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

April 2, 2020 **Refer to NMFS No:** WCRO-2019-04029

Derek Rupert
Bureau of Reclamation
Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, California 96019-8400

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Buckhorn Dam Outlet Channel Maintenance Project in Trinity County, California (file number NC-311, 2.2.1.06)

Dear Mr. Rupert:

Thank you for your letter of December 3, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Buckhorn Dam Outlet Channel Maintenance Project. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). 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 Buckhorn Dam Outlet Channel Maintenance Project (Project).

The enclosed biological opinion describes NMFS' analysis of effects on threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) and 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, nor is the project likely to destroy or adversely modify designated critical habitat. NMFS expects the proposed action would result in incidental take of SONCC coho salmon. 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 coho salmon and Chinook salmon, Pacific Salmon species managed under the Pacific Coast Salmon Fishery Management Plan. Based on our analysis, NMFS concludes that the project would adversely affect EFH for coho salmon and Chinook salmon and we have identified one EFH Conservation Recommendation.

Please contact Matt Goldsworthy, Northern California Office, Arcata, at (707) 825-1621 or via email 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

Enclosure

cc: ARN File #151422WCR2019AR00267

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

Buckhorn Dam Outlet Channel Maintenance Project
Trinity County, California

NMFS Consultation Number: *WCRO-2019-04029*

Action Agency: Bureau of Reclamation, Northern California Office

Table 1. Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Southern Oregon/North California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*)	Threatened	Yes	Yes	No	No

Table 2. 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: April 2, 2020

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1 INTRODUCTION

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

1.1 Background

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

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on October 28, 2019 [84 FR 44976]. As the preamble to the final rule adopting the regulations noted, "[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice." We have reviewed the information and analyses relied upon to complete this biological opinion in light of the updated regulations and conclude the biological opinion is fully consistent with the updated regulations.

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 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). A complete record of this consultation is on file at the NMFS Northern California Office in Arcata, California.

1.2 Consultation History

On December 6, 2019, NMFS received a request to initiate informal consultation with the Bureau of Reclamation (Reclamation) on the proposed Project. NMFS responded via email that Reclamation's determination may be incorrect, as the removal of beaver dams is expected to cause take of SONCC coho salmon individuals and adversely affect designated critical habitat for SONCC coho salmon. On December 23, 2019, Reclamation clarified that they had updated their request to now initiate formal consultation, and Reclamation anticipated adverse effects to both individuals and designated critical habitat. Reclamation also determined that the Project would adversely affect EFH for species managed under the Pacific Coast Salmon Fishery Management Plan (FMP). Formal consultation was initiated on December 23, 2019.

1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). For EFH consultation, 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).

Reclamation's proposed action is to reduce the height or fully remove two beaver dams below Buckhorn Dam. The purpose of the Project is to ensure that Reclamation can collect data to support the required Safety of Dams inspections in the lower outlet channel below Buckhorn Dam on Grass Valley Creek in Trinity County. Beaver dams within the outlet channel have caused the water surface elevation to increase so that the two toe drains located at the outlet of the base of the dam can no longer be measured because of inundation. Measurement of the toe drain discharge is critical information about the structural soundness and safety of Buckhorn Dam. Reducing the height of the beaver dams, or fully removing them, is necessary to ensure that Reclamation staff can accurately and routinely measure Buckhorn Dam's toe drain seepage.

1.3.1 Project Description

The Project will disassemble beaver dams, lowering water elevations to fully expose the dam's toe drains. The beaver dams in the outlet channel will be sequentially deconstructed, as needed, to reduce the water elevations. Initially, Beaver Dam #1, which is closest to the Buckhorn Dam, would be the first one removed, followed by the partial disassembly of the next downstream Beaver Dam #2, depending on the resulting water surface elevation at the toe drains (see Figure 1). Only beaver dams that directly affect the water elevation at the toe drain will be deconstructed. Based on technical assistance provided by NMFS, Reclamation has discontinued plans to deconstruct Beaver Dam #3, as it is too far downstream to influence water surface elevations at the toe drains. The toe drains need to be fully exposed and high enough above the water level to fit a 5-gallon bucket (i.e., 2 ft below bottom of the toe drain).

