6516 Meadowgreen Place, just west of the intersection of Highway 12 and Oakmont Drive, within Oakmont Village. The site is situated on a portion of Oakmont Creek's stream bank and contains a variety of tree species and riparian vegetation along the creek. The site is bounded by single-family residences to the north and east and Oakmont Creek to the south and west. The site is zoned Planned Development, with a land use designation of Low Residential. All surrounding properties are developed. The creek has a decent riparian zone and extensive canopy cover.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. 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 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The proposed action is located on an unnamed tributary to Santa Rosa Creek, known locally by the City of Santa Rosa as Oakmont Creek. Santa Rosa Creek is a 22-mile-long (35 km) stream in Sonoma County, California, with headwaters on Hood Mountain and drainage to the Laguna de Santa Rosa. Major tributaries to Santa Rosa Creek include Piner Creek, Matanzas Creek and Rincon Creek. Annual precipitation in the Sonoma Creek watershed is between 60–70 cm (24–38 inches).

The proposed action is located on four residential parcels in the Oakmont Village community's Meadowgreen subdivision. The site is bordered by residential development with open space

further to the south and west. Vegetation within the site consists of annual grasses, ornamental landscaping and several riparian and upland trees including California walnut (*Juglans californica*), California bay laurel (*Umbellularia californica*), big-leaf maple (*Acer macrophyllum*), California buckeye (*Aesculus californica*), and coast live oak (*Quercus agrifolia*).

A rapid assessment of instream habitat was conducted on July 14 and August 16, 2022 by fisheries biologists with Stillwater Sciences to assist in development of the engineering design and Biological Assessment for the proposed action. Instream habitat in the project reach is composed of two pools, four riffles, and three flatwaters. The upstream and more complex pool is about 5 feet deep and the downstream pool is 1.5 feet deep. A single isolated patch of suitably sized spawning gravel is present in the reach. Rearing habitat is of fair quality and consists of undercut banks, terrestrial vegetation, and rootwads. The upstream pool, in which juvenile steelhead were observed, contains the best rearing habitat in the reach. Water temperature at 1 pm on August 16, 2022 was 21 degrees Celsius (°C).

2.4.1. Status of CCC Steelhead in the Action Area

CCC steelhead can be consistently found in Oakmont Creek. In a recent survey by Stillwater Sciences, juvenile steelhead were found rearing in the deeper pool of the project reach in August. Oakmont Creek is a tributary to Santa Rosa Creek, which flows into Mark West Creek as part of the Mark West Creek watershed. The Mark West Creek watershed population is within the Interior Diversity Stratum and is designated as a potentially independent population of the DPS (NMFS 2016). This population is also considered essential towards CCC steelhead recovery. Current threats and limiting factors to this population include land clearing and management associated with agriculture, channel modification, residential and commercial development, road and railroad development that increases impervious surfaces within the basin, and an increase in invasive predators.

Historical anecdotal information suggests steelhead were widely distributed and abundant throughout the population area. A 1953 survey of Mark West Creek noted abundant juvenile steelhead within the mainstem creek where flow persisted throughout the summer (Bruer 1953). In 1958, CDFW estimated that 5,000 steelhead returned to spawn annually within Santa Rosa Creek (CDFG 2006). Additionally, CDFW stream surveys during the late 1990s continued to document juvenile steelhead within most Santa Rosa Creek and Mark West Creek tributary reaches containing perennial flow, although densities were notably lower than those observed during surveys of the 1950s and 1960s (CDFG 1965; 1966; 1969; 1971). Similarly, snorkel and electrofishing sampling during the summers of 1999-2001 documented moderate numbers of juvenile steelhead within both Santa Rosa and Mark West Creek, with the highest densities occurring within headwater reaches (SCWA 2002). Concerning adults, fyke-net sampling on both Santa Rosa Creek and Mark West Creek captured small numbers of steelhead (both upstream and downstream migrants) during the winters of 1993/94 and 1994/95 (Merritt Smith Consulting 1996).

