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

June 14, 2022 **Refer to NMFS No:** WCRO-2022-00629

James Mazza
Chief, Regulatory Division
U.S. Department of the Army
San Francisco District, Corps of Engineers
450 Golden Gate Avenue, 4th Floor
San Francisco, California 94102-3404

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Humboldt Redwoods State Parks Watershed Restoration Program, located in Humboldt County, California (Corps File SPN-2022-00093)

Dear Mr. Mazza:

Thank you for your letter of March 15, 2022, 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 U.S. Army Corps of Engineers' San Francisco District proposed permitting of restoration activities implemented under the Humboldt Redwood State Parks Watershed Restoration Program. 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 (MSA)(16 U.S.C. 1855(b)) for this action. This letter transmits NMFS' final biological opinion and EFH response for the proposed Humboldt Redwood State Parks Watershed Restoration Program.

The enclosed biological opinion describes NMFS' analysis of effects on threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), California Coastal (CC) Chinook salmon (*O. tshawytscha*), Northern California (NC) steelhead (*O. mykiss*), and their designated critical habitat in accordance with section 7 of the ESA. Based on the best scientific and commercial information available, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon, CC Chinook salmon, NC steelhead, nor is the project likely to destroy or adversely modify their designated critical habitats. NMFS expects the proposed action would result in incidental take of SONCC coho salmon, CC Chinook salmon, and NC steelhead. An incidental take statement with non-discretionary terms and conditions is included with the enclosed biological opinion.

The enclosed EFH consultation was prepared pursuant to section 305(b) of the MSA. The proposed action includes areas identified as EFH for species managed under the Pacific Coast Salmon Fishery Management Plan (FMP). Based on our analysis, NMFS concludes that the

project would adversely affect EFH for Pacific Coast Salmon and have identified one EFH Conservation Recommendation.

Please contact Matt Goldsworthy at Matt.Goldsworthy@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

cc: FRN# 151422WCR2022AR00061

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

Humboldt Redwood State Parks Watershed Restoration Program

NMFS Consultation Number: WCRO-2022-00629
Action Agency: United States 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?
Southern Oregon/North California Coast (SONCC) coho salmon	Threatened	Yes	No	Yes	No
California Coastal (CC) Chinook salmon	Threatened	No	No	Yes	No
Northern California (NC) steelhead	Threatened	Yes	No	Yes	No

Essential Fish Habitat and NMFS Determinations:

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	Yes	Yes

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: June 14, 2022

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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 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 California Coastal NMFS office.

1.2. Consultation History

On March 15, 2022, NMFS received a request from the United States Army Corps of Engineers (Corps) to initiate formal ESA consultation on the proposed Program due to anticipated adverse effects to Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), California Coastal (CC) Chinook salmon (*O. tshawytscha*), and Northern California (NC) steelhead (*O. mykiss*), and their designated critical habitats. The Corps also determined the proposed Program might adversely affect EFH for species managed under the Pacific Coast Salmon Fishery Management Plan (FMP). On March 21, 2022, NMFS requested clarification via email regarding the duration of the proposed action. On March 21, 2022, the Corps responded via email and confirmed that the duration of the permit would be for 10 years.

On April 11, 2022, Humboldt Redwoods State Park contacted the Corps and NMFS via email to discuss potential modifications to the proposed action regarding the numbers of crossings and miles of road work to be allowed each year and clarified the need to use branches and twigs in lieu of culverts for some crossings where that approach would cause fewer effects. NMFS responded on April 12, 2022, via email requesting further clarification and for language to ensure there would be no crossings constructed of branches and twigs in fish-bearing waterways. On April 19, 2022, Humboldt Redwoods State Park contacted the Corps and NMFS via email providing further clarifications and proposing a measure to avoid constructing crossings made of branches and twigs on crossings that are fish-bearing crossings.

On April 21, 2022, NMFS requested clarifications from Humboldt Redwoods State Park via email regarding the limits for certain activities, such as large wood structures. On April 26, 2022, Humboldt Redwoods State Parks responded via email clarifying the intended limits.

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). The Corps proposes to authorize the California Department of Parks and Recreation, pursuant to Section 404 of the Clean Water Act (CWA) of 1972, as amended, 33 U.S.C. § 1344 *et seq*., to implement instream and upland habitat restoration activities under the Humboldt Redwoods State Park's (HRSP) Watershed Restoration Program (Program) for 10 years to restore watershed and ecosystem form, function, and processes. HRSP proposes to conduct a variety of treatments in order to restore areas previously damaged or impaired by land use practices as well as treat specific reaches of fish bearing streams in order to increase shelter complexity and floodplain connectivity. The proposed Program would be located within the North Coast Redwoods District of California Department of Parks and Recreation in Humboldt County, California. HRSP is approximately 53,000 acres in size with more than 17,000 acres of old growth redwood and Douglas-fir forests. The HRSP area encompasses numerous watersheds, including the entire Bull, Canoe, and Decker Creek watersheds, the downstream portions of tributaries to the lower Eel River and South Fork Eel River along the Avenue of the Giants, and several small headwater sections that drain to the Mattole River, all within Humboldt County, California.

The HRSP proposes to remove legacy roads and stream crossings, restore critical zone functions, increase large wood loading levels, help progress the riparian and upland forests toward late seral conditions, and clean up and restore cannabis grow sites. In addition, HRSP proposes to rehabilitate the middle Bull Creek corridor, prairies, utilize fire and biomass abatement practices, and other restoration actions (e.g., invasive species removal and rare plant restoration) through a variety of funding sources. Restoration efforts will be integrated at the planning area level and across the HRSP. The Program intends to maximize restoration opportunities through strategic planning and synchronization that considers a suite of restoration actions and logistics (access, excess fuel/wood sources, and fuel break locations).

1.3.1. Sequencing and Approach

The HRSP WRP will progressively rehabilitate and restore HRSP watersheds in phases over a 10-year implementation period as funding allows, with each phase treating one planning area. The HRSP planning areas are largely driven by watershed boundaries and the initial proposed sequencing is presented in Table 1. The initial schedule is focused on Bull Creek but includes all HRSP watershed areas. This list considers a combination of factors, including potential legacy logging road and road-stream crossing erosion, forest restoration needs (e.g., stand density and species composition), and ingress and egress for these actions. Watershed restoration actions (i.e., cannabis grow site cleanup, landform recovery, vegetation management and stream restoration) will be implemented holistically, where applicable, within sub-watersheds. HRSP anticipates that all phases of the Program would rely on the use of sideboards (minimum or maximum numbers of actions implemented during each phase as well as standard management practices or measures that apply Program-wide).

Table 1. Proposed sequencing of HSRP Program activities over the next 10 years (2022-2031).

HRSP Planning Areas	Phase*	Implementation
Panther Gap; South and Middle Fork Panther Creek; Middle and Westlund Creeks (Mattole River Tributaries)	1	2022-2024
North Fork Panther Creek	2	2025
Burns Creek	3	2026-2027
Slide and Slug Creeks	4	2028-2029
Tres Creek	5	2030
Facet 28	6	2031
Preacher Gulch and Prairie Creek	7	2030-2031

*The exact sequencing and order may shift slightly depending on funding availability.

1.3.2. Cannabis Grow Remediation

There are hundreds of known cannabis grow sites in HRSP ranging from five to 30 years old that have been remediated in part, or completely. The HRSP WRP will focus primarily on the older grow sites within HRSP that have been cleared and secured and previously remediated in part by Law Enforcement. These grow sites have already been dismantled (e.g., plants removed, site swept for weapons, and irrigation lines disconnected). Some hazardous waste (e.g., gasoline, rodenticides, pesticides, etc.) was removed by Law Enforcement although this was not specifically documented in most cases.