Reclamation staff will use hand tools to disassemble each beaver dam. Woody debris from the dams will be placed outside the channel and above the ordinary high-water mark, but within the action area (i.e., within 100 ft from the wetted channel). Beaver dam deconstruction could occur as needed throughout the year (January 1 through December 31) to facilitate the toe drain seepage rate data collection. Toe drain seepage measurements must be collected quarterly. Reclamation anticipates that beavers will rebuild dams between site visits, so dam deconstruction could occur up to four times per year.

1.3.2 Minimization Measures

Quarterly inspections of the toe drain are planned to occur during January, April, July, and October to minimize overlap with the majority of SONCC coho salmon spawning (November). Qualified fisheries biologist(s) will survey the outlet channel before dam removal, to ensure that no salmon redds are disturbed while the beaver dams are removed. Should the biologist identify a redd within 10 feet of a beaver dam scheduled for modification or removal, work at the affected beaver dam will be postponed. For all channel maintenance activities, work will be completed with hand tools. These tools will produce only minimal disturbances within the project area. Reclamation staff will enter the stream channel at the work site only and they will avoid walking in the channel outside of the work area. Beaver dams will be disassembled in a slow and methodical nature (>2 hours), which will limit disruption to the habitats downstream. The disassembly of the beaver dams involves removal of small woody debris from the channel and placement on dry ground between 50 to 100 feet away from the stream channel.

Figure 1. Overview of the outlet channel of Buckhorn Dam and downstream to the confluence with the spillway. The current locations of beaver dams is also depicted (Rupert 2019).

1.3.3 Other Activities

We considered whether the proposed action would cause any other activities that would have consequences on SONCC coho salmon or its critical habitat and determined that it would not. 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.

2 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

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

that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

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

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02). The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 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 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition 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 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 SONCC coho salmon that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the species faces, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

2.2.1 Species Description and General Life History

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.

2.2.2 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 VSP parameters continue to decline and no improvements have been noted since the previous status review in 2011 (Williams et al. 2016).

2.2.2.2 Status of Critical Habitat

The condition of SONCC coho salmon 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 (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 ESU. 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). From 2014 through 2016, drought conditions in California reduced stream flows and increased temperatures, further exacerbating stress and disease. Ocean conditions have been unfavorable in past years due to the El Nino 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 2014). 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 provides 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. 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.

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the project encompasses the outlet channel below Buckhorn Dam on Grass Valley Creek in Trinity County, and downstream as far as 500 feet of Beaver Dam #2. The action area includes 100 feet on either side of the outlet channel, where pieces of wood and vegetation that are removed from beaver dams will be placed.

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 from climate change is likely to be similar to those described above in the Species Status section. For example, the action area is likely to experience increases in average summer air temperatures; more extreme heat waves; and an increased frequency of drought (Lindley et al. 2007). In addition to the increased frequency of drought, high intensity rainfall events are also expected to become more common, leading to

increased erosion and flooding. 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.

Coho salmon occurring in the action area belong to the Upper Trinity River population of SONCC coho salmon, which is below the number of adult spawners needed to be at low risk of extinction (5,800 adults needed, NMFS 2014). The Upper Trinity River population is likely at moderate risk of extinction. The key limiting stress identified in the recovery plan for SONCC coho salmon include altered hydrologic function and adverse hatchery related effects. Barriers and a lack of floodplain and channel structure were also high rated stresses. The key limiting threats are dams/diversions and hatcheries. Priority restoration actions identified within or nearby the action area include: increasing the abundance of beavers; increasing instream flow; increasing channel complexity; reconnecting the channel to the floodplain; increasing floodplain and channel structure.

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

Grass Valley Creek supports an abundance of SONCC coho salmon and is a key component of the Upper Trinity River population. Water quality in the action area is cool throughout the summer months, in part due to the moderately dense riparian vegetation. Most of the adequate water temperatures in Grass Valley Creek are due to the cold water outlet of Buckhorn Dam, which releases a constant flow of cold water throughout the summer. Buckhorn Dam was constructed to control and trap decomposed granitic soils, so the reach of channel downstream of Buckhorn Dam now has a limited supply of sediment. Rupert (2019) surveyed the action area and observed hundreds of coho salmon. Beavers inhabit the action area and have built three beaver dams, creating a mosaic of complex floodplain and instream habitat.