A recent study monitoring steelhead in Russian River tributaries conducted in summer of 2019 showed 2,402 YOY and 275 steelhead parr in a snorkel survey of Santa Rosa Creek, which covered 73 pools over 4.6 km (McClary et al. 2020). Additionally, the same survey observed

4,468 YOY and 682 steelhead parr in Mark West Creek, which covered 229 pools surveyed throughout 22.1 km. Overall, steelhead remain widely distributed within the Mark West population area, but at abundance levels that are likely significantly lower than those documented several decades prior.

2.4.2. Climate Change in the Action Area

Climate change poses a threat to salmonid populations in central California. In the San Francisco Bay region, warm temperatures generally occur in July and August, but with climate change these events will likely begin in June and could continue through September (Cayan et al. 2012). Climate simulation models indicate the San Francisco region will maintain its Mediterranean climate regime for the 21st century; however, these models predict a high degree of variability in annual precipitation through at least 2050, leaving the region susceptible to drought (Cayan et al. 2012). These models of future precipitation suggest that, during the second half of the 21st century in this region, most years will be drier than the historical annual average (1950-1999). California is currently experiencing drought conditions which have likely been exacerbated by climate change (Williams et al. 2020, Williams et al. 2022, Diffenbaugh et al. 2015, Williams et al. 2019).

The threat of climate change to listed steelhead will likely be lower in the northern coastal sections of California due to the fog zone and benefits of old growth redwood forests, including shady, complex stream and riparian areas, and cool stream temperatures. Climate change will impact forests of the western U.S., which dominate the landscape of many watersheds in the region. Forests are already showing evidence of increased drought severity, forest fire, and insect outbreak (Halofsky et al. 2020). Additionally, climate change will affect tree reproduction, growth, and phenology, which will lead to spatial shifts in vegetation. Halofsky et al. (2018) projected that the largest changes will occur at low- and high-elevation forests, with expansion of low-elevation dry forests and diminishing high-elevation cold forests and subalpine habitats.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

The Rangewide Status of Species and Critical Habitat (section 2.2), describes the status of listed species affected by the proposed action (CCC steelhead). NMFS expects implementation of the proposed action to cause adverse effects to limited numbers of individual juvenile CCC steelhead. The construction season (June 15 – October 15) is designed to avoid the migratory periods of adult salmon and steelhead. Therefore, no adverse effects to adult salmonids are anticipated.

These effects to juveniles usually result from dewatering of streams and relocation of fish, disruption of fluvial processes, heavy equipment operation, exposure to toxic materials, and site restoration. NMFS expects juvenile CCC steelhead may be exposed to the following stressors as a result of the proposed action:

- Fish collection, relocation, and dewatering;
- Impaired water quality;
- Loss of benthic habitat;
- Changes in stream form and function.

2.5.1. Fish Collection, Relocation, and Dewatering

Stream reaches that require dewatering will require relocation of any fish occurring there beforehand. A qualified biologist will capture and relocate fish outside of the restoration project work site prior to draining the project reach to enable in-water work, and to prevent crushing and desiccation. Initial fish removal efforts will occur one day prior to installation of the upstream and downstream cofferdams and while natural flow is in the channel. Aquatic species will be initially removed using small seines, D-frame dip nets, or other suitable equipment to herd the fish and amphibians to a few feet downstream of the cofferdam location. A block net will be installed at the downstream end of the project reach to keep fish and amphibians from reentering the reach. Removal via electrofishing will be used as a last resort, and will be conducted by trained and experienced biologists. If electrofishing is used, the captured species will be segregated by size to minimize predation, and maintained in cool, well-oxygenated water until released to suitable habitat outside of the project area. Another fish removal effort will take place during the dewatering process, to relocate any remaining species. During dewatering, any remaining fish and amphibians will become exposed and available for hand and dip net capture as water levels drop. These captured species will be segregated by size and placed in cool, well-oxygenated water until released to suitable habitat outside of the project area. Biologists will remain until the area is fully dewatered and all fish and amphibians are captured and relocated. Biologists will take care to release captured animals in several locations upstream and downstream of the work area to minimize crowding and reduce stress on the animals.

