UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

July 8, 2021 **Refer to NMFS No:** WCRO-2021-01053

Jason Meyer
Senior Environmental Planner/Branch Chief E3
North Region Environmental
California Department of Transportation, District 1
P.O. Box 3700
Eureka, California 95502-3700

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Caltrans' HUM-36 Three Bridges Project (EA 01-0C500)

Dear Mr. Meyer:

Thank you for your letter of April 14, 2021, requesting 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 HUM-36 Three Bridges Project, California Department of Transportation[1] (Caltrans) reference EA 01-0C500. 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 (16 U.S.C. 1855(b)) for this action. This letter transmits NMFS' final biological opinion and EFH response for the proposed HUM-36 Three Bridges Project.

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

[1] Pursuant to 23 USC 327, and through a series of Memorandum of Understandings beginning June 7, 2007, the Federal Highway Administration (FHWA) assigned and Caltrans assumed responsibility for compliance with Section 7 of the federal Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for federally-funded transportation projects in California. Therefore, Caltrans is considered the federal action agency for consultations with NMFS for federally funded projects involving FHWA. Caltrans proposes to administer federal funds for the implementation of the proposed action, and is therefore considered the federal action agency for this consultation.

affect California Coastal (CC) Chinook salmon (*O. tshawytscha*) and its designated critical habitat.

The enclosed EFH consultation was prepared pursuant to section 305(b) of the MSA. The proposed action includes areas identified as EFH for species managed under the Pacific Coast Salmon Fishery Management Plan (FMP). Based on our analysis, NMFS concludes that the project would adversely affect Pacific Coast Salmon EFH and we have provided one EFH Conservation Recommendation.

Please contact Mike Kelly at (707) 825-1622, Northern California Office, Arcata, or via email at Mike.Kelly@noaa.gov if you have any questions concerning this section 7 consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Jennifer Brown, Caltrans, District 1, Eureka, CA
Jennifer Olson, California Department of Fish and Wildlife, Eureka, CA
NMFS ARN# 151422WCR2021AR00088

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

Caltrans' HUM-36 Three Bridges Project
Humboldt County, California

NMFS Consultation Number: WCRO-2021-00444
Action Agency: California Department of Transportation (Caltrans)

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or 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	No	No
Northern California (NC) steelhead (*O. mykiss*)	Threatened	Yes	No	No
California Coastal (CC) Chinook salmon (*O. tshawytscha*)	Threatened	No[2]	N/A	N/A

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 FMP	Yes	Yes

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: July 8, 2021

[2] Please refer to section 2.12 for those species and critical habitats that are not likely to be adversely affected.

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1. INTRODUCTION

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

1.1. Background

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

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). 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 the NMFS Northern California Office in Arcata, California.

1.2. Consultation History

On June 13, 2019, NMFS biologist Mike Kelly visited each of the three bridges with the California Department of Transportation (Caltrans) staff.

On December 7, 2021, Mike Kelly met via teleconference with Caltrans staff to discuss survey results at Butte Creek and aspects of developing the Biological Assessment (BA).

On January 5, 2021, Mike Kelly met via teleconference with Caltrans staff to discuss fish presence and exposure estimates at all three bridges.

On January 26, 2021, NMFS biologist Mike Kelly met via teleconference with Caltrans and California Department of Fish and Wildlife (CDFW) staff to discuss possible mitigation strategies.

On February 18, 2021, Mike Kelly met via teleconference with Caltrans and CDFW staff to further discuss fish presence at all three sites.

On March 22, 2021, Caltrans provided a draft BA for review.

On April 4, 2021, Mike Kelly provided comments on the draft BA.

On April 14, 2021, Caltrans submitted a revised BA and requested initiation of formal section 7 consultation for adverse effects to SONCC coho salmon, NC steelhead, and Pacific Salmon EFH. NMFS accepted the BA and notified Caltrans that we had initiated formal consultation.

On April 28, 2021, Caltrans provided a copy of the BA with some added language needed for CDFW's consistency determination process. The addition contained no substantive technical information so NMFS responded that we