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

February 27, 2023 **Refer to NMFS No:** WCRO-2022-01927

L. Kasey Sirkin, Lead Biologist
U.S. Department of the Army
601 Startare Drive, #13
Eureka, California 95501

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Stewart Bar Mining Project on the Middle Fork Eel River

Dear Ms. Sirkin:

Thank you for your letter of July 13, 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 Stewart Bar Mining project.

The enclosed biological opinion is based on our review of the U.S. Department of the Army Corps of Engineers' (USACE) proposed project and describes NMFS' analysis of potential effects on threatened California Coastal (CC) Chinook salmon (*Oncorhynchus tshawytscha*), Northern California (NC) steelhead (*Oncorhynchus mykiss*) and designated critical habitat for these species in accordance with section 7 of the ESA. In addition, we include the potential affects to critical habitat for Southern Oregon and Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*) and omit inclusion of effects to species of SONCC coho salmon because they have not been present in the Middle Fork Eel for decades. In the enclosed biological opinion, NMFS concludes the project is not likely to jeopardize the continued existence of these species; nor is it likely to adversely modify critical habitat. However, NMFS anticipates that take of CC Chinook salmon and NC steelhead may occur. An incidental take statement which applies to this project with non-discretionary terms and conditions is included with the enclosed opinion.

NMFS has reviewed the proposed project for potential effects on EFH and determined that the proposed project would adversely affect EFH for Pacific Coast Salmon, which are managed under the Pacific Coast Salmon Fishery Management Plan. While the proposed action will result in adverse effects to EFH, the proposed project contains measures to minimize, mitigate, or otherwise offset the adverse effects; thus, no EFH Conservation Recommendations are included in this opinion.

Please contact Thomas Daugherty at (707)575-6050, or via email at Tom.Daugherty@noaa.gov, if you have any questions concerning this section 7 and EFH consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Mel Goodwin, Wylatti Resource Management, Covelo, CA, melgoodwin@comcast.net
Copy to E-File: FRN 151422WCR2022SR00156

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

Stewart Bar Mining Project on the Middle Fork Eel River

NMFS Consultation Number: WCRO-2022-01927
Action Agency: U.S. Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
California Coastal Chinook (*O. tshawytscha*)	Threatened	yes	no	yes	no
Northern California steelhead (*Oncorhynchus mykiss*)	Threatened	yes	no	yes	no
Southern Oregon Northern California Coasts coho salmon (*O. kisutch*)	Threatened	no	no	yes	no

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: February 27, 2023

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1. INTRODUCTION

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

1.1. Background

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

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two 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

Early consultation for the proposed project was first conducted on June 14, 2017, during a site visit of the Stewart Bar with Mel Goodwin (Wilatti Resource Management) and Thomas Daugherty, staff biologist with NMFS. During this site visit, the project applicant described the access to the gravel bar, potential extraction scenarios, and the need for a temporary crossing to access the bar in some years.

On July 13, 2022, NMFS received an initiation package from the U.S. Department of the Army Corps of Engineers (USACE) requesting formal consultation for the proposed project which included the biological assessment (Gallaway Enterprises 2021) and cover letter. NMFS reviewed the biological assessment for sufficiency and accepted the initiation package on September 13, 2022, for formal interagency consultation.

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

1.3. Proposed Federal Action

Under the ESA, “action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).] We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not cause additional effects beyond those that are from the action as described below.

USACE proposes to authorize a Section 404 permit for an application received from Wylatti Resource Management, to perform annual gravel extraction activities on the Stewart Bar, on the Middle Forks Eel River, including constructing a temporary stream crossing, and stockpiling material. The proposed project is located at 51111 Covelo Road, in the town of Dos Rios, Mendocino County, California, at latitude 39.705º longitude -123.328º. The project permit period will run through December 31, 2032

Project activities will involve the excavation of sand and gravel using conventional construction equipment (e.g., dozer, excavator, water truck) and loading of the material into haul trucks for transport to an existing processing facility located off State Route (SR) 162 near Longvale, California. Only extraction, loading, and haul-out will occur, with no processing onsite. Project activities will be timed during the summer low-flow season, from June 15 through October 15. There is no vegetation removal anticipated as part of Project activities.

Total annual extraction volumes will be replenishment based, with a maximum proposed annual extraction quantity of 20,000 cubic yards. Project activities will occur during the summer low-flow season (June 15 through October 15) to avoid potential impacts to ESA-listed salmonids. Post-extraction reclamation activities will include removal of any remaining temporary gravel stockpiles, finished grading of the gravel bar to fill in low areas and depressions, recontouring of the gravel bar to meet agency-approved post-extraction slopes and gravel bar configuration, removal of temporary culverts (if necessary), installation of storm water control measures, and removal of all work materials and debris.

Extraction Methods

Gravel extraction at the site will be consistent with the NMFS’ approved skimming methodology which involves the removal of gravel using excavators, loaders, and haul trucks from selected areas of the gravel bar in a sloped configuration to avoid creating holes or channels. Extraction will be limited to the aggraded portion of the bar, utilizing horizontal and vertical offsets for buffers from the low-flow channel. The extraction area maintains an undisturbed head of bar buffer that begins at the upstream end of the bar and extends downstream for a distance equaling approximately 30-35 percent of the total length of the exposed bar to protect bar stability. A lateral buffer is maintained between the outer edge of the bar and the low-flow channel providing a vertical offset from the water’s edge and a horizontal offset of at least 10 feet in width from the water’s edge. The remaining interior portion of the bar is skimmed down to a longitudinal slope approximating the gradient of the adjacent low-flow channel from the downstream end of the bar ascending to the head buffer. Actual extraction designs are determined on an annual basis based on channel morphology and gravel replenishment, and are subject to review and approval from the California Department of Fish and Wildlife (CDFW) and NMFS.