The primary contributing factors to stress and death from handling are differences in water temperatures (between the river and wherever the fish are held), dissolved oxygen conditions, the amount of time that fish are held out of the water, and physical trauma. Stress on salmonids increases rapidly from handling if the water temperature exceeds 18 °C (64 °F) or dissolved oxygen is below saturation. Fish that are transferred to holding tanks can experience trauma if care is not taken in the transfer process, and fish can experience stress and injury from overcrowding in holding facilities, if the tanks are not emptied on a regular basis. Although sites selected for relocating fish will likely have similar water temperature as the capture site and should have ample habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may also have to compete with other native and non-native fishes for available resources such as food and habitat. Some of the fish at the relocation sites may move and reside in areas that have more suitable habitat and lower fish densities. As each fish moves, competition is expected to remain localized to a small area or quickly diminish as fish disperse. Capturing and handling all fish causes them stress, though they

typically recover fairly rapidly from the process and therefore the overall effects of the procedure are generally short-lived.

Electrofishing may be used to remove fish from the project area prior to dewatering activities. During electrofishing, an electrical current is passed through water containing fish (and the fish themselves) in order to stun them, which makes them easy to capture. This method can cause effects of varying severity - from disturbance of fish to immediate mortality. Salmonids can be injured or killed by spinal injuries that sometimes occur due to forced muscle contractions when the current passes through the body. Smaller fish are subjected to a lower voltage gradient than larger fish (Sharber and Carothers 1988), resulting in lower injury rates (e.g., Hollender and Carline 1994, Dalbey et al. 1996, Thompson et al. 1997). The percentage of fish that are injured or killed by electrofishing varies widely depending on the equipment used, the settings on the equipment, the expertise of the technician, and water temperature (Sharber and Carothers 1988, McMichael 1993, Dalbey et al. 1996, Dwyer and White 1997). Studies on the long-term effects of electrofishing indicate that even with spinal injuries, salmonids can survive long-term, although severely injured fish may have stunted growth (Dalbey et al. 1996, Ainslie et al. 1998).

Streamflow diversion and dewatering could harm individual rearing juvenile salmonids by concentrating or stranding them in residual wetted areas before they are relocated. Juvenile fish that avoid capture in the project work area will likely die during dewatering activities due to desiccation or thermal stress. These impacts are typically short in duration, lasting a few hours at a time during active construction. Water withdrawal without an adequate fish screen can entrain juvenile fish, which typically injures or kills them.

Stress to juvenile salmonids caused by dewatering and handling due to the implementation of the proposed action is not likely to be sufficient to reduce their individual fitness or performance. Restricting the work window to June 15 through October 15 will largely limit the effects to stream rearing juveniles. Sites selected for relocation should have similar water temperatures as the capture sites, and should have adequate habitat to allow for survival of transported fish. NMFS cannot accurately estimate the number of fish that may be affected by competition, but does not expect this short-term stress to reduce the individual performance of juvenile salmonids, or cascade through watershed populations of these species based on the small areas to be affected and the relatively small number of salmonids to be relocated. The Avoidance and Minimization Measures (AMMs) proposed for fish capture and release, including: use of pump-intake screens during the de-watering phase in accordance with Juvenile Fish Screen Criteria for Pump Intakes developed by NMFS (NMFS 1996b), and fish passage around the isolation area are based on standard NMFS guidance to reduce the adverse effects of these activities (NMFS 2011). Use of properly sized screens during water withdrawal will reduce or nearly eliminate injury or death of fish caused by entrainment.

The number of juvenile steelhead encountered and estimates of mortality will vary with project location, timing, and magnitude. Since fish relocation activities will be conducted by qualified fisheries biologists following NMFS electrofishing guidelines (NMFS 2000), injury and mortality of juvenile salmonids during capture and relocation will be minimized. The guidelines provided by NMFS and applicable AMMs are expected to be effective at removing salmonids from work sites and therefore we anticipate that less than one percent of salmonids in an area

will remain in a project site following dewatering. Any fish that remain would likely die during dewatering. Data on fish relocation efforts between 2002 and 2009 show mortality rates from fish capture and relocation are approximately two percent for steelhead (Collins 2004; CDFW 2005, 2006, 2007, 2008, 2009, 2010). Therefore, unintentional mortality of juvenile salmonids expected from dewatering, capture, and handling procedures is not likely to exceed three percent.