Cannabis grow remediation actions within HRSP will primarily include the collection and removal of trash such as irrigation line, soil bags, and camping equipment. Once collected, the trash will be removed by hand to a collection point and hauled out by all-terrain vehicle (ATV), truck, or helicopter to an appropriate disposal site. The cleanups and road removal actions will be sequenced to limit the time between efforts. California's Proposition 64 statute uses the term 'remediation' to describe the cleanup and removal of cannabis grow trash and infrastructure (e.g., camping equipment, used containers, imported soils, and irrigation systems). In contrast, restoration of grow sites may include landform recovery, vegetation management, hydrologic improvements, protection of archeological resources, cultural resource management, and natural resource management that offsets otherwise irreparable losses (the restorative elements of cannabis grow site actions are described below).

Prior to entering a cannabis grow site, a Field Safety Plan must be completed, which identifies the baseline information for establishing a safe working environment and controlling site hazards. If any suspected hazardous waste is found, a Hazardous Waste Inventory will be completed. If necessary, a Chemical Safety Plan will detail the operational phases of hazardous waste cleanup. The grow sites proposed for cleanup are all older than 5 years, which means numerous rainstorms, wind events, and wildlife have disturbed, leached, evaporated, or unfortunately consumed most of the potentially hazardous waste (e.g., pesticides, human feces, and solvents). This makes the likelihood of finding and addressing hazardous waste (e.g., highly toxic chemicals) unlikely. Cleanup may begin only after all of these plans are completed and approved as needed.

1.3.3. Landform Recovery

Landform recovery is the restoration of the landscape (e.g., hillslopes, swales, creek and river corridors) and hydrologic (groundwater and surface water) flow pathways to pre-disturbance conditions. Previous cannabis grow site remediation efforts at HRSP revealed that abandoned logging roads have been used directly for cultivating cannabis and/or indirectly for travel to impacted areas that have been modified and terraced for cannabis cultivation. The HRSP WRP will employ road reoccupation (including appurtenant features such as crossings, landings, and skids), road removal, and cannabis cultivation landform recovery to restore degraded watersheds. In addition, reoccupation of roads and landings will facilitate additional watershed restoration activities described herein. Impacted landforms will be restored using heavy equipment and/or hand crews following prescriptions described below. There are no plans to draft water directly from HRSP creeks and/or rivers during the summer or low flow periods.

1.3.3.1 Road Reoccupation and Use

Program activities will include road reoccupation and/or drainage structure installation that would be expected to occur on approximately 1-3 miles of road per year and up to two stream crossings per year per watershed. Reoccupation activities may include vegetation clearing, removing water bars, grading road surfaces, and drainage reconstruction as needed. Fill material and old culverts may need to be removed from abandoned roads before new culverts could be installed. Single-season-use roads will be removed at the end of the dry season and will not be reoccupied in following years. Roads needed for multiple years will be constructed using more robust drainage structures, including multi-layer headwalls and tailwalls to facilitate ephemeral drainage. Temporary roads may need to be constructed to access restoration areas and will be removed as soon as possible after treatment.

Temporary reconstruction of road-stream crossings may be required. At failed crossings, a small road bench will be reconstructed along the upstream end of the crossing to allow access to both sides of the crossing. A minimal amount of fill will be used, and streamflow (if present) will be piped through a temporary culvert. Multi season or permanent stream crossings and bridges will be sized to pass the 100-year recurrence interval discharge of flow, sediment, and debris. Structures such as rolling dips may also be installed to limit concentration of runoff and erosion on roads used during restoration activities.

Some of the constructed temporary roads may be used for more than one operating season. If used for more than one season, all multi-season use, native surface roads will be winterized to prevent erosion. Heavy equipment and log trucks will not be driven on native surface roads outside of the normal operating period (October 15 through June 15) unless a period of dry weather is predicted.

1.3.3.2 Road and Crossing Removal

Once remediation, vegetation management, and stream restoration actions are complete, designated abandoned and/or reoccupied roads and appurtenant features will be removed, consistent with the HRSP Roads and Trails Management Plan. Complete fill recovery and drainage structure removal will be implemented along all unneeded roads and landings. The

distance of road and the number of crossings removed each year will vary depending on the sub-watershed terrain, fill volumes, road network layout, and size of the road-stream crossings. Based on previous road removal efforts in the Bull Creek watershed, this Program will remove up to 12 miles of road and 20 stream crossings per season (per HUC 16 sub-watershed). In general, HRSP will likely operate in no more than three sub-watersheds per year.

Road removal will include excavation of embankment fill from roads and stabilization of excavated materials on cut benches to provide for natural (pre-disturbance) landform shape. Vegetation disturbance will be limited to growth within the fill material, roadbed, and cutbank. Partial re-contouring may be prescribed when it reduces the potential for post treatment failure. Where fill deficits exist and no export sites are nearby, a full match may not be achieved in balancing cut and fill volumes. Removed vegetation is placed as mulch over the finished surface and recovered large wood will be integrated into the site.

Stream crossing removal will include excavation of road/stream channel and stabilization of the excavated materials. Crossings will be fully re-contoured and fill will be removed and exported to adjacent road sections. The channel grade will be re-established, and the banks will be excavated to as low as slope as is practical. The excavation is generally designed to match the slopes and banks upstream and downstream from the crossing. In cases where the failed crossing includes a large inner-gorge gully or has incised below pre-disturbance stream grade, it may be necessary to leave the channel configuration in its unnatural condition. If the stream is flowing, water will be temporarily diverted away from the excavation area to reduce turbidity and returned to flow in the restored channel once channel excavation is complete.

The standard technique for treating road gullies is to eliminate the source of water entering the gully whenever possible. Re-contouring a gully requires thorough ripping of the existing gully and compacting that material into the bottom without leaving any air pockets or concentrations of organic material. All embankment gullies will be de-compacted and re-contoured. However, re-contouring entrenched gullies, where the gully floor is significantly lower than the downhill slope, may be too costly or could cause other impacts that make full re-contouring infeasible. Where gullies cross the road, the road will be dipped, and embankment fill will be exported. Where gullies or other diversions have incised across crossing sites, reestablishment of the crossing grade shall be deeper than the intersecting diversion channel. This will eliminate the possibility of reoccupation of the gully by flow from the restored channel. The re-contouring of gullies includes construction of swales at all-natural topographic depressions, construction of buried drain lenses or subsurface drains at appropriate locations, and re-contouring the remaining embankment fill.

1.3.3.2.1 Fish Relocation for Crossing Work

Prior to construction, surveys for aquatic species shall be conducted at any culvert replacement site that exhibits surface flow. Surveys shall extend upstream and downstream beyond the impact footprint area. If aquatic species are detected, exclusion fencing (i.e., block nest) will be installed upstream and downstream of the work area and relocation will occur prior to water diversion and construction activities. All fencing will remain in place during construction to prevent migration of fish or amphibians back into the work area and will be removed upon completion of all construction activities. Given that most stream crossing removals will not occur in Class I

streams, HRSP estimates that in most years only one fish relocation is likely per sub-watershed per year. In general, HRSP will likely operate in no more than three sub-watersheds per year.