Following annual extraction activities, reclamation grading of the gravel bar is performed to fill in low areas and depressions. The extraction surface is reclaimed to a smoothly graded condition such that no depressions or lumps greater than one-half foot higher or lower than the planned grading plane remain. In addition, final contouring of the gravel bar is performed to meet agency-approved post-extraction slopes and gravel bar configuration to minimize erosion.

Temporary Stream Crossing

It is anticipated that changes in channel morphology may require the placement of a temporary crossing to access the mining area. Should a channel form between the gravel bar and the access road in during the life of the USACE permit, a temporary wet crossing (culvert) will be installed at the base of the existing road to allow access to the bar. If a crossing is utilized, the temporary culvert will be removed prior to October 15 each season to provide an unobstructed channel for winter flows. The culvert area is backfilled with clean gravel from the gravel bar, so a clean channel is left after the culvert is removed.

Avoidance and Minimization Measures

The following avoidance and minimization measures are proposed to minimize impact to ESA listed salmonids, their critical habitat, and to EFH:

1. Limiting annual gravel extraction to quantities no greater than replenishment by natural bedload transport processes. The skimming methodology conforming to NMFS/CDFW recommendations and guidelines, will be adjusted each time the bar is to be harvested.

2. Avoiding extraction from the upper 30-35% of the bar formation to protect bar stability as recommended in NMFS' sediment removal guidelines.

3. A lateral buffer is maintained between the outer edge of the bar and the low-flow channel providing a vertical offset from the water's edge and a horizontal offset of at least 10 feet in width from the water's edge for equipment wheels or tracks.

4. The remaining interior portion of the bar is skimmed down to a longitudinal slope approximating the gradient of the adjacent low-flow channel from the downstream end of the bar ascending to the head buffer.

5. Conducting all extraction activities during the late-summer to early-fall low-flow period when salmonids are unlikely to be present in the nearby channel. Mining activities are seasonally limited between June 15 and October 15 each year.

6. Avoiding disturbance of mature woody riparian vegetation.

7. Post-extraction finished grading of the gravel bars to fill in low areas and depressions and recontouring of the gravel bars to meet agency-approved post-extraction slopes and gravel bar configuration.

8. Removal of temporary stream crossing (if necessary) at the end of each extraction season.

9. Installation of post-extraction storm water control measures as-needed.

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

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

2.1. Analytical Approach

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

This biological opinion also relies on the regulatory definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation(s) of critical habitat for CC Chinook salmon, SONCC coho salmon and NC steelhead 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 Life History

The biological opinion analyses the effects of the federal action on the following Federally-listed species (Distinct Population Segment (DPS) or Evolutionary Significant Unit (ESU)) and designated critical habitat:

Threatened Northern California (NC) steelhead DPS (*Oncorhynchus mykiss*)
Threatened (71 FR 834, January 5, 2006)
Critical habitat (70 FR 52488, September 2, 2005);

Threatened California Coastal (CC) Chinook salmon ESU (*O. tshawytscha*)
Threatened (70 FR 37160; June 28, 2005)
Critical habitat designation (70 FR 52488; September 2, 2005);

Threatened Southern Oregon Northern California Coasts (SONCC) coho salmon ESU (*O. kisutch*) Critical habitat designation (64 FR 24049; May 5, 1999).

Critical habitat is designated for SONCC coho salmon in all accessible reaches throughout the ESU, however, SONCC coho salmon are not currently known to inhabit the watershed area of the Middle Fork Eel River. The USACE determined the proposed action is not likely to adversely affect threatened SONCC coho salmon. NMFS concurs with determination and therefore, this biological opinion does not further analyze effects to individual SONCC coho salmon as there are no expected effects to this species.

2.2.1.1 General Life History of Listed Species

Chinook Salmon

Chinook salmon follow the typical cycle of Pacific salmon, hatching in freshwater, migrating to the ocean, and returning to freshwater to spawn and die. Diversity within this life cycle exists, however, in the time spent at each stage. Chinook salmon are classified into two groups, ocean-type and stream-type, based on the period of freshwater residence (Healey 1991; Meyers et al. 1998). Fall or late fall-run fish enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few weeks of freshwater entry. Juveniles emigrate to estuarine or marine environments shortly after emergence from the red (Healey 1991). Stream-type fish are typically winter or spring-run fish that have a protracted adult freshwater residency, sometimes spawning several months after entering freshwater. Progeny of stream-type fish frequently spend one or more years in freshwater before emigrating. After emigrating, Chinook salmon remain in the ocean for two to five years and tend to stay in the coastal waters off California and Oregon (Healey 1991). Chinook salmon are also characterized by the timing of adult returns to freshwater for spawning, with the most common types referred to as fall-run and spring-run fish.

Chinook generally remain in the ocean for two to five years (Myers et al. 1998). Some Chinook salmon return from the ocean to spawn one or more years early. These early maturing fish are referred to as jacks (males) and jills (females). The low flows, high water temperatures, and sand bars that develop in smaller coastal rivers of coastal California during the summer months favor an ocean-type life history or fall-run (Myers *et al*. 1998). With this life history, adults enter freshwater between August and January (Chase *et al.* 2007) and smolts typically outmigrate as sub-yearlings between April and July (Myers *et al*. 1998). Fall-run fish typically enter freshwater with fully developed gonads, move rapidly to their spawning areas on the mainstem or lower tributaries of mainstem rivers (elevations of 200 to 1,000 feet), and spawn within a few weeks of freshwater entry. In contrast, spring-run fish inhabit large river systems with high elevation tributaries fed by melting snowpack. Spring-run fish enter river systems during peak snowmelt, between April and August, with undeveloped gonads that mature over the summer. These fish migrate when high flows facilitate passage into cold, headwater tributaries where the fish hold until they spawn later that fall.

Spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 24 cm. Adult female Chinook salmon prepare redds in stream areas with suitable gravel composition, water depth, and velocity. Individual females spawn for five to fourteen days and will guard or defend their redds for two to four weeks before dying (Beauchamp *et al.* 1983). The number of eggs a female produces generally ranges from 2,000–17,000 and is not directly correlated to fish size (Hassler 1987; Moyle 2002). Optimal spawning temperatures range between 5.6 and 13.9°C. Redds vary widely in size and location within the river. Preferred spawning substrate is clean, loose gravel, mostly sized between 1.3 and 10.2 cm, with fine sediment not exceeding 10 percent. Chinook salmon eggs incubate for 90 to 150 days depending on water temperature (Beauchamp et al. 1983). Successful incubation depends on several factors, including dissolved oxygen levels, temperature, substrate size, amount of fine sediment, and water velocity. Maximum survival of incubating eggs and pre-emergent fry occurs at water temperatures between 5.6 and 13.3°C with an optimal temperature of 11.1°C. Alevins remain in the gravel for a month or longer (about four to six weeks) until they emerge as fry (Beauchamp *et al.* 1983; Moyle 2002). Fry emergence begins in December and continues into mid-April (Leidy and Leidy 1984).

After emergence, Chinook salmon fry seek out areas behind fallen trees, back eddies, undercut banks, and other cover (Everest and Chapman 1972). Cover, in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provides food, shade, and protects juveniles from predation. As they grow larger, juveniles move away from stream margins and begin to use deeper water areas with slightly faster water velocities, but continue to use available cover to minimize the risk of predation and reduce energy expenditure (Chapman and Bjornn 1969; Everest and Chapman 1972).

Steelhead

Steelhead are the anadromous form of *O. mykiss*, spawning in freshwater and migrating to marine environments to grow and mature. Steelhead have a complex life history that requires successful transition between life stages across a range of freshwater and marine habitats (*i.e.,* egg-to-fry emergence, juvenile rearing, smolt outmigration, ocean survival, and upstream migration and spawning). Steelhead exhibit a high degree of life history plasticity (Shapovalov and Taft 1954; Thrower et al. 2004; Satterthwaite et al. 2009). The occurrence and timing of these transitions are highly variable and generally driven by environmental conditions and resource availability (Satterthwaite et al. 2009; Sogard et al. 2012).

Steelhead are generally divided into two ecotypes based on timing and state of maturity when returning to freshwater: summer-run and winter-run. Summer-run steelhead return to natal streams in spring and early summer while they are still sexually immature and spend several months maturing before spawning in January and February (Nielson and Fountain 2006). Winter-run steelhead enter natal streams as mature adults with well-developed gonads. They typically immigrate between December and April and spawn shortly after reaching spawning grounds (Shapovalov and Taft 1954; Moyle et al. 2008).

Adult steelhead spawn in gravel substrates with low sedimentation and suitable flow velocities. Females lay eggs in redds, where they are quickly fertilized by males and covered. Egg survival depends on oxygenated water circulating through the gravel, facilitating gas exchange and waste removal. Adults usually select spawning sites in pool-riffle transition areas of streams with gravel cobble substrates between 0.6 to 10.2 centimeters (cm) in diameter and flow velocities between 40 - 91cm per second (Smith 1973; Bjornn and Reiser 1991). Eggs incubate in redds for approximately 25 to 35 days depending on water temperature (Shapovalov and Taft 1954). Incubation time depends on water temperature, with warmer temperatures leading to lower incubation periods due to increased metabolic rates. Eggs hatch as alevin and remain buried in redds for an additional two to three weeks until yolk-sac absorption is complete (Shapovalov and Taft 1954). Optimal conditions for embryonic development include water temperatures between 6 and 10°C, dissolved oxygen near saturation, and fine sediments less than 5% of substrate by volume (Bjornn and Reiser 1991; USEPA 2001).

Upon emerging from redds, juvenile steelhead occupy edgewater habitats where flow velocity is lower and cover aids in predator avoidance. Rearing juveniles feed on a variety of aquatic and terrestrial invertebrates. As they grow, juveniles move into deeper pool and riffle habitats where they continue to feed on invertebrates and have been observed feeding on younger juveniles (Chapman and Bjornn 1969; Everest and Chapman 1972). Juveniles can spend up to four years rearing in freshwater before migrating to the ocean as smolts, although they typically only spend one to two years in natal streams (Shapovalov and Taft 1954; Busby et al. 1996). Successful rearing depends on stream temperatures, flow velocities, and habitat availability. Preferred water temperature ranges from 12 to 19°C and sustained temperatures above 25°C are generally considered lethal (Smith and Li 1983; Busby et al. 1996). In Central California streams, juvenile steelhead are able to survive peak daily stream temperatures above 25°C for short periods when food is abundant (Smith and Li 1983). Response to stream temperatures can vary depending on the conditions to which individuals are acclimated, however, consistent exposure to high stream temperatures results in slower growth due to elevated metabolic rates and lower survival rates overall (Hokanson et al. 1977; Busby et al. 1996).

Juveniles undergo behavioral, morphological, and physiological changes in preparation for ocean entry, collectively called smoltification. Juveniles begin smoltification in freshwater and the process continues throughout downstream migration with some smolts using estuaries for further acclimation to saltwater prior to ocean entry (Reiser and Bjornn 1979). Juveniles typically will not smolt until reaching a minimum size of 160 mm (Burgner et al. 1992). Smoltification is cued by increasing photoperiod. Stream temperatures influence the rate of smoltification, with warmer temperatures leading to more rapid transition. Downstream migration of smolts typically occurs from April to June when temperature and stream flows increase. Preferred temperature for smoltification and outmigration is between 10 and 17°C with temperatures below 15°C considered optimal (Hokanson et al. 1977; Wurtsbaugh and Davis 1977; Zedonis and Newcomb 1997; Myrick and Cech 2005). In coastal systems with seasonal lagoons, smolts may take advantage of higher growth potential in productive lagoon habitats before ocean entry (Osterback et al. 2018).