The condition of SONCC coho salmon critical habitat in the action area, specifically its ability to provide for their conservation, is degraded from conditions known to support viable populations. The action area has been subjected to a high degree of manipulation over time, as Buckhorn Dam has blocked all passage of adults and juveniles and also created an artificial flow regime, which lacks natural variability. Although the cold water outlet and flow releases at Buckhorn Dam provide cold water throughout the summer, the amount of habitat available has been reduced, and the natural variability of flows in the action area have been lost and muted. Currently, the cool and complex habitat found in Grass Valley Creek, and specifically within the action area, support high densities of juvenile SONCC coho salmon.

2.4.2 Previous ESA Section 7 Consultations in the Action Area

Stream restoration actions under programmatic consultations may take place in the action area. These programmatic consultations include the NOAA Restoration Center's restoration program, Trinity River Restoration Program, and the Corps Regional General Permit 12 programmatic for salmonid restoration projects funded by CDFW. These consultations anticipate a limited amount of take for juvenile salmonids during instream work conducted in the summer months. NMFS determined these restoration actions are likely to improve habitat conditions for listed species and that the limited amount of take anticipated is unlikely to affect future adult returns. NMFS' ESA Section 10(a)(1)(A) research and enhancement permits and research projects in the annual CDFW ESA Section 4(d) rule research program could potentially occur in the Grass Valley Creek watershed, including the reaches within the action area. Salmonid monitoring approved

under these programs includes carcass surveys and juvenile surveys. In general, these activities are closely monitored and require measures to minimize take during the research activities. NMFS determined these research projects are 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. 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 50 CFR 402.17(a) and (b) factors for assistance in evaluating when activities are reasonably certain to occur and when consequences are considered to be caused by the proposed action.

2.5.1 Turbidity and Contaminants

Reclamation plans to deconstruct two beaver dams prior to each of the quarterly monitoring inspections of the toe drain, resulting in the likely deconstruction of both beaver dams as many as four times each year (or eight deconstructions total in each year). Turbidity is expected to extend as far as 500-feet downstream of each beaver dam during deconstruction and should return to background conditions within several hours after deconstruction is complete. The effects of turbidity on juveniles rearing downstream of the work sites is expected to be miniscule, as turbidity is expected to last for only a few hours after each deconstruction event. The turbidity and suspended sediments generated by the Project are not expected to affect the value of critical habitat downstream, as the volume of suspended sediment generated will not be enough to influence changes to habitat parameters. Contaminants are not expected as only hand tools will be used. NMFS expects the effects of toxic contaminants leaking into the action area from hand tools to be improbable.

2.5.2 Impingement

Each of the eight annual deconstruction events will expose juvenile SONCC coho salmon rearing in the beaver ponds. As the dams are deconstructed and water surface elevations begin changing, some juveniles will seek refuge in portions of the dam that might shift or be removed later. NMFS expects that a small number of juveniles will become impinged within the beaver dams during deconstruction due to the changing and temporarily higher velocities and shifting pieces of woody materials within the dam. NMFS expects most of the juveniles present to be of sufficient size and have ample swimming capabilities in order to remain resilient to what could be abrupt changes in water surface elevation (WSE). NMFS expects that a low proportion (1%) of the juvenile coho salmon residing in the beaver dam pools to become impinged and perish during deconstruction events. Although Reclamation staff did not observe coho salmon juveniles upstream of Beaver Dam #1, they could be expected to occur in the future as passage conditions are changed by the Project through the repeated deconstruction (and likely reconstruction) of the beaver dams over time.