1.3.3.3 Landform Recovery of Cannabis Grow Sites

Landform recovery associated with cannabis operations at HRSP typically consists of topographic restoration of minor terracing and depressions. Cannabis operations on or directly adjacent to abandoned logging roads and landings will be restored with heavy equipment during road restoration efforts. Most topographic restoration can occur by labor crews using hand tools such as shovels. The vegetation cleared from the minor terraces or other planted hillslopes will be cut, scattered, and incorporated into the landform recovery work.

1.3.4. Silviculture and Vegetation Management

Proposed Vegetation Management Actions include restoration through thinning, snag creation, crown manipulation, vegetation removal, and/or revegetation. Vegetation management activities will generally occur during the dry period (June 15 to October 15), but work may occur outside of this period as weather conditions allow. HRSP will thin and/or remove biomass from up to 500 acres per year.

Table 2. Riparian buffer zone widths and canopy cover retention standards for HRSP.

Riparian Zone	Fish Bearing (may be perennial or intermittent) and Perennial Non-Fish Bearing		Non-fish Bearing and Evidence of Scour or Deposition (intermittent or ephemeral)		
Inner Zone Width[1]	30 feet from confined channel, or channel migration zone		30 feet or break in slope or other feature that prevents sediment delivery to watercourse, whichever is less		
Inner Zone Canopy Cover Retention[2]	80%		60%		
Inner Zone Restrictions	Equipment exclusion zone, no tree removal[4,5]		Equipment exclusion zone, no tree removal[4,5]		
Outer Zone Width[1]	130 feet from outer edge of inner zone		20 feet from outer edge of inner zone		
Outer Zone Canopy Retention[2]	60%		60%		
Outer Zone Slope	>35%	<35%	>85%	35% to 85%	<35%
Outer Zone Restrictions	Equipment exclusion zone[4,5]	Equipment exclusion zone, unless sediment delivery is prevented by a break in slope or another barrier such a bench[3,4,5]	Equipment exclusion zone	Equipment exclusion zone, except tethered equipment that does not increase sediment delivery potential over one-end, cable suspension systems[4,5]	Equipment exclusion zone, unless sediment delivery is prevented by a break in slope or another barrier such as a bench[3,4,5]

1. Zone width measured in slope distance.
2. Canopy cover averaged across 1,000-foot sections of streams.
3. If there is a bench or break in slope that is closer and prevents sediment delivery, then the outer zone can be less than 160 feet from the stream channel.
4. Heavy equipment will be used in inner zone areas for other restoration actions. Thinning actions when combined with other restoration activities (e.g., large wood loading or stream crossing removal) may reduce inner zone canopy cover to 60%.
5. Any felled trees will be retained on site.

1.3.4.1 Forest Thinning

Thinning refers to any silvicultural treatment intended to reduce stand density, redistribute growth among remaining trees, and enhance conditions to expedite the development of late-seral structure. In areas adjacent to and within prairies the thinning objectives are to restore and/or expand the prairie or oak and madrone woodlands that are typical of a more resilient landscape. During forest thinning activities, trees may be removed to reduce fuel loads in strategic locations, such as along roads and ridgetops. All vegetation treatments will adhere to the riparian buffers proposed in Table 2. Forest restoration treatments include a thinning method and an operational method.

The primary thinning method that will be used is variable density thinning (VDT), which focuses on the enhancement of spatial heterogeneity (i.e., uneven variation of tree spatial pattern over areas and time) across the landscape by prescribing fine-scale variation to the forest structure. VDT can take many forms, and may incorporate a mixture of treatments. Forest thinning

treatments will vary in intensity to encourage heterogeneity throughout the project area. When averaging across an entire forest restoration unit, treatments will not exceed a 50% reduction in the basal area, and the basal area will be reduced by 40% or less in most locations. Basal area is defined as the sum of cross-sectional areas of tree trunks at breast height for a given plot of land. The canopy coverage will also be maintained at least 60%. Treatments are designed to break up the continuous canopy, promote older/larger trees, promote underrepresented species, release wildlife trees (with complex canopies or dead tops), improve habitat, and reduce fire danger (crown fire spread). Thinning methods will be selected based on site-specific conditions to further promote landscape-scale heterogeneity.

1.3.4.2 Operational Methods

An operational method describes how trees are felled (mechanized heavy equipment or manually with chainsaws) and how woody material is treated and/or removed from the treatment area. Operational methods include two general categories: biomass removal or lop and scatter. The following types of operational methods will be used as part of the Program: biomass removal and/or lop and scatter.

1.3.4.2.1 Biomass Removal

Biomass removal refers to removing trees from forest treatment units to achieve desired fuel accumulation levels and understory development. This removal method will be used to cover road and road-stream removal areas or to load large wood in creeks or on landslide surfaces. Excess biomass that is not removed from the site will be lopped and scattered on site as described below. Biomass removal requires the use of heavy equipment to load, and transport trees to a staging area or directly to a road removal or stream restoration area. Biomass removal will be accomplished using one or a combination of methods. The method will change based on the existing slope of the work area or access considerations, as described below. Within the project area, all forested land being considered for restoration has the potential for biomass removal to restore ecosystem function and reduce large wildfire risk, while retaining ample wood for soil nutrients and fish and wildlife habitat. The following types of biomass removal methods will be used:

- Ground-based operations typically refers to the use of traditional ground-based mechanized equipment (e.g., tractor, feller-buncher, or rubber-tired skidder) to fell trees and/or skid trees/logs during timber harvest operations. The Program will only use heavy equipment during road removal (e.g., excavator and dozer) to extract trees in areas where road removal and forest restoration overlap, and trees can be reached from the road removal area footprints. Tree removal using traditional ground-based operations will be restricted to areas with slopes less than 40% slope gradient.

- Tethered equipment operations are a variation on traditional ground-based operations. Cut-to-length harvesting systems use a harvester and forwarder. This system differs from other whole tree harvesting ground-based mechanized methods in that the harvester fells, processes, and bucks the stems at the stump while the forwarder transports the processed logs to the landing area. This method can be used on slopes up to 85% slope gradient with a cable tether.

- Skyline operations use a cable yarding machine, an overhead system of winch-driven cables, to pull logs or whole trees from the stump area to the landing or roadside area. Felled trees will be processed (cut to log length and limbed) using chainsaws prior to skyline yarding. Regardless of the type of skyline system used, a slack pulling, or grapple carriage will be used to skid felled trees to the main cable yarding corridor. Cable yarding corridors are generally not larger than 20 feet in width. Tail holds (anchors the end of a mainline) can be trees or stumps. If trees are used as a tailhold or lift tree, only second-growth trees will be used, and no large residual trees of any species that pre-date logging will be used. Guylines will also be anchored to stumps, or second-growth trees; residual trees of any species will not be used to anchor guylines. Impacts to soils on slopes over 40% slope gradient will be minimized using these cable yarding operations.

- Helicopter operations remove trees or portions of trees in areas where access by other means is infeasible. Trees are generally cut in advance and a ground crew assists the helicopter crew by securing trees to a cable hanging from the helicopter. The cost is prohibitive in many circumstances but may be more feasible when the wood will be used to create instream large wood accumulations in areas where vehicle access is prohibited and/or in conjunction with the removal of large quantities of cannabis grow site trash.

1.3.4.2.2 Lop and Scatter

Lop and Scatter refers to an operational method where felled trees are cut and limbed using chainsaws (i.e., lopped) and broadcast (i.e., scattered) throughout the treatment area for natural decomposition. This method will be used in locations where equipment cannot access the stand because of steep slopes, special management zones, or where there is limited access because there are no existing haul roads (i.e., roads that can support the heavy equipment required for operations). No felled trees will be removed, and no heavy equipment will be used in these areas.