Adult steelhead are known to be highly migratory during ocean residency but little is known of their habitat use and movements. They have been observed moving north and south along the continental shelf, presumably to areas of high productivity to feed (Barnhart 1986). Adults will typically spend one to two years in the ocean, feeding and growing in preparation for spawning (Shapovalov and Taft 1954; Busby et al. 1996). Upstream migration typically begins once winter rains commence and stream flows increase. For coastal systems with seasonal freshwater lagoons, winter storms are required to breech the sandbars and allow access to upstream spawning sites. Unlike salmon, steelhead are iteroparous, meaning they can return to spawn multiple times. Adult steelhead may spawn up to four times in their lifetime, although spawning runs predominantly consist of first-time spawners (~59%) (Shapovalov and Taft 1954). The maximum life span of steelhead is estimated to be nine years (Moyle 2002).

2.2.2 Status of Listed Species

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

The population viability parameters are used as surrogates for numbers, reproduction, and distribution, as defined in the regulatory definition of jeopardy (50 CFR 402.20). For example, abundance, population growth rate, and distribution are surrogates for numbers, reproduction, and distribution, respectively. The fourth parameter, diversity, is related to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained, resulting in reduced population resilience to environmental variation at local or landscape-level scales.

CC Chinook salmon

The CC Chinook salmon ESU was historically comprised of approximately 32 Chinook salmon populations (Bjorkstedt et al. 2005). Many of these populations (14) were independent, or potentially independent, meaning they have a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were likely more dependent upon immigration from nearby independent populations than dependent populations of other salmonids (Bjorkstedt et al. 2005).

Data on CC Chinook abundance, both historical and current, is sparse and of varying quality

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

(Bjorkstedt et al. 2005). Estimates of absolute abundance are not available for populations in this ESU (Myers et al. 1998). In 1965, CDFG (1965) estimated escapement for this ESU at over 76,000. Most were in the Eel River (55,500), with smaller populations in Redwood Creek (5,000), Mad River (5,000), Mattole River (5,000), Russian River (500) and several smaller streams in Humboldt County (Myers et al. 1998). More recent information from Sonoma Water monitoring at their Mirabel fish ladder from 2000 to 2014 suggests moderate to good abundance of Russian River Chinook salmon with 1,113 to 6,696 adult fish reported (Martini and Manning 2015).

CC Chinook salmon populations remain widely distributed throughout much of the ESU. Notable exceptions include the area between the Navarro River and Russian River and the area between the Mattole and Ten Mile River populations (Lost Coast area). The lack of Chinook salmon populations both north and south of the Russian River (the Russian River is at the southern end of the species' range) makes it one of the most isolated populations in the ESU. Myers et al. (1998) reports no viable populations of Chinook salmon south of San Francisco, California.

Because of their prized status in the sport and commercial fishing industries, CC Chinook salmon have been the subject of many artificial production efforts, including out-of-basin and out-of-ESU stock transfers (Bjorkstedt et al. 2005). It is, therefore, likely that CC Chinook salmon genetic diversity has been adversely affected despite the relatively wide population distribution within the ESU. An apparent loss of the spring-run Chinook life history in the Eel River Basin and elsewhere in the ESU also indicates risks to the diversity of the ESU.

Data from the 2009 adult CC Chinook salmon return counts and estimates indicated a further decline in returning adults across the range of CC Chinook salmon on the coast of California (Jeffrey Jahn, NMFS, personal communication 2010). Ocean conditions are suspected as the principal short-term cause because of the wide geographic range of declines (SWFSC 2008). However, the number of adult CC Chinook salmon returns in the Russian River Watershed increased substantially in 2010/2011 compared to 2008/09 and 2009/10 returns. Increases in adult Chinook salmon returns during 2010/2011 have been observed in the Central Valley populations as well.

The most recent status review summary by Seghesio and Wilson (2016) reports that the new information available since the last status review (Williams et al. 2011) does not appear to suggest there has been a change in extinction risk for this ESU. 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. (2011) concluded the extinction risk of the CC Chinook salmon ESU has not changed since the last status review which affirmed no change to the determination that the CC Chinook salmon ESU is a threatened species, as previously listed (NMFS 2011, 76 FR 50447). NMFS' previous status review (Williams et al. 2011) discussed the fact that populations that lie between the lower boundary of the Central Valley Fall Chinook salmon ESU (Carquinez Straits) and the southern boundary of CC Chinook salmon ESU (Russian River) were not included in either ESU, despite the fact that Chinook salmon had been reported in several basins. Available genetic evidence indicated fish from the Guadalupe and Napa rivers in San Francisco and San Pablo Bays had close affinity with Central Valley Fall Chinook salmon (Garza and Pearse 2008), and it was recommended that fish from these two watersheds be included in the Central Valley Fall Chinook ESU. Evidence for fish in Lagunitas Creek was equivocal, with 17 samples assigned almost equally between CC Chinook salmon and Central Valley Fall Chinook salmon. The biological review team in 2011 from SWFSC tentatively concluded that Lagunitas Creek Chinook salmon should be considered part of the CC Chinook salmon ESU pending additional data (Williams et al. 2011). NMFS subsequently indicated that a boundary change was under consideration (76 FR 50447); however, no action has been taken to date. Currently there is no new genetic information that helps resolve this issue (Spence 2016). This most recent status review of this CC Chinook salmon suggests that spatial gaps between extant populations along the Mendocino coast are not as extensive as previously believed (Seghesio and Wilson 2016). As stated above, this information has not changed the determination that the extinction risk for this ESU remains as threatened (Seghesio and Wilson 2016).