2.5.2. Impaired Water Quality

The following aspects of the proposed action have the potential to detrimentally affect water quality: equipment refueling, fluid leakage, and maintenance activities within and near the stream channel. The proposed action will include work within the channel of Oakmont Creek and adjacent areas (access ramp, excavation and bank stabilization). These activities will involve earthmoving and other actions that disturb soils and result in turbidity. Erosion of disturbed soils or sheet flow runoff from the surrounding disturbed project area could also increase turbidity and sedimentation in the stream channel.

Short-term increases in turbidity and suspended sediment levels associated with construction may temporarily negatively impact fish survival and growth if they lead to reduced availability of food, reduced feeding efficiency, or reduced ability to see and avoid predators. Small pulses of turbid water can cause salmonids to temporarily move from their established territories into less suitable habitat, possibly increasing competition and predation if the new habitat is of lower quality. Due to low streamflow during the construction period, NMFS expects that any sediment suspended by instream activity would settle to the substrate and return to baseline conditions within 15 minutes to one hour after disturbance. This short duration may not disturb fish enough to abandon their original habitat. Any fish that move into nearby habitat to avoid turbidity are expected to quickly return to the original habitat once the initial disturbance of sediment is over, with negligible effects to their fitness.

Major work in the channel will include use of cofferdams to delineate an area to be dewatered. Fish between the cofferdams will be relocated to habitat nearby, and any sediment introduced during in-water work in the dewatered area will be contained by the cofferdams, preventing it from entering nearby habitat. Once in-water work is complete for the season, sediment within the dewatered area will be introduced to the stream and briefly mobilized when the cofferdams are removed and flow is restored to the reach.

Studies of sediment effects during culvert construction determined that increased sediment accumulation within the streambed was measurable (relative to control levels within) at a range of 358 to 1,442 meters downstream of the culvert (Lachance et al. 2008). Turbidity is therefore expected to extend as far as 1,500 feet downstream of work areas. In freshwater areas, turbidity should decline rapidly once the source of disturbance stops; the volume of water in these areas is expected to stay the same or decline during the construction season, which ends before the rainy season begins. Without disturbance from increased flow, sediment suspended in the water column is expected to rapidly settle onto the stream substrate. It is also expected that there will be a short-term increase in turbidity during the first fall/winter rain events as the work area initially stabilizes. This project includes includes actions that would reduce erosion and production of sediment, including: buried rock keyways along the toe of the slopes, biotechnical stabilization using vegetated soil lifts, and use of erosion control fabric, silt fences, straw wattle

installation, and revegetation along channel banks. NMFs expects these actions will reduce the sediment entering the stream to a great degree. Most of any newly introduced sediment that settles on the stream substrate is expected to exit the system during winter storms with scouring flows.

Effects of project activities on species are expected to be minor and temporary, given the protection measures summarized in the proposed action (section 1.3), which should effectively limit or eliminate entry of chemicals into stream courses and therefore minimize effects of pollution from equipment refueling, leakage, and maintenance. Any fish that do detect toxic chemicals in their environment during the construction season are expected to avoid them by temporarily relocating either upstream or downstream into suitable habitat adjacent to the worksite. NMFS also expects that the adherence to required protection measures described in the proposed action (section 1.3) will reduce the extent, severity, and duration of turbidity and reduce suspended sediment levels enough that the most severe effect would be a short-term reduction in feeding. NMFS does not expect these temporary effects to feeding to decrease the individual fitness of any listed fish.