1.3.4.3 Restoration and Removal

1.3.4.3.1 Restoration of Diversity by Crown Manipulation and Snag Creation

Crown manipulation is used to enhance the structural complexity of the forest canopy to develop late seral forest characteristics and is achieved by pruning the crown or cutting the top out of trees. Neighboring trees may be cut to release the pruned tree. The resulting crown damage is intended to create reiterations and other features that will enhance the vertical complexity of the forest. Additionally, some trees may be selected for tree topping or crown manipulation using arborist methods that involve climbing selected trees and pruning the crown.

Snag creation is a vegetation management method that refers to trees that may be intentionally killed and left standing to create wildlife habitat. Snag creation will be limited to older stands with larger trees because large snags are more useful and last longer as wildlife habitat. Snags will be created by girdling trees by removing bark and cambium in a continuous strip around the bole of the tree or burning slash material under selected trees. Snag creation may occur as part of a thinning operation or as a stand-alone treatment.

1.3.4.3.2 Removals of Non-Native or Invasive Species

Vegetation removal will be used to treat invasive, non-native plant species and pathogens. Invasive, non-native species will be treated to prevent their spread, reduce their extent of eliminate them from HRSP. Plants and small trees will be removed using hand tools such as shovels. For larger plants and trees, a brush cutter, handsaw, masticator, or chainsaw will be used. Torching, solarizing, and or covering are vegetation removal techniques that may be utilized to effectively control non-native species without disturbing the ground. Invasive exotic vegetation removal via heavy equipment may be used for initial treatment in areas already planned for ground disturbance for landform recovery. Removed vegetation will either be left in place, lopped or chipped and scattered, masticated, piled and burned, transported to other locations within the HRSP area for disposal, or some combination thereof. When feasible, removed vegetation will be placed in inconspicuous areas not visible to the public and allowed to decompose naturally. Vegetation may also be removed to reduce the severity or potential spread of wildfire and/or to facilitate the use of prescribed fire. Brush and small trees will be cut with chainsaws or masticated along roadsides, ridgetops, structures and other natural barriers. Fuels reduction projects are distinct from forest thinning in that fuels reduction will have minimal impacts on the forest overstory. Prescribed fire will be covered in a separate permitting effort and not covered.

1.3.4.4 Revegetation

Most revegetation activities will occur on recently removed roads and road-stream crossings or in conifer-deficient riparian stands adjacent to the road removal work areas. Other revegetation efforts may seek to shift species composition or to introduce plants that are resistant to disease. To mitigate browsing, small protection structures may be used, and regular monitoring of reforestation sites for several years will help ensure higher seedling survival. In areas where replanting is proposed, seed collection, propagation, and planting will adhere to policy on genetic integrity. If local populations have been decimated, the closest, most genetically similar population(s) to that State Park System unit will be used.

1.3.5. Stream Restoration and Large Wood Loading

HRSP will place large wood (10 feet long and greater than one foot in diameter), preferably with root wads or as whole trees, in HRSP stream and river corridors until natural recruitment and delivery processes become self-sustaining. Large wood placement locations and designs will be determined in the field the year before implementation. Large wood will generally be placed in the late summer or early fall when site conditions are most likely to be dry. Large wood will also be placed in streams prior to or during flows for transport and deposition downstream. Large wood will be placed using hand crews with chainsaws and grip hoists, heavy equipment (e.g., excavator), and/or helicopters. Placement will generally occur, in conjunction with other vegetation management restoration and road removal actions. Large wood will primarily be sourced on site or from forest restoration, road/landing removal, and stream crossing excavations.

Large wood may be temporarily stockpiled for future use. Large wood and small woody debris (e.g., branches and brush) will be arranged based on the field-based design but will be field fit

with the oversight of a geomorphologist or other skilled large wood structure builder. Cable and rebar will not be used to anchor large wood due to safety risks, aesthetic concerns, and for natural routing processes to occur. Natural large wood recruitment, transport, and deposition is dynamic, thus HRSP expects large wood to occasionally break loose, transport, and deposit naturally at downstream sites. As such, large wood will not be placed less than 300 feet upstream of at-risk infrastructure without consultation with a licensed geologist or engineer.

Given the reduction of large wood volumes following extensive logging, the objective is to increase and maintain large wood volumes until the logged forests recover and natural recruitment becomes self-sustaining. Large wood monitoring will be used to track changes and determine when and if additional large wood loading is necessary. To accomplish this objective, up to 20 large wood accumulations and/or structures will be installed in any given year, per stream reach within HRSP. A reach is a length of creek or river corridor between or within a HUC 16 sub-watershed. Where appropriate, large wood placement will include a mixture of large, medium, and small volume stems with up to 100 stems per structure.

The site selection process will include evaluations of logistical constraints (e.g., equipment access and proximity to infrastructure, such as bridges and culverts), current stream morphology, and an assessment of effects to the current streambed, floodplain, and downstream sediment routing. Wood loading site locations and prescriptions (species, placement method, and approximate quantity) will be provided to regulatory agencies annually as part of the pre-implementation package.

The falling of trees and placement of large wood (e.g., helicopter) will temporarily open portions of the riparian canopy. While HRSP will maximize existing riparian canopy cover retention levels, there will be creek reaches that require large wood quantities and placement methods that may reduce canopy cover to 60% within the inner zone. For example, helicopter large wood loading and system roads and/or road and crossing removals will require lower short-term retention levels for longer term gain. Tree selection for large wood will be done with forestry staff to release riparian conifers to grow larger and taller will increase shade, regulate ground temperatures, and ultimately improve stream temperatures.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

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.

The Corps determined the proposed action is likely to adversely affect SONCC coho salmon, CC Chinook salmon, NC steelhead, and their designated critical habitats.

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 designations of critical habitat use 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.

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.

2.2.1. Species Description and General Life History

2.2.1.1 SONCC Coho Salmon

Coho salmon have a generally simple 3-year life history. The adults typically migrate from the ocean and into bays and estuaries towards their freshwater spawning grounds in late summer and fall, and spawn by mid-winter. Adults die after spawning. The eggs are buried in nests, called redds, in the rivers and streams where the adults spawn. The eggs incubate in the gravel until fish hatch and emerge from the gravel the following spring as fry. These 0+ age fish typically rear in freshwater for about 15 months before migrating to the ocean. The juveniles go through a physiological change during the transition from fresh to salt water called smoltification. Coho salmon smolts typically outmigrate between March and July (Ricker et al. 2014). Coho salmon typically rear in the ocean for two growing seasons, returning to their natal streams as 3-year-old fish to renew the cycle.

2.2.1.2 CC Chinook Salmon

CC Chinook salmon are typically fall spawners, returning to bays and estuaries before entering their natal streams in the early fall. The adults tend to spawn in the mainstem or larger tributaries of rivers. As with the other anadromous salmon, the eggs are deposited in redds for incubation. When the 0+ age fish emerge from the gravel in the spring, they typically migrate to saltwater shortly after emergence. Therefore, Chinook salmon typically enter the estuary as smaller fish compared to coho salmon. Chinook salmon are typically present in the stream-estuary ecotone, which is located in the downstream portions of major tributaries to estuaries like Humboldt Bay, from early May to early September, with peak abundance in June/July (Wallace and Allen 2007). Similar to coho salmon, prey resources during out-migration are critical to Chinook salmon survival as they grow and move out to the open ocean. A study by MacFarlane (2010) indicated that juvenile Chinook salmon require less prey in the estuary, equivalent to one northern anchovy (*Engraulis mordax*) per day, compared to a range of one to four anchovies needed per day in the ocean.