The NMFS's recovery plan (NMFS 2016) for the CC Chinook salmon ESU identified the major threats to recovery. These major threats include channel modification, roads, logging and timber harvesting; water diversions and impoundments; and severe weather. The impacts of these major threats are described in the effects to critical habitat section. New threats to Chinook salmon populations identified since the last status review include poor ocean conditions, drought, and marijuana cultivation (Seghesio and Wilson 2016).

NC Steelhead

Historically, the NC steelhead DPS was comprised of 41 independent populations (19 functionally and 22 potentially independent) of winter run steelhead and 10 functionally independent populations of summer run steelhead (Bjorkstedt et al. 2005). Based on the limited data available (dam counts of portions of stocks in several rivers), NMFS' initial status review of NC steelhead (Busby et al. 1996) determined that population abundance was very low relative to historical estimates (1930s and 1960s dam counts), and recent trends were downward in most stocks. Overall, population numbers are severely reduced from pre-1960s levels, when approximately 198,000 adult steelhead migrated upstream to spawn in the major rivers supporting this Distinct Population Segment (DPS) (Busby et al. 1996, 65 FR 36074).

NMFS status reviews reached the same conclusion, and noted the poor amount of data available, especially for winter run steelhead (NMFS 1997, Good et al. 2005). The information available suggested that the population growth rate was adverse. It is known that dams on the Mad River and Eel River block large amounts of habitat historically used by NC steelhead (Busby et al. 1996). 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. Historical hatchery practices at the Mad River hatchery are of particular concern, and included out-planting of non-native Mad River hatchery fish to other streams in the DPS and the production of non-native summer steelhead (65 FR 36074). The conclusion of an earlier status review by (Good et al. 2005) echoes that of previous reviews. Abundance and productivity in this DPS are of most concern, relative to NC steelhead spatial structure (distribution on the landscape) and diversity (level of genetic introgression).

NMFS evaluated the listing status of NC steelhead and proposed maintaining the threatened listing determination (71 FR 834) in 2006. A subsequent status review by Williams et al. (2011) reported a mixture of patterns in population trend information, with more populations showing declines than increases. Although little information was available to assess the status for most population in the NC steelhead DPS, overall Williams et al. (2011) found little evidence to suggest a change in status compared to the last status review by Good et al. (2005).

The most recent status review (Seghesio and Wilson 2016) found that information on steelhead populations in the NC steelhead DPS has improved considerably in the past 5 years, due to implementation of the CMP across a significant portion of the DPS. Nevertheless, significant gaps in information still remain, particularly in the Lower Interior and North Mountain Interior diversity strata, where there is very little information from which to assess status. Overall, the available data for winter-run populations— predominately in the North Coastal, North-Central Coastal, and Central Coastal strata— indicate that all populations are well below viability targets, most being between 5% and 13% of these goals. For the two Mendocino Coast populations with the longest time series, Pudding Creek and Noyo River, the 13-year trends have been adverse and neutral, respectively (Spence 2016). However, the short-term (6-year) trend has been generally beneficial for all independent populations in the North-Central Coastal and Central Coastal strata, including the Noyo River and Pudding Creek (Spence 2016). Data from Van Arsdale Station likewise suggests that, although the long-term trend has been adverse, run sizes of natural-origin steelhead have stabilized or are increasing (Spence 2016). Thus, we have no strong evidence to indicate conditions for winter-run populations in the DPS have worsened appreciably since the status review by Williams et al. (2011).

Most populations for which there are population estimates available remain well below viability targets; however, the short-term increases observed for many populations, despite the occurrence of a prolonged drought in northern California, suggests this DPS is not at immediate risk of extinction (Seghesio and Wilson 2016).

2.2.3 CC Chinook Salmon, SONCC Coho Salmon and NC Steelhead Critical Habitat

In designating critical habitat, NMFS considers, among other things, the following requirements of the species: 1) space for individual and population growth, and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing offspring; and, generally; and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on physical and biological features, or PBFs, and/or essential habitat types within the designated area that are essential to conserving the species and that may require special management considerations or protection.

PBFs for CC Chinook salmon, SONCC coho salmon and NC steelhead critical habitat, and their associated essential features within freshwater include:

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

Generally, for CC Chinook salmon, SONCC coho salmon and NC steelhead) critical habitat the following essential habitat types were identified: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development to adulthood; 4) adult migration corridors; and 5) spawning areas. Within these areas, essential features of critical habitat include adequate: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions (64 FR 24029).

The condition of critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that currently depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging, 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 (Weitkamp et al. 1995; Busby et al. 1996; 64 FR 24049; 70 FR 37160; 70 FR 52488).

2.2.4 Additional Threats to CC Chinook Salmon, SONCC Coho Salmon and NC Steelhead and their Critical Habitat

Global climate change presents an additional potential threat to salmonids and their critical habitats. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir et al. 2013). Snow melt from the Sierra Nevada Mountains has declined (Kadir et al. 2013). However, total annual precipitation amounts have shown no discernable change (Kadir et al. 2013). Listed salmonids may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local, climate factors likely still drive most of the climatic conditions' steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape.

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

For Northern California, most models project heavier and warmer precipitation. Extreme wet and dry periods are projected, increasing the risk of both flooding and droughts (OEHHA 2018). Estimates show that snowmelt contribution to runoff in the Sacramento/San Joaquin Delta may decrease by about 20 percent per decade over the next century (Cloern et al. 2011). Many of these changes are likely to further degrade listed salmonid habitat by, for example, reducing stream flows during the summer and raising summer water temperatures. Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Osgood et al. 2002, Ruggiero et al. 2010). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008; Feely 2004; Osgood 2008; Turley 2008; Abdul-Aziz et al. 2011; Doney et al. 2012). The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007; Santer et al. 2011).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area is located within the Middle Fork (MF) Eel River approximately 1.5 miles upstream of the confluence with the mainstem Eel River at Dos Rios, in Mendocino County California. Direct effects of gravel extraction are proposed on 5.3 acres of gravel bar area and indirect effects may occur in downstream reaches from the mining area. The 5.3-acre area includes a secondary channel where a temporary bridge may be needed periodically. We include a 2,000-foot reach downstream in the action area where indirect effects could occur to four pool-riffle sequences. This downstream reach spans from the extraction area downstream to where a tributary, Cable Creek enters the MF Eel River. The addition of tributary flow at this location is likely to buffer potential effects of the project with the introduction of sediment and flow into the MF Eel River.