2.5.3. Loss of benthic habitat

Some degree of temporary disturbance to benthic habitat is possible during implementation of the project [i.e., when access to the habitat where fish are located is established, and during the implementation of project actions (e.g., during placement of rock slope protection and vegetation in the stream]. For the proposed action, there will be post-construction, permanent impact to a total of 0.051 acres below the OHWM. These impacts are due to 0.041 acres of bioengineered stream bank, and 0.010 acres of construction access grading. After construction, the two areas graded for construction access will be converted to alcoves totaling 0.020 acres that will provide areas of slower velocities during larger storm events which steelhead and other aquatic species can use for high-flow refugia. The alcoves' gradual slopes will be planted with sedge and rush to create year-round stream edge cover and foraging areas for smaller fish along the perennial stream's wetted margin. The slope transition zone will be lined with willow wattles to protect the slope and to increase the tree canopy for cooler water temperatures during the summer months.

During construction, there will be a temporary impact to 0.102 acres of the action area due to dewatering. Dewatering operations may affect salmonids by temporarily preventing juvenile fish from accessing the work area for forage. Benthic (bottom dwelling) aquatic macroinvertebrates are an important food source for rearing salmonids; they may be killed, or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from streamflow diversions and dewatering will be temporary because construction activities will be relatively short-lived. Rapid recolonization is expected following re-watering and typically occurs within one to two months (Cushman 1985, Thomas 1985, Harvey 1986). For this reason, we expect the function of benthic habitat will return to pre-project levels before adults and smolts use the action area for migration. The effect of macroinvertebrate loss on juvenile salmonids is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas via streamflow diverted around the project work sites. Thus, NMFS expects fish will be able to find food and cover outside of project work sites as needed to maintain their fitness during construction activities.

2.5.4. Changes to stream form and function

This project proposes to repair the failing streambank along Oakmont Creek and protect four stream-adjacent properties. The project consists of stabilizing four locations along the streambank, totaling 325 LF, which has been actively eroding during periods of high flows and creating over-steepened banks. The project will place riprap and vegetation over the unstable, eroding streambank. Additionally, this project will create two alcove habitat features on the opposing bank. This design would flatten the slope on the opposing bank in the active channel, and as the storm flow rises, fish would have a place with slower velocities for refuge. The two alcoves would also increase the active channel area and promote dynamic bed complexity development overtime in this relatively straight and incised reach of the stream. The alcove slopes will be planted with sedge and rush to create year-round stream edge cover. The top half of the slope will be revegetated with native shrubs and trees to fill in gaps in the existing riparian vegetation, and will help provide shade.

While the creation of the alcove habitats will improve salmonid habitat by providing refuge during high flows, stream edge cover, and increased shade, the achieved habitat quality and persistence may fall short of what could be achieved naturally through dynamic channel processes if unhampered by the bank stabilization. Streambank stabilization is expected to preclude lateral movement of the channel, 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, Dunne 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 rearing salmonids (Florsheim et al. 2008).

Translating this impact into actual injury/death at the individual fish level is inherently difficult. The habitat proxy NMFS chose to estimate the extent of fish loss is the length of bio-engineered streambank restored per project, which is a total of 325 LF at this site. Due to the availability of habitat upstream and downstream of the project site, and the creation of alcove habitats, NMFS expects overall reductions in juvenile steelhead numbers due to this project to be minimal.

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 and 402.17(a)]. 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.

Non-Federal activities that are reasonably certain to occur within the action area include those described in the environmental baseline and likely to continue into the future: agricultural practices, water withdrawals/diversions, mining, state or privately sponsored and funded habitat restoration activities on non-Federal lands and without Federal permit needs or funding, road work, timber harvest, and residential growth. NMFS assumes these activities, and similar

resultant effects [as described in the Status of the Species (Section 2.2) and Environmental Baseline (Section 2.4) sections within this document] on listed salmonids will continue on an annual basis over time.

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 earlier in the discussion of environmental baseline (Section 2.4).