2.2.1.3 NC Steelhead

Steelhead are the anadromous form of *O. mykiss*, spending time in both fresh and saltwater. Steelhead generally return to freshwater to spawn as 4 or 5-year-old adults. Unlike other Pacific salmonids, steelhead can survive spawning and return to the ocean only to return to spawn in a future year. It is rare for steelhead to survive more than two spawning cycles. Steelhead typically spawn between December and May. Like other Pacific salmonids, the steelhead female deposits her eggs in a redd for incubation. The 0+ age fish emerge from the gravel to begin their freshwater life stage and can rear in their natal stream for 1 to 4 years before migrating to the ocean.

Steelhead have a similar life history as noted above for coho salmon, in the sense that they rear in freshwater for an extended period before migrating to saltwater. As such, they enter the estuary as larger fish (mean size of about 170 to 180 mm or 6.5 to 7.0 inches) and are, therefore, more oriented to deeper water channels. The California Department of Fish and Wildlife (CDFW) data indicate that steelhead smolts generally migrate downstream toward the estuary between March 1 and July 1 each year, although they have been observed as late as September (Ricker et al. 2014). The peak of the outmigration timing varies from year to year within this range, and generally falls between early April and mid-May.

2.2.2. Status of Species and Critical Habitat

In this biological opinion, NMFS assesses four population viability parameters to help us understand the status of each species and their ability to survive and recover. These population viability parameters are: abundance, population productivity, spatial structure, and diversity (McElhaney et al. 2000). While there is insufficient information to evaluate these population viability parameters in a thorough quantitative sense, NMFS has used existing information, including the Recovery Plan for SONCC Coho Salmon (NMFS 2014), to determine the general condition of each population and factors responsible for the current status of the Evolutionarily Significant Unit (ESU). We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.02).

2.2.2.1 Status of SONCC Coho Salmon

SONCC Coho Salmon Abundance and Productivity: Although long-term data on coho salmon abundance are scarce, the available evidence from short-term research and monitoring efforts indicate that spawner abundance has declined since the last status review for populations in this ESU (Williams et al. 2016). In fact, 24 of the 31 independent populations in the ESU are at high risk of extinction because they are below or likely below their depensation threshold, which can be thought of as the minimum number of adults needed for survival of a population. No populations are at a low risk of extinction and all core populations are thousands short of the numbers needed for recovery (Williams et al. 2016).

SONCC Coho Salmon Spatial Structure and Diversity: The distribution of SONCC coho salmon within the ESU is reduced and fragmented, as evidenced by an increasing number of previously occupied streams from which SONCC coho salmon are now absent (NMFS 2001, Good et al.

2005, Williams et al. 2011, Williams et al. 2016). Extant populations can still be found in all major river basins within the ESU (70 FR 37160; June 28, 2005). However, extirpations, loss of brood years, and sharp declines in abundance (in some cases to zero) of SONCC coho salmon in several streams throughout the ESU indicate that the SONCC coho salmon's spatial structure is more fragmented at the population-level than at the ESU scale. The genetic and life history diversity of populations of SONCC coho salmon is likely very low. The SONCC coho salmon ESU is currently considered likely to become endangered within the foreseeable future in all or a significant portion of its range, and there is heightened risk to the persistence of the ESU as Viable Salmonid Population parameters continue to decline and no improvements have been noted since the previous status review (Williams et al. 2016).

2.2.2.2 Status of CC Chinook Salmon

CC Chinook Salmon Abundance and Productivity: Low abundance, generally negative trends in abundance, reduced distribution, and profound uncertainty as to risk related to the relative lack of population monitoring in California have contributed to NMFS' conclusion that CC Chinook salmon are likely to become an endangered species within the foreseeable future throughout all or a significant portion of their range. Where monitoring has occurred, Good et al. (2005) found that historical and current information indicates that CC Chinook salmon populations are depressed. Uncertainty about abundance and natural productivity, and reduced distribution are among the risks facing this ESU. Concerns regarding the lack of population-level estimates of abundance, the loss of populations from one diversity stratum[1] as well as poor ocean survival contributed to the conclusion that CC Chinook salmon are likely to become an endangered species in the foreseeable future (Good et al. 2005, Williams et al. 2011, Williams et al. 2016).

CC Chinook Salmon Spatial Structure and Diversity: Williams et al. (2011) found that the loss of representation from one diversity stratum, the loss of the spring-run history type in two diversity substrata, and the diminished connectivity between populations in the northern and southern half of the ESU pose a concern regarding viability for this ESU. Based on consideration of this updated information, Williams et al. (2016) concluded the extinction risk of the CC Chinook salmon ESU has not changed since the last status review. The genetic and life history diversity of populations of CC Chinook salmon is likely very low and is inadequate to contribute to a viable ESU, given the significant reductions in abundance and distribution.

2.2.2.3 Status of NC Steelhead

NC Steelhead Spatial Structure and Diversity: NC steelhead remain broadly distributed throughout their range, with the exception of habitat upstream of dams on both the Mad River and Eel River, which has reduced the extent of available habitat. Extant summer-run steelhead populations exist in Redwood Creek and the Mad, Eel (Middle Fork, Van Duzen), and Mattole rivers. The abundance of summer-run steelhead was considered "very low" in 1996 (Good et al. 2005), indicating that an important component of life history diversity in this DPS is at risk. Hatchery practices in this DPS have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. However,

[1] A diversity stratum is a grouping of populations that share similar genetic features and live in similar ecological conditions.

abundance and productivity in this DPS are of most concern, relative to NC steelhead spatial structure and diversity (Williams et al. 2011).

NC Steelhead Abundance and Productivity: With few exceptions, NC steelhead are present wherever streams are accessible to anadromous fish and have sufficient flows. The most recent status review by Williams et al. (2016) reports that available information for winter-run and summer-run populations of NC steelhead do not suggest an appreciable increase or decrease in extinction risk since publication of the last viability assessment (Williams et al. 2011). Williams et al. (2016) found that population abundance was very low relative to historical estimates, and recent trends are downwards in most stocks.

2.2.2.4 Status of Critical Habitats

The condition of SONCC coho salmon, CC Chinook salmon, and NC steelhead critical habitat, specifically its ability to provide for conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that currently depressed population conditions are, in part, the result of the following human induced factors affecting critical habitat: timber harvest, agriculture, mining, urbanization, stream channelization, dams, wetland loss, and water withdrawals (including unscreened diversions for irrigation). Impacts of concern include altered stream bank and channel morphology, elevated water temperature, lost spawning and rearing habitat, habitat fragmentation, impaired gravel and wood recruitment from upstream sources, degraded water quality, lost riparian vegetation, and increased erosion into streams from upland areas (Williams et al. 2016, Weitkamp et al. 1995). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the DPS. Altered flow regimes can delay or preclude migration, dewater aquatic habitat, and strand fish in disconnected pools, while unscreened diversions can entrain juvenile fish.