Over the course of ten years, Reclamation might deconstruct the beaver dams as many as 80 times in order to access the toe drain of Buckhorn Dam. Because the abundance of juveniles

present in the action area and within each of the beaver ponds might vary over the next ten years, NMFS will rely on an estimate intended to represent the median. Rupert (2019) observed over 300 coho salmon juveniles during a dive of the 0.4 mile long outlet channel, while Wiseman (2013) estimated between 4,000 and 5,000 juvenile coho salmon to be present during a previous dive of the outlet channel. The action area is located in the upstream portion of Grass Valley Creek, and adult passage into the action area is limited by beaver dams downstream. Rupert (2019) found a high proportion (75%) of the juvenile coho salmon downstream of Beaver Pond #3 (see Figure 1), suggesting the beaver dams are an impediment to juvenile passage. NMFS expects that all of the juvenile coho salmon rearing in the action area migrate from areas downstream. Rupert (2019) found only 32 coho salmon juveniles upstream of Beaver Dam #2 and there were no coho salmon juveniles present upstream of Beaver Dam #1. NMFS will assume that each beaver pond might have 100 individuals present, given that the action area represents a proportion of the 0.4 mile long outlet channel where past surveys were focused (Rupert 2019 and Wiseman 2013). With each pond having an estimated100 individual coho salmon present, the Project will expose 800 juvenile SONCC coho salmon each year (resulting in an estimated death of 8 juvenile coho salmon each year).

2.5.3 Increased Competition and Predation

After deconstruction of beaver dams is complete, the high numbers of juvenile fish residing in the pools must redistribute and establish new territories in likely less suitable habitat. Juvenile SONCC coho salmon are expected to be exposed to increased rates of competition and predation during and after these events. It is also likely the availability of prey will be temporarily diminished as productive flooded pool areas are drained; further stressing displaced individuals who are competing for habitat and prey. Although juveniles residing in the action area will have to relocate and establish new territories, it is not expected to cause adverse effects to individuals. During the episodic and rather brief deconstruction events, rates of predation upon those juveniles displaced downstream will be ameliorated by the increase in turbidity. Based upon the expected densities of juveniles, and the productivity and availability of habitat in the action area, the increase in competition and minor reductions in prey are not likely to cause a fitness consequence to individuals exposed.

2.5.4 Redd Dewatering

The water surface elevations in the action area may be reduced by as much as seven feet after beaver dams are deconstructed, leaving large areas formerly flooded or ponded to become completely dry. If adult coho salmon spawn within the action area, redds could be dewatered during beaver dam deconstruction. However, it is likely that adults are currently not spawning in the action area, as most of the area is currently flooded or ponded and does not provide suitable spawning habitat. Most of the existing riffle habitat is of very low quality, with unsuitable substrate. Rupert (2019) indicated that adult coho salmon have not been observed upstream of the confluence of the spillway and outlet channel (Figure 1) for several years. Beaver Dam #3 likely impedes the upstream passage of adults into the action area and therefore, NMFS expects adult passage into the action area to continue to be impeded by beaver dams downstream. NMFS does not expect that redds will be dewatered and therefore considers these effects to be negligible.

2.5.5 Effects to Critical Habitat

Beavers are well known for their dam building abilities, which they use to flood large areas of stream valleys. Beavers, or more appropriately, beaver colonies (a family group averaging 4 to 8 individuals) build their dams from logs, sticks, leaves, mud, and rocks (Pollock et al. 2017). Beaver dams can last many years, with some beaver dams shown to last hundreds of years or more (James and Lanman 2012). Beavers in the area are likely to rebuild Beaver dams #1 and 2 in between quarterly inspection/deconstruction events. Repeated deconstruction of the two beaver dams in the outlet channel will reduce the quantity and quality of designated critical habitat. Deconstructing beaver dams will directly reduce pool depths and volumes, diminish groundwater recharge, disengage complex floodplain habitat, and adversely affect the available rearing habitat in the action area.

In-channel obstructions, such as beaver dams and/or woody debris, can produce transient (water) storage by temporarily detaining water. Jin et al. (2009) found that the number of beaver dams and the volume of the corresponding beaver ponds was directly related to the amount of transient (water) storage. Beaver dams can raise local water table elevations, divert streamflow into the subsurface, enhance surface and ground water interaction and increase hydraulic residence time (Westbrook et al. 2006).