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).

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

The historical population abundance of adult steelhead in the Middle Fork Eel River was estimated to be 17,000 spawners, which includes about 2,000 summer steelhead (CDFG 1966). Currently, the Middle Fork Eel River population of summer steelhead is the largest in California, where annual counts between 1966 and 2003 have ranged from 196 to 1601 adult fish (Harris 2002). One estimate for summer steelhead in the Middle Fork Eel was 523 in 2010 (S. Harris, CDFW, personal communication, 2010). The most current abundance estimate was conducted by the Round Valley Indian Tribes' Fisheries Department operated a Dual-Frequency Identification Sonar (DIDSON) camera on the MF Eel River to enumerate adult salmonid escapement from Oct 29, 2021– March 29,2022. 552 adult Chinook Salmon and 1,167 adult steelhead are estimated to have passed upstream in the MF Eel River, primarily in evening and early morning hours (Smith 2022). This adult salmonid monitoring was conducted just downstream of the action area for the proposed mining project.

Limited juvenile steelhead distribution surveys have been conducted by CDFW and other agencies in this basin. Existing habitat typing surveys and other stock assessment surveys as recent as 2009 show presence of juvenile steelhead in most tributaries, and the upper reaches of the Middle Fork Eel River. The lower 25 miles of the mainstem below the confluence of the Black Butte River has historically had elevated stream temperatures and limited presence of salmonids during the summer months (CDWR 1965). CC Chinook salmon use the action area to migrate to upper reaches of the MF Eel River, and large sub watersheds such as the Black Butte River and Elk Creek. Juvenile Chinook salmon migrate to the ocean after a few months in freshwater and do not rear instream during the summer.

The action area, represents a small fraction (0.38 miles) of the 294 miles of potential steelhead habitat for the Middle Fork Eel River steelhead population and 324 miles of Chinook salmon habitat in the Upper Eel River Chinook population. The current conditions in the project area are generally poor during the summer months with elevated stream temperatures and minimal riparian canopy to maintain stream temperature. The project is located in low in the watershed near the confluence with the mainstem Eel River. The action area stream reach is predominately a migration corridor for adult steelhead and Chinook salmon and smolts as they migrate out of the watershed. As described above, this lower reach of the watershed has limited steelhead rearing habitat during the summer months due to elevated watershed conditions (NMFS 2016). The watershed's geology is naturally unstable and the Eel River is one of the highest sediment-producing rivers in the world, producing approximately 15 times the sediment load as the Mississippi River (Brown and Ritter 1971). In an average runoff year, the Middle Fork Eel River transports approximately 240,000 cubic yards of bedload (Brown 1986). The Multi-Species

Recovery Plan (NMFS 2016) identifies actions to increase riparian shading in tributary habitat, and reduce road generated sediment from the U.S. Forest Service and private lands in the upper watershed.

Given that streamflow and temperatures for salmonids the action area is currently stressed during the hot summer months, we also rely on information from section 2.2.4 with respect to the broader climatic variables influencing the current condition of habitat in the action area. Variables such as air temperature, wind patterns, and precipitation are likely influencing localized environmental conditions, such as water temperature, stream flow, and food availability. These local environmental conditions can affect the biology of listed species and the functioning of critical habitat and its value for conservation. The combination of climate change effects and effects of past and current human activities on local environmental conditions further reduce the current condition of habitat in the MF Eel River.

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).

Gravel extraction on a large (5.3 acres) gravel bar is expected to result in indirect effects to the downstream areas that are part of the action area approximately 2,000 feet downstream. Actions required to extract gravel such as temporary bridge placement may result in direct effects to juvenile NC steelhead and their habitat. NMFS sediment removal guidelines (NMFS 2004) summarizes the effects of sediment or gravel removal from streams which can result in destruction of spawning, feeding, and resting habitats. Other undesirable physical effects include bed degradation, bank erosion, channel and habitat simplification, and reduced effectiveness of geomorphic processes such as pool maintenance and sediment sorting. Adverse biological effects include reduced egg and alevin growth and increased mortality, reduced riparian vegetation and all associated aquatic benefits, reduced water quality, and direct mortality of juveniles. Following we include both the effects to species and critical habitat as they are difficult to separate.

Temporary Bridge Placement

The placement and removal of temporary bridges can adversely affect salmonids and habitat by crushing during construction and removal, and by turbidity and sedimentation from pushing up bridge approaches and abutments (NMFS 2004). Construction timing is designed to avoid most salmonid life stages that utilize the action area. The work window of June 15 to October 15 each year is expected to avoid effects to spawning adult fish but low numbers of juvenile salmonids may be present. During the construction of the crossing there is a low potential for juvenile steelhead to be in the action area, and juvenile Chinook salmon are not expected to be present. The proposed action may require minor alteration of the wetted channel to place a temporary bridge for access to the extraction area. Clean river run gravel will be used to construct the crossing with a culvert that will provide fish passage at the crossing that is likely to be placed in a secondary channel of the main river. The temporary crossing is located at secondary channel to the main river will be used for access to the mining bar. This crossing will be approximately 30 feet wide by 60 feet long and will be filled with gravel and culverts to pass flow. When this crossing is placed during the summer wetted habitat for juvenile salmonids will be lost. Critical habitat in this 1800 square foot area of wetted habitat will not be available for rearing or use by juvenile steelhead that may present in the early summer before stream temperatures become limiting within the action area. In addition, placement of gravel and a culvert into the wetted channel may cause mortality of young-of-the-year juvenile steelhead if they seek cover in cobble substrate. Larger juvenile steelhead will likely flee the area when gravel is placed in the wetted channel. As mentioned above, low numbers of salmonids are expected to present in the action area when the temporary crossing is placed during the late summers as proposed (Gallaway 2021).