2.2.3. Factors Responsible for the Decline of Species and Critical Habitat

The factors that caused declines of species and degradation of critical habitat include hatchery practices, ocean conditions, habitat loss due to dam building, degradation of freshwater habitats due to a variety of agricultural and forestry practices, water diversions, urbanization, over-fishing, mining, climate change, and severe flood events exacerbated by land use practices (Good et al. 2005, Williams et al. 2016). Sedimentation and loss of spawning gravels associated with poor forestry practices and road building are particularly chronic problems that can reduce the productivity of salmonid populations. Late 1980s and early 1990s droughts and unfavorable ocean conditions were identified as further likely causes of decreased abundance (Good et al. 2005). Since 2014, drought conditions in California reduced stream flows and increased temperatures, further exacerbating stress and disease. Drought conditions during present conditions in 2021 represent near record low conditions in both precipitation and streamflow. Ocean conditions have been unfavorable in past years due to the El Niño in 2015 and 2016 and other anomalously warm waters in the Gulf of Alaska. Reduced flows can cause increases in water temperature, resulting in increased heat stress to fish and thermal barriers to migration.

One factor affecting the range wide status and aquatic habitat at large is climate change. The best available information suggests that the earth's climate is warming, and that this could significantly impact ocean and freshwater habitat conditions, and thus the survival of species

subject to this consultation. Recent evidence suggests that climate and weather is expected to become more extreme, with an increased frequency of drought and flooding (IPCC 2019). Climate change effects on stream temperatures within Northern California are already apparent. For example, in the Klamath River, Bartholow (2005) observed a 0.5°C per decade increase in water temperature since the early 1960's, and model simulations predict a further increase of 1-2°C over the next 50 years (Perry et al. 2011).

In coastal and estuarine ecosystems, the threats from climate change largely come in the form of sea level rise and the loss of coastal wetlands. Sea levels will likely rise exponentially over the next 100 years, with possibly a 43-84 cm rise by the end of the 21st century (IPCC 2019). This rise in sea level will alter the habitat in estuaries and either provide an increased opportunity for feeding and growth, or in some cases will lead to the loss of estuarine habitat and a decreased potential for estuarine rearing. Based on the surrounding terrain or other infrastructure, some estuaries will have space to expand as sea level rises, while other estuaries may be reduced in size as saltwater intrusion overwhelms freshwater inputs. Marine ecosystems face an entirely unique set of stressors related to global climate change, all of which may have deleterious impacts on growth and survival while at sea. In general, the effects of changing climate on marine ecosystems are not well understood given the high degree of complexity and the overlapping climatic shifts that are already in place (e.g., El Niño, La Niña, Pacific Decadal Oscillation) and will interact with global climate changes in unknown and unpredictable ways. Overall, climate change is believed to represent a growing threat, and will challenge the resilience of SONCC coho salmon, CC Chinook salmon, and NC steelhead.

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 includes the entire HRSP park area and 1,500-feet of the lower Eel River downstream, where effects such as suspended sediments and turbidity are likely to occur downstream from the HRSP Program activities.

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).

In the action area, the threat to SONCC coho salmon, CC Chinook salmon, and NC steelhead from climate change is likely to include a continued increase in average summer air temperatures; more extreme heat waves; and an increased frequency of drought (Lindley et al.

2007). In future years and decades, many of these changes are likely to further degrade habitat throughout the watershed by, for example, reducing streamflow during the summer and raising summer water temperatures. Many of these impacts will likely occur in the action area via higher water temperatures and reduced flows.

SONCC coho salmon in the action area belong to the South Fork Eel River population (those individuals occurring in the South Fork Eel River and its tributaries) as well as the Lower Eel/Van Duzen River population (those individuals occurring in the lower Eel River and its tributaries). The NMFS SONCC Coho Salmon Recovery Plan indicates the South Fork Eel River population is at moderate risk of extinction, while the Lower Eel/Van Duzen River population is at a high risk of extinction (NMFS 2014). Chinook salmon in the action area belong to the Lower Eel/South Fork population, which the NMFS Coastal Multispecies Recovery Plan suggests is likely well below the number needed to be at a low risk of extinction (NMFS 2016). Winter-run steelhead in the action area belong to the South Fork Eel River population of NC steelhead, which is also likely well below the number needed to be at a low risk of extinction (NMFS 2016). The Coastal Multispecies Recovery Plan indicates a need for at least 250 adult summer-run steelhead to avoid the effects of depensation within the South Fork Eel population of summer-run steelhead (NMFS 2016). A recent estimate of the number of redds produced by pairs of spawning salmon and steelhead in the South Fork Eel River during 2013 indicate an estimated 879 SONCC coho salmon redds; 149 CC Chinook salmon redds; and 1,113 NC steelhead redds (Ricker et al. 2015). Summer-run steelhead have not been documented in the action area. It should be noted that both the Chinook and steelhead data likely represent underestimates given the timing and distribution of the survey effort being geared towards coho salmon.

2.4.1. Status of the Listed Species and Critical Habitat in the Action Area

The condition of designated critical habitats in the action area, specifically their ability to provide for conservation, is degraded from conditions known to support viable populations. The majority of the HRSP area exists in the South Fork Eel River, with limited ownership along the mainstem of the Eel River. The highest threats to SONCC coho salmon, CC Chinook salmon, and NC steelhead in the South Fork Eel River are water diversions and impoundments, largely due to the cannabis industry and rural land use (NMFS 2014, 2016). The South Fork Eel River consistently remains in the stressful to lethal range for salmonids during the summer (Kubicek 1977, NMFS 2014). The HRSP Program area has been subjected to numerous disturbances over time, including timber harvest, large floods, drought, and more recently illegal cannabis growing. The floods of 1955 and 1964 contributed large volumes of sediment, which filled in pools and disrupted drainage patters as roads and culverts failed and eroded. Waterways in the action area were the subject of large wood removal efforts, which greatly simplified the habitat available. The lack of wood and complexity and abundance of alluvial material and sediment often causes large reaches to flow subsurface or intermittently during the low flow summer months. Most waterways in the action area have disconnected surface flows with simplified habitat conditions where listed species are known to occur.

2.4.2. Previous ESA Section 7 Consultations in the Action Area

NMFS' ESA Section 10(a)(1)(A) research and enhancement permits and research projects and the annual CDFW ESA Section 4(d) rule research program could potentially occur in the action area. Salmonid monitoring approved under these programs includes carcass surveys, adult salmonid monitoring and juvenile surveys. The Community of Shively operates a temporary seasonal bridge over the lower Eel River, which NMFS' Biological Opinion (WCRO-2019-00115) anticipated small numbers of juveniles would be taken during the installation and removal of the seasonal bridge. In general, these activities are closely monitored and require measures to minimize and monitor for take. NMFS determined these projects were unlikely to affect future adult returns.

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).

2.5.1. Turbidity and Contaminants

Turbidity and suspended sediments are expected to extend as far as 1,500 feet downstream of the HRSP boundary along the Eel River. The magnitude of turbidity is not expected to cause injuries or impede behavior of individuals and the duration of turbid conditions will likely be similar to baseline conditions. The amount and extent of road work and removal, crossing removal or upgrades, and landform treatments will disturb soils and make them prone to adjustments and erosion until they stabilize. The re-occupation and use of native surfaced roads will also create dust and contribute suspended sediment into waterways. The amount of suspended sediment being generated during these activities is likely to result in reductions in the quantity and quality of designated critical habitat for SONCC coho salmon, CC Chinook salmon, and NC steelhead. Suspended sediments related to Program activities are expected to deposit downstream and contribute to diminished pool depths and higher percentages of fine sediments in waterways, including the Mainstem and South Fork Eel River.

The increase in turbidity and suspended sediments from Program activities will expose all life stages of SONCC coho salmon, CC Chinook salmon, and NC steelhead, and NMFS expects these individuals would attempt to relocate to les turbid areas, or experience a temporary reduction in feeding performance. Turbid conditions in tributaries tend to be of shorter duration than in the Mainstem or South Fork Eel River. NMFS does not expect any fitness consequence to occur as a result of short-term reductions in feeding performance. Regarding toxic contaminants, NMFS expects adverse effects from toxic contaminants leaking into waterways within the action area to be improbable based on most work areas being isolated during construction, and spill prevention and clean-up measures incorporated.