Pollock et al. (2004) found that the greatest reduction in coho salmon smolt production capacity originated from the extensive loss of beaver ponds. Yokel et al. (2018) found that after the installation of beaver dam analogues, there was an increase in both summer and overwinter rearing area; an increase in wetted area and rise in groundwater elevations and an improvement to water temperature. During the winter, juvenile coho salmon residing in channels impounded by beaver dams utilize such habitats at a higher density, are consistently larger, and have a greater overwinter survival rate than juveniles that use channels without beaver dams (Pollock et al. 2004). Juvenile coho salmon rearing in beaver dam analogues had the highest growth rate of all habitat types measured by Yokel et al. in 2018. Beaver ponds also serve as important rearing areas during the summer. Higher densities and larger sizes of juvenile coho salmon have been found upstream of beaver dams during the summer in main-stem and off-channel habitats (Pollock et al. 2004).

One of the highest priority restoration actions identified in the SONCC coho salmon recovery plan is to increase the abundance of beavers in the population area and the repeated deconstruction of beaver dams caused by the action will cause adverse effects to critical habitat and impede or slow the trajectory of recovery for the species. If the beaver dams are deconstructed and beaver activity in the action area is reduced or ceases, there will be reductions in both summer and winter rearing habitat in the action area until the number of beaver dams and associated beaver pond volumes return to baseline conditions.

2.6 Cumulative Effects

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

are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

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

SONCC coho salmon have declined to a large degree from historic numbers. Almost all of the populations of SONCC coho salmon are at a high risk of extinction, and the Upper Trinity River Population is one of a few that are only at a moderate risk of extinction. Grass Valley Creek is a key area within the Upper Trinity River Population, and the complex channel and floodplain habitat in the action area are essential for recovery of the ESU.

There is a very low likelihood that the loss of 8 individual juvenile SONCC coho salmon each year could affect future adult returns, nor would the cumulative loss of 80 juveniles over the course of ten years. The loss of juveniles is temporary and represents a small percentage of the overall number of individuals in the population. The overall number of individuals in the population will likely provide a compensatory effect, as the loss of eight individuals will create more feeding and rearing opportunities for the remaining individuals in the action area and likely improve their growth and future survival. The brief episodes of turbidity, temporary increases in competition, and low likelihood of redd dewatering will not affect the fitness or survival of juveniles in the future. In addition, other areas of Grass Valley Creek also host similar or greater densities of SONCC coho salmon than the action area and are expected to continue to contribute to the population during the time when some juveniles in the action area will likely be harmed or killed as a result of this proposed project.

Adverse effects to critical habitat are expected due to the repeated deconstruction of beaver dams and subsequent lowering of water surface elevations, reduction in transient water storage, and reduction in the amount and complexity of pool habitat. Increasing beaver activity is a high priority recovery action for the Upper Trinity River population, and the action conflicts with progress towards these objectives. The loss of complexity provided by the beaver dams will likely reduce growth rates of juveniles rearing in the action area.

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 activities would be completed by 2030 and the likely long term effects of climate change described above are unlikely to meaningfully change within that time frame. Overall, the project is unlikely to appreciably reduce the likelihood of survival and recovery of SONCC coho salmon, and the project is unlikely to appreciably diminish the value of designated critical habitat for the conservation of these 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, or destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

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

Impingement
NMFS expects that up to 8 juvenile SONCC coho salmon may be killed each year during beaver dam deconstruction activities for the next ten years.

2.9.2 Effect of the Take

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

2.9.3 Reasonable and Prudent Measures

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

1. Ensure that all necessary and appropriate actions are taken to minimize injury and mortality to SONCC coho salmon during deconstruction of beaver dams and while monitoring for incidental take.
2. Submit annual reports regarding deconstruction activities and results.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and Reclamation or any contractor must comply with them in order to implement the RPMs (50 CFR 402.14). Reclamation or any contractor 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. Reclamation 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. Reclamation shall ensure that any minimization measures described in the Proposed Federal Action section are properly implemented.
    c. Reclamation shall inspect and monitor the work areas during and after deconstruction for any individuals which may be injured or killed.
    d. Reclamation shall contact NMFS within 24 hours of meeting or exceeding take of listed species prior to project completion. Notify Matt Goldsworthy by phone at 707-825-1621 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:
    Reclamation 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 or via mail to Matt Goldsworthy at 1655 Heindon Road, Arcata, California, 95521. The report shall contain, at a minimum, the following information:

a. **Beaver Dam Deconstruction** – The report will summarize how each beaver dam is treated during each year, with photographs of the dams before and after deconstruction events occur.
b. **Take of coho salmon** – The report will summarize any observations that occur regarding take of SONCC coho salmon or other species.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