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in assessing the risk that the proposed action poses to species and critical habitat. 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 diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

CCC steelhead have experienced significant declines in abundance compared to historic populations, and long-term population trends suggest a negative growth rate. Habitat degradation has been a major factor in the decline of CCC steelhead, and poor habitat conditions continue to limit their recovery potential. In addition to ongoing concerns such as fine sediment and poor water quality resulting from legacy land management practices, persistent drought conditions across the entire action area impact water quantity and result in juvenile mortality as well as suppression of fish growth. Actions to restore habitat make up the vast majority of needed actions identified in the recovery plan for CCC steelhead. As described in the status of species and cumulative effects sections, NMFS expects that ongoing Federal and non-Federal actions to support human activities will continue. Some of these activities are expected to incidentally harm these species or adversely affect their designated critical habitat (e.g., agricultural practices, water withdrawals/diversions, road work, and timber harvest). Habitat restoration activities sponsored by state, federal, and private entities, as well as regulatory changes, are expected to provide an overall benefit to these species and their habitat. The most recent status review reaffirmed the threatened status of CCC steelhead (NMFS 2016b).

Project construction activities may result in declines in water quality, such as a temporary increase in turbidity post construction. The vast majority of juvenile steelhead, as well as other fish exposed to other habitat changes (e.g., temporary elevated turbidity, etc.) will avoid detrimental effects, aside from potential temporary behavioral impacts to feeding behavior. As noted earlier, these behavioral impacts will likely be negligible, given their short duration and sub-injurious nature.

As described in the Effects of the Action section, a small number of juveniles may be injured or

killed during dewatering and fish relocation. 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 streamflow. Based on the low mortality rates for similar relocation efforts, NMFS expects that at most, three percent of the fish captured on any given day would perish, leaving the majority of the fish in any location to persist unharmed (e.g., of thirty CCC steelhead relocated at Creek x on Day y, perhaps one would die). Similarly, any losses in carrying capacity due to streambank stabilization are likely minor and limited to the site level. Thus, while the abundance of juveniles in the project area may be slightly reduced, these numbers would likely be insignificant at the population level. NMFS expects the distribution of juvenile fish across the action area to generally remain unchanged, and it is unlikely that the small potential loss of juvenile steelhead during the duration of project activities will impact future adult returns.

The action area could be subject to higher average summer air temperatures and lower total precipitation levels due to climate change. Although the total precipitation levels may decrease, the average rainfall intensity has increased and is expected to continue to increase in the future. Higher air temperatures would likely warm stream temperatures. Reductions in the amount of precipitation would reduce stream flow levels and estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. For this project, all of the activities would be completed by 2023 and the likely long-term effects of climate change described above are likely to continue to cause repeated severe droughts, increased air and water temperatures, and increased wildfire intensity. The project proposes the creation of two alcove habitats, which may provide refuge during high flows. Overall, the project is unlikely to appreciably reduce the likelihood of survival and recovery of CCC steelhead.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CCC steelhead.

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). "Harass" is further defined by interim guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "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. The take exemption conferred by this incidental take statement is based upon the proposed action occurring as described in this opinion and in more detail in the Biological Assessment (Stillwater Sciences 2023).

2.9.1. Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

A low-level of incidental take of juvenile CCC steelhead in the form of injury or mortality is reasonably certain to occur during dewatering and fish relocation events associated with implementation of project activities:

> Unintentional mortality of listed juvenile salmonids during capture, handling, and relocation is not likely to exceed three percent of the total CCC steelhead handled. The amount of incidental take during dewatering and fish relocation will be considered exceeded if more than three percent of the total fish handled are injured or killed during any dewatering and fish relocation event.

NMFS also anticipates that CCC steelhead will be adversely affected by stream channelization due to bank stabilization. Quantifying the number of individuals lost from the harm caused by the proposed stream channelization is inherently difficult. Complex and variable components such as individual fish behavior and how that behavior adapts to changes in habitat, will primarily influence the number of fish in the action area that are harmed. In addition, finding dead individuals will be difficult due to their small size and the presence of scavengers. In such circumstances, NMFS cannot provide a precise amount of take that would be caused by the proposed action and instead uses one or more surrogates to estimate the extent of incidental take. NMFS will use the length of proposed streambank stabilization per project as a surrogate for the extent of incidental take resulting from channelization of streams due to the proposed bank stabilization. For this project, if the length of streambank stabilized is longer than a combined 325 linear feet, the extent of take will have been exceeded.