2.5.2. Water Temperature

HRSP will be thinning as many as 500-acres of forest per year, or as many as 5,000-acres of forest thinning over the 10-year Program duration. The riparian buffers proposed lack no-harvest buffers along fish-bearing waterways, which is a departure from the State of California's Forest Practice Rules. The Program's approach to thin the forest, while also providing large wood to streams, requires that streamside trees be cut to facilitate achieving the Program's goals. Upon removal of streamside trees that provide shade to waterways in the action area, there will be an increase in the amount of sunlight that reaches waterways (as much as 20% reduction in canopy shade in fish bearing streams, or 40% reduction in canopy shade in streams that drain into fish bearing streams).

The opening of canopy shade over waterways will likely increase the water temperature regimes for several years. Given the current water temperature regimes in the tributaries within the action area, the minor increase in water temperatures is not expected to increase temperatures to such levels where they might cause stressful and/or lethal conditions within the HRSP area tributaries. However, these increases may further warm the South Fork Eel River, and diminish the value of cool water refugia that might be present in the South Fork Eel River where HRSP tributaries connect and provide cooler water inputs to the warm South Fork Eel River. Given the HRSP area is patchy and concentrated along a narrow strip of land along the Mainstem Eel River, NMFS does not anticipate Program activities to influence temperatures along the Mainstem Eel River beyond the minor increase in water temperatures expected to be contributed by the South Fork Eel River.

Coincident with thinning operations, HRSP does plan to augment watercourse complexity by incorporating large wood structures, which will likely improve pool depths and habitat complexity and help offset some of the increases in water temperatures within the tributary areas that receive riparian canopy treatments. NMFS expects individual SONCC coho salmon, CC Chinook salmon, and NC steelhead occurring in tributaries to experience minor increases in water temperatures. The improved pool depths and habitat complexity will help ameliorate these changes within tributaries, while effects to the South Fork Eel River will be more profound.

The degradation of thermal refugia in the South Fork Eel River will reduce the quality of critical habitat and will be an adverse effect. NMFS expects individuals in the South Fork Eel River will have less access to thermal refugia during the warm months, which will cause additional stress and mortalities to juvenile NC steelhead who are attempting to rear in the South Fork Eel River. NMFS expects the effects of the current drought (low flows, warmer temperatures) to continue during the HRSP 10-year Program. After HRSP implements the Program and completes treatments across entire sub-watersheds, NMFS expects thermal refugia and adverse effects to NC steelhead juveniles to begin in 2026.

2.5.3. Crushing

HRSP proposes to install large wood structures during low flows as well as individual pieces during various higher flow levels in order to transport pieces downstream. HRSP expects to construct as many as 20 structures per reach, or sub-watershed, and generally operates in three sub-watersheds each year. Therefore, HRSP may install as many as 60 wood structures per year,

or as many as 6,000 pieces of large wood per year across three sub-watersheds. Most of the wood installations are expected to occur in dry or intermittent flow conditions, but some installations will occur while there are surface flows in waterways. Additionally, some pieces of wood will be added to waterways during higher flow periods so that the wood pieces would be transported downstream. NMFS expects as many as 40% of the wood structures, or pieces, would be installed during dry conditions; 40% during low flow conditions; and 20% during higher flow conditions. NMFS does not expect any individuals to be exposed to crushing during wood installations that occur during dry conditions.

Table 3. Anticipated amounts of annual and total take due to crushing caused by Program activities over the 10-year permit duration.

Species	Dry Flow Installations	Low Flow Installations	High Flow Installations	Annual Total	10-year Total
SONCC coho salmon	0	8	3	11	110
NC steelhead	0	24	6	30	300

As many as 40% of the wood structures (24 structures) are likely to be installed during summer low flow conditions, where juvenile SONCC coho salmon or NC steelhead may be present and exposed to foot traffic and wood placement where there is a potential for individuals to be crushed. NMFS expects one juvenile SONCC coho salmon to be crushed at 1/3 of the structures (8 structures) installed each year (8 juvenile SONCC coho salmon crushed during structure installation/year). NMFS expects that one juvenile NC steelhead would be crushed during the installation of wood structures at all of the structure locations installed in flowing water (24 structures x one individual = 24 individual juvenile NC steelhead/year, see Table 3).

NMFS expects that as many as 20% of the pieces of large wood installed each year (1,200 pieces) might be installed during higher flow conditions so that they are transported downstream to target areas. During higher flows within the HRSP operating season, juvenile life stages of SONCC coho salmon or NC steelhead could be present and potentially exposed. The addition of pieces of wood presents a crushing hazard as the piece is lowered, or dropped, into the water. Once the piece is in the water, it is intended to float and be carried downstream, where the likelihood of crushing becomes unlikely. NMFS expects a very low portion of the pieces added would actually crush a juvenile SONCC coho salmon (1/500 pieces) or juvenile NC steelhead (1/200 pieces) upon placement in the water. Therefore, NMFS expects three juvenile SONCC coho salmon and six juvenile NC steelhead to be crushed by the installation of wood pieces during higher flows (see Table 3).

2.5.4. Dewatering and Fish Relocation

HRSP anticipates the need for fish to be relocated before dewatering commences during crossing removal work at one location per sub-watershed per year, and HRSP anticipates working in as many as three sub-watersheds per year, for a total of a maximum of three fish relocation episodes per year. Fish relocation would be necessary in order to deconstruct and remove road crossings, which would likely be required for an average of 100-feet per crossing removed, with an average width of three feet (three fish relocations x 100-feet length x 3-feet width = 900 square feet of fish relocation per year). NMFS expects that one third of the fish relocation efforts required each

year (~300 square feet) would occur in a waterway with low numbers of SONCC coho salmon juveniles present, and all fish relocation efforts would occur in waterways with NC steelhead juveniles present. Densities of SONCC coho salmon and NC steelhead are likely similar to those found in nearby tributaries to the Mattole River, which are also intermittent with low flows. NMFS expects SONCC coho salmon juvenile density would be one individual per 10 square feet (30 individual SONCC coho salmon juveniles relocated per year) and NC steelhead juvenile density to also be one individual per 10 square feet (90 individual NC steelhead juveniles relocated each year). Of the fish captured and relocated, NMFS expects one percent of those fish handled to succumb to handling stress and perish: one percent of 90 NC steelhead juveniles is equivalent to one fish being killed each year and one percent of the 30 SONCC coho salmon juveniles is equivalent to one fish being killed each year.

2.5.5. Critical Habitat Summary

As previously described, Program activities will likely reduce the quantity and quality of all designated critical habitat in the action area due to the generation of suspended sediments and subsequent infilling or aggradation of habitats downstream; as well as the lack of no harvest measures that will create openings in over-stream canopy that will increase water temperatures throughout the system and contribute to cumulative effects in downstream portions of the action area. The increases in water temperature are expected to be delayed in time (beginning in 2026) as more riparian trees are removed from the banks of waterways and over canopy shade is reduced. As HRSP implements this work, the large wood component will ameliorate some of the adverse effects by creating deeper and more complex habitats. At confluences of HRSP tributaries with the South Fork Eel River, NMFS expects the quality of potential thermal refugia to be reduced due to the cumulative warming of water temperatures throughout sub-watersheds. NMFS expects canopy shade conditions to recover after several years of vegetative growth, at which point the temperature conditions would return to baseline conditions several years after the 10-year Program has concluded.