Increases in turbidity and noise from construction equipment may result in short term behavior modifications of individual fish, reduced feeding and greater intra and/or inter-species competition within the action area. Turbidity increases from the crossing construction is likely to occur from the placement of gravel in the flowing water. Turbidity increases are expected be short in duration (1-2 hours) and not reach levels that will cause mortality of juvenile fish exposed to the changes in water quality.

Effects to Spawning Areas

Gravel bar extraction is known to remove the armor layer of the bar and expose finer grain sediments on the skimmed bar to high velocity flows during winter rain events. These fine grain sediments can be transported from the skimmed bar to the stream reach downstream. All spawning salmonid species excavate depressions within gravel deposits into which eggs are laid, which are then fertilized and covered by a porous layer of gravel. The embryos incubate within these gravel nests (redds) for several weeks to months before hatching. Alevins, newly hatched fish, reside within the gravel pore spaces for additional weeks, taking nourishment from their abdominal yolk sac (NMFS 2004). Embryos and alevins depend on the flow of intragravel water (hyporheic flow) to carry off metabolic wastes and supply them with well-oxygenated water. Upon final absorption of the yolk sac, the young fish must then pass up through the gravel pore-spaces to the bed surface (Bjornn and Reiser 1991).

The action area that may be affected by fine grain sediment that is transported from the gravel bar downstream is a reach that extends 2,000 feet from the extraction area. This reach is likely to be impacted by fine grained material that may transport from the bar during winter flow events to spawning areas downstream. Spawning habitat and redds (nests) in this stream reach of the action area have the potential to be degraded during years when low flow conditions require Chinook salmon and steelhead to spawn in this area of the MF Eel River. During most normal or wet water years Chinook salmon and steelhead migrate past the action area to preferred spawning sites in the upper tributaries and upper reaches of the MF Eel River. During the 10-yer permit period requested by the USACE we expect that dry conditions could occur during three of the years where adult salmonids could spawn in the action area. Spawning habitat that may be affected during these low flow years is likely to be degraded with the transport of fine sands from the surface of the skimmed bar. The reduction in spawning habitat quality in the 2,000-foot reach downstream is difficult to predict. Large amounts of sediment transported from upstream in the MF Eel River effects the quality of the spawning areas included in the action area. Therefore, we understand that specific flow conditions must occur for adult fish to spawn in the reach, and for fine sediment to transport off the bar. These conditions are not expected to occur during normal or wet water-year conditions, only in dry low flow conditions that occur periodically during the spawning season (October-April). When these conditions occur spawning areas within the action spawning habitat is likely to be degraded and reduce Chinook salmon and steelhead egg incubation and survival to emergence.

Gravel extraction can also cause direct effects to the gravel bar form by skimming/removing gravel from the lower end of the bar. Alternate bars and point bars, and the associated pool-riffle sequences, are the fundamental geomorphic units found in alluvial channels. Composed of deposited coarse sediments, alternate bars occur in straight, sinuous and meandering channels as well as within straightened and levee-confined, engineered channels. Coarse bed materials are typically transported and deposited in appreciable quantities along streams during flood flows on only a few days per year (Emmett 1999). Changes to the bar form can cause the river to scour during high winter flow events and effect the river pattern and depth. These potential changes can in turn have impacts to salmon nest sites, and may affect migration if the river becomes very wide and shallow.

To minimize effects on the stream channel, form the applicant has proposed a head-of-bar buffer, vertical and lateral buffers that are intended to minimize the potential for major changes in the river pattern, bar form and stream-bed elevation. Monitoring of the pre and post extraction cross-sections and minimum gravel accumulation are proposed to minimize the potential for changes river channel form which could impact salmonid habitat. These measures are also intended to prevent the over harvesting of gravel over the 10-year permit period.

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).

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.

The proposed action will authorize the extraction of up to 20,000 cubic yards from a gravel bar on the lower MF Eel River. The effects of this action may cause the degradation of spawning habitat for CC Chinook salmon and NC steelhead in a 2,000-foot reach of the river and mortality of juvenile steelhead during stream crossing construction . The impacts to spawning habitat are likely to occur during low flow years when material from the skimmed bar can be transported a short distance downstream. During normal or wet years when flow in the MF Eel River is very large, sediment from upstream sources likely overwhelms any material transported from the bar. Also, during most years Chinook salmon and steelhead migrate past the action area to the upper MF Eel River and its tributaries. During the summer when the gravel extraction is conducted, a temporary crossing may cause mortality of young-of-the year salmonids that seek refuge and are covered by gravel placed in the wetted channel. Low numbers of juvenile salmonids are expected to be present during the bridge construction. Bridge construction effects will cause a short duration of increased turbidity at the site, but not at levels that will cause mortality.

The MF Eel River currently has populations of CC Chinook salmon and NC steelhead that use the action area primarily as a migration corridor for adult fish accessing spawning habitat and for outmigration of smolts during the spring. The baseline condition in the action area reach functions as migration corridor for both Chinook salmon and steelhead trout but due to its location in the lower reach of this large watershed it is limited rearing habitat due to elevated stream temperatures during the most of the summer and fall. The gravel mining project is proposed during the late summer and early fall when salmonids do not reside in the action area.