NMFS recommends considering alternatives that preserve and increase beaver activity in order to maintain the high quality habitat created by beaver dams in the action area. One alternative to consider is the use of drainpipes inserted into the beaver dams at the appropriate elevations to achieve the desired reductions in water surface elevations (WSE) at the toe drains. Drainpipes could be driven or inserted through the beaver dams, which would drain the beaver ponds and reduce WSE to the elevations in which the pipes were installed. The drainpipes could be installed at each dam prior to the scheduled inspections, and then removed or capped and left in place after the inspections. The use of drainpipes would ensure the beaver dam structures would be largely left undisturbed, and presumably beavers would continue maintaining the dams and repair any minor damage caused by the drainpipes. Reclamation would have to calculate the number and diameter of drainpipes to use, as well as how to achieve appropriate fish screening and maintenance while in use. Another alternative is to install posts and incorporate the materials removed from Beaver Dams #1 and 2 to create a new beaver dam analogue downstream of Beaver Dam #3. If beavers colonize the beaver dam analogue, it may both help compensate for the adverse effects to designated critical habitat, and discourage continued beaver dam reconstruction at Beaver Dams #1 and 2.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Buckhorn Dam Outlet Channel Maintenance Project. As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3 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. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 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) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by Reclamation and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans 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 Complex Channels and Floodplain Habitats. The HAPC developed for Complex Channels and Floodplain Habitats will be adversely affected due to the repeated deconstruction of the beaver dams.

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 coho salmon have already been described in the Effects of the Action section. The effects to Chinook salmon habitat are likely similar to those described for coho salmon. The adverse effects to EFH and HAPC in the action area include:

1. Deconstruction of beaver dams and subsequent reduction in quantity and quality of EFH, and also an adverse effect to the Complex Channel and Floodplain Habitat HAPC
2. Temporary reduction in water quality caused by increase in suspended sediments and turbidity.

3.3 Essential Fish Habitat Conservation Recommendations

Most of the adverse effects from the proposed action are temporary as beavers are expected to rebuild one or both beaver dams being removed. However, quarterly inspections of the toe drain will require repeated (quarterly) treatments and repeated deconstruction of the beaver dams. As described in the Effects of the Action section, the Project is expected to reduce the amount of complex channel and floodplain structure. Therefore, NMFS suggests the following Conservation Recommendation to minimize or compensate for the adverse effects:

1. NMFS recommends considering alternatives that preserve and increase beaver activity in order to maintain the high quality habitat created by beaver dams in the action area to minimize or avoid adverse effects to EFH and HAPC. One alternative to consider is the use of drainpipes inserted into the beaver dams at the appropriate elevations to achieve the desired reductions in water surface elevations (WSE) at the toe drains. Drainpipes could be driven or inserted through the beaver dams, which would drain the beaver ponds and reduce WSE to the elevations in which the pipes were installed. The drainpipes could be installed at each dam prior to the scheduled inspections, and then removed or capped and left in place after the inspections. The use of drainpipes would ensure the beaver dam structures would be largely left undisturbed, and presumably beavers would continue maintaining the dams and repair any minor damage caused by the drainpipes. Reclamation would have to calculate the number and diameter of drainpipes to use, as well as how to achieve appropriate fish screening and maintenance while in use. Another alternative is to install posts and incorporate materials removed from Beaver Dams #1 and 2 to create a new beaver dam analogue downstream of Beaver Dam #3. If beavers colonize the beaver dam

analogue, it may both help compensate for the adverse effects to EFH/HAPC, and discourage continued beaver dam reconstruction at Beaver Dams #1 and 2.

Fully implementing this EFH conservation recommendation would protect EFH and HAPC, by avoiding or minimizing the adverse effects described in 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

Reclamation 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 U.S.

Bureau of Reclamation. Other interested users could include the California Department of Fish and Wildlife. A copy of this opinion was provided to Reclamation. The format and naming adheres 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 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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