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 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. Minimize the amount or extent of incidental take of listed salmonids resulting from project implementation activities.

2. Measures shall be taken to monitor the amount and extent of incidental take by reporting the results of fish relocation activities as well as other project details.

2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. 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: Minimize the amount or extent of incidental take of listed salmonids resulting from project implementation activities.
    a. The Corps and/or the Applicant shall contact NMFS within 48 hours if injuries or mortality at any project or monitoring site on any given day exceed three percent of the number of captured fish for any listed species. Fish capture and/or relocation will cease at the project site until NMFS is contacted. NMFS will review the activities resulting in take and determine if modified methods or additional protective measures are required before fish handling at the site may resume.

2. The following terms and conditions implement reasonable and prudent measure 2: Measures shall be taken to monitor the amount and extent of incidental take by reporting the results of fish relocation activities as well as other project details.
    a. Any salmonid or steelhead mortalities must be retained, placed in an appropriately sized whirl-pack or zip-lock bag, labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be retained until specific instructions are provided by NMFS.
    b. The Applicant will prepare an implementation monitoring report and submit to NMFS Santa Rosa Office by letter or email within 30 days after project completion. The monitoring report should include the following:
        i. Start and end dates of construction;
        ii. Description in detail of any incidental take that occurred during the project. This shall include the species taken, date taken, type of take (injury or mortality), number taken, and fork length of any mortalities;

iii. Summary of habitat conditions – include photos (including both river banks, upstream and downstream views, and the construction itself) of the project site before, during, and after construction activities.

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 formal consultation for the Meadowgreen #2 HOA Bank Stabilization Project.

Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include

measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific Coast salmon (Pacific Fishery Management Council [PFMC] 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

The Pacific Coast Salmon FMP contains EFH that will be adversely affected by the project. Specific habitats identified in the PFMC (2014) for pacific coast salmon include habitat areas of particular concern (HAPCs), identified as: 1) complex channels and floodplain habitats; 2) thermal refugia; and 3) spawning habitat.

3.2. Adverse Effects on Essential Fish Habitat

Potential adverse effects of this project on EFH have been described in the preceding biological opinion and include temporary and permanent loss of benthic habitat, temporary loss of wetted habitat, and temporary decrease in water quality. This project may also degrade instream habitat by preventing natural fluvial and geomorphic processes that create and maintain salmonid habitat.

Additional adverse effects of this project on EFH include disturbance of the channel bed, which provides spawning habitat for salmonids. The stream substrate within the action area is dominated by cobble with gravel being subdominant. Spawning sites within the action area are limited with a small patch of suitable gravel observed in the 370-foot-long project reach. The proposed action of stabilizing the eroding streambank will include entry and travel by heavy equipment within the channel, which will disturb the patch of existing spawning gravel in the project reach. The disturbance to spawning gravel would last until the first few high flows, which would scour, transport, and resort the substrate into a natural morphology. In addition, the stabilization of the streambank will result in reduced sediment delivery to the channel, which may be beneficial to downstream spawning habitat.

3.3. Essential Fish Habitat Conservation Recommendations

Section 305(b)(4)(A) of the MSA authorizes NMFS to provide EFH Conservation Recommendations that will minimize adverse effects of an activity on EFH. Although temporary potential adverse effects are anticipated as a result of the project activities, the proposed AMMs in the accompanying opinion are sufficient to avoid, minimize, and/or mitigate for the anticipated effects. Therefore, no additional EFH Conservation Recommendations are necessary at this time that would otherwise offset the adverse effects to EFH.

3.4. Supplemental Consultation

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations [50 CFR 600.920(l)].

4. 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.

4.1. 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 Corps. Other interested users could include the applicant. Individual copies of this opinion were provided to the Corps. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

4.2. 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.

4.3. 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 part 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 and EFH consultation 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 and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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