The action is unlikely to reach a level that would change or negatively affect the status of CC Chinook salmon or NC steelhead or preclude recovery of these species in the future. NMFS makes this determination because large areas of habitat in the MF Eel River and watersheds such as the Black Butte River and Elk Creek are expected to continue to produce the majority of the juveniles that survive to outmigrate from the MF Eel River. However, the anticipated small loss of Chinook salmon and steelhead eggs or juvenile steelhead is unlikely to appreciably impact the future survival and recovery at the DPS scale. We make this determination because adequate quantities of habitat remain within the tributary reaches of the MF Eel River from which the lost production can be regained.

Gravel bar gravel extraction can also impact the river form with potential to channel form and bed elevation. The applicant has proposed to monitor the bar elevations, gravel recruitment and provide setback buffers for mining activities to minimize changes in river pattern and form.

Minimization measures and monitoring of the physical stream characteristics are expected to be sufficient to minimize affects to designated critical habitat for Chinook and steelhead.

Global climate change presents another real threat to the long-term persistence of CC Chinook salmon and NC steelhead, especially when combined with the current population status and human caused impacts. Regional (i.e., North America) climate projections for the mid to late 21st Century expect more variable and extreme inter-annual weather patterns, with a gradual warming pattern in general across California and the Pacific Northwest. However, extrapolating these general forecasts to our smaller action area is difficult, given local nuances in geography and other weather-influencing factors.

The proposed action will degrade PBFs and essential habitat types in the action area, namely those related to juvenile rearing and spawning habitat in some years. Yet, the effects of the proposed action, when added to the environmental baseline, cumulative effects, and species status, are not expected to appreciably reduce the quality and function of critical habitat at the larger CC Chinook, SONCC coho salmon ESU or NC steelhead DPS scale, given the small area being degraded compared to the quality and quantity of habitat available in the MF Eel River watershed.

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 action as proposed in Gallaway (2021) is not likely to jeopardize the continued existence of NC steelhead and or destroy or adversely modify its designated critical habitat.

After reviewing and analyzing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the action as proposed in Gallaway (2021) is not likely to jeopardize the continued existence of CC Chinook or destroy or adversely modify its designated critical habitat.

After reviewing and analyzing the current status of the 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 action as proposed in Gallaway (2021) is not likely to destroy or adversely modify SONCC coho salmon designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). “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:

Take of listed juvenile NC steelhead may occur during the construction of a temporary crossing at the proposed mining site. The number of NC steelhead that may be incidentally taken during crossing construction is expected to be small, and limited to the young-of-year juvenile life stage. NMFS expects that few (<20) of juvenile steelhead within the 1800 square-foot construction area of the MF Eel River will be injured, harmed, or killed during construction activities. If more than 1800 square-feet of the total is area is used for the stream crossing incidental take will have been exceeded.

During dry waters CC Chinook salmon and steelhead spawning areas may be degraded and an unknown number of eggs may be lost due to sediment transport into Redds in the action area. Given the amount of sediment that may be transported downstream to spawning it is difficult to estimate the level of take that may occur. We estimate that this impact will occur when very specific flow conditions occur which may be two or three years during the permit period. The spawning reach is likely to have a few pairs of Chinook salmon or steelhead that spawn in the action area reach. The extent of take which is likely to be limited to a small number of individual salmonid redd sites that are degraded and within the affected redds a small percentage of eggs will suffer mortality due to sediment intrusion. Take for this action will be exceed if the project mining extraction exceeds more than 5.3 acres.

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 CC Chinook salmon and NC steelhead:

1. undertake measures to ensure that injury and mortality to salmonids resulting from temporary bridge construction is low;

2. conduct mining extraction that minimizes impacts to channel form; and

3. prepare and submit plans and reports regarding the pre and post mining conditions.

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 [*name Federal agency*] 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. Place gravel in slow deliberate manner to allow fish to flee from the area.

    b. Place crossing as late in the summer as possible to avoid the presence of salmonids.

    c. Provide NMFS with a report documenting the temporary crossing installation. Please include photo documentation of the placement of gravel, culverts and the final bridge installation including amounts of material used and size of the crossing. The report must be submitted to NMFS' North-Central Coast Office, Attention: North Coast Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

2. The following terms and conditions implement reasonable and prudent measure 2:

    a. Provide NMFS with an opportunity for onsite evaluation of pre-mining gravel levels, proposed area and extraction plans.

    b. Allow NMFS to make minor changes to the mining area (staking) that would minimize potential effects to river form.

3. The following terms and conditions implement reasonable and prudent measure 3:

    a. Provide NMFS with pre and post mining report for each calendar year of mining activity. The report must be submitted to NMFS' North-Central Coast Office, Attention: North Coast Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

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).

1. NMFS has no conservation recommendations.

2.11. Reinitiation of Consultation

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

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

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

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

3.1. Essential Fish Habitat Affected by the Project

Pacific coast salmon EFH may be adversely affected by the proposed action. Specific habitats identified in the PFMC (2014) for pacific coast salmon include habitat areas of particular concern (HAPCs), identified as: 1) complex channels and floodplain habitats; 2) thermal refugia; and 3) spawning habitat. HAPCs for Chinook salmon include all waters, substrates, and associated biological communities falling within critical habitat areas described above in the accompanying biological opinion for the project located on Middle Fork Eel River. Essentially, all CC Chinook salmon habitat located within the proposed action area is considered HAPC as defined in PFMC (2014).

3.2. Adverse Effects on Essential Fish Habitat

The potential adverse effects of the Project on EFH have been described in the preceding biological opinion and include disturbance of the channel bed and degradation of spawning habitat. Therefore, the effects of the project on ESA-listed species are anticipated to be the same as the effects to EFH in the action area as described in the biological opinion above.

3.3. Essential Fish Habitat Conservation Recommendations

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

3.4. Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is the

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

4.2. Integrity

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

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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