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.

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).

SONCC coho salmon, CC Chinook salmon, and NC steelhead in the action area are likely to be affected by future, ongoing non-federal activities like agriculture and timber harvest, both from upstream sources and within the action area. Water diversions also contribute to diminished

stream flows and warmer water temperatures. The future effects of agriculture and timber harvest include continued land disturbance, road construction and maintenance, and higher rates of erosion and sedimentation.

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.

SONCC coho salmon, CC Chinook salmon, and NC steelhead have declined to a large degree from historic numbers and summer run populations of NC steelhead are in very poor condition. As described in the Effects of the Action section, a small number of juveniles may be injured or killed during fish relocation activities and large wood structure installation. NMFS does not expect that the loss of juveniles by this Program would impact future adult returns for SONCC coho salmon, CC Chinook salmon, or NC steelhead. The Program will treat sub-watersheds in phases, and there will be large numbers of individuals residing in the action area who remain largely unaffected. In NMFS' judgement, they are likely to produce enough future spawning adult fish to outweigh any losses from the action area until the Program is complete. There will be adverse effects to critical habitat in the action area as pool depths and complexity are reduced by increases in suspended sediments, and water temperatures are warmed due to the removals of shade trees.

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 2031 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. Because the project will help restore multiple areas within the action area, NMFS expects it will help improve the resilience of species and habitats to climate change over the long term. Overall, the project is unlikely to appreciably reduce the likelihood of survival and recovery of SONCC coho salmon, CC Chinook salmon, or NC steelhead, and the project is unlikely to appreciably diminish the value of designated critical habitat for the conservation of the species.

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, the effects of

other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon, CC Chinook salmon, or NC steelhead, nor destroy or adversely modify their designated critical habitats.

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.

2.9.1. Amount or Extent of Take

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

Crushing
NMFS expects that up to 11 juvenile SONCC coho salmon and 30 juvenile NC steelhead will be killed by crushing during the installation of wood pieces annually. Over the 10-year Program, NMFS expects a total of 110 juvenile SONCC coho salmon and 300 juvenile NC steelhead to be killed and crushed by the Program.

Relocation
NMFS expects that fish relocation efforts will be efficient and all of the anticipated individual juvenile SONCC coho salmon (30 individuals) and juvenile NC steelhead (90 individuals) will be captured, handled, and relocated each year. A small number (1%) of the relocated fish are expected to be killed each year due to handling injuries, or one juvenile SONCC coho salmon and one juvenile NC steelhead. Over 10 years, there would likely be 300 juvenile SONCC coho salmon and 900 juvenile NC steelhead captured, handled, and relocated with 10 individual juvenile SONCC coho salmon and NC steelhead perishing due to handling stress over the 10-year Program.

Total Amount of Take
Combined, there are 300 individual juvenile SONCC coho salmon and 900 individual juvenile NC steelhead expected to be captured, handled, and released over 10 years. One percent of those

fish captured and released are expected to be killed each year due to handling stress (10 individual juvenile SONCC coho salmon and NC steelhead, see Table 4). There are also 110 individual juvenile SONCC coho salmon and 300 individual NC steelhead expected to be killed and crushed during the 10-year Program (see Table 4).

Table 4. 10-year Program totals for the various forms of take that are anticipated.

ESU/Species	Captured, Handled, Released	Killed Due to Handling Stress	Crushed and Killed by Wood Installations	10-year Total Number Killed
SONCC coho salmon	300	10	110	120
NC steelhead	900	10	300	310

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 NC steelhead:

1. Ensure that all necessary and appropriate actions are taken to minimize injury and mortality to SONCC coho salmon and NC steelhead during structure installation, fish relocation and dewatering work.
2. Submit annual reports regarding construction activities and results.

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:
    a. The Corps and HRSP shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel to visit the project site during activities described in this opinion.

b. The Corps and HRSP shall ensure that any minimization measures described in the Proposed Federal Action section are properly implemented.
c. The Corps and HRSP shall inspect and monitor the work areas during and after deconstruction or large wood structure installation for any individuals which may be injured or killed.
d. The Corps and HRSP shall contact NMFS within 24 hours of meeting or exceeding take of listed species prior to project completion. Notify Matt Goldsworthy by phone at 707-357-1338 or email at Matt.Goldsworthy@noaa.gov. NMFS will review the activities resulting in take and determine if additional protective measures are required.

2. The following terms and conditions implement reasonable and prudent measure 2:
    a. HRSP shall provide a written report to NMFS by February 15 of each year. The report shall be sent to NMFS via email to Matt.Goldsworthy@noaa.gov. The report shall contain, at a minimum, the following information:
        i. **Fish Relocation and Dewatering** – The report will include 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 salmonid 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.
        ii. **Large Wood Structures** – The report will summarize any observations that occur regarding injury or death of listed species during the installation of structures or pieces of wood, and summarize the work completed each year.

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).

2.11. Reinitiation of Consultation

This concludes formal consultation for the Humboldt Redwoods State Parks Watershed Restoration Program. 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 (PFMC 2016) contained in the fishery management plan developed by the Pacific Fisheries Management Council (PFMC) and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

Essential Fish Habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802[10]). "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). The term "adverse effect" means any impacts which reduce the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrates and loss of, or injury to, benthic organisms, prey species, and their habitats, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of it and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR

600.910). The EFH consultation mandate applies to all species managed under a Fishery Management Plan (FMP) that may be present in the action area.

The Pacific Coast Salmon FMP contains EFH that will be adversely affected by the Project. Furthermore, the Project is located in a Habitat Area of Particular Concern (HAPC) for federally managed fish species (Chinook and coho salmon) under the Pacific Coast Salmon FMP. HAPC are described in the regulations as subsets of EFH that are identified based on one or more of the following considerations: the importance of the ecological function provided by the habitat; the extent to which the habitat is sensitive to human-induced environmental degradation; whether, and to what extent, development activities are, or will be stressing the habitat type; and the rarity of the habitat type (50 CFR 600.815(a)(8)). Designated HAPC are not afforded any additional regulatory protection under MSA; however, federal projects with potential adverse impacts to HAPC are more carefully scrutinized during the consultation process. One of the HAPCs that were developed as part of the Pacific Coast Salmon FMP is Thermal Refugia.

3.2. Adverse Effects on Essential Fish Habitat

Both Chinook salmon and coho salmon are expected to occur seasonally within the action area. The effects to these species have already been described in the Effects of the Action section. The adverse effects to EFH and HAPC in the action area include: degradation of thermal refuge HAPC at tributary confluences along the South Fork Eel River will affect individuals throughout the year and contribute additional stressors to already weak stocks.

3.3. Essential Fish Habitat Conservation Recommendation

NMFS suggests the following Conservation Recommendation to offset the adverse effects of the HRSP Program on thermal refuge in the action area:

1. Ensure that large wood structures are installed at or near all HRSP tributary confluence areas to promote scour and habitat complexity in areas which are expected to experience increases in water temperature regimes into the future. Providing deeper and more complex habitat in these areas will help ameliorate and offset the adverse effects.

Fully implementing this EFH conservation recommendation would protect EFH and HAPC, by avoiding or minimizing the adverse effects described in the ESA Effects of the Action and section 3.2 above.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, Reclamation must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must

explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).
In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5. 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 Recommendation (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 and HRSP. Other interested users could include CDFW. Individual copies of this opinion were provided to the Corps. The document will be available 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 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 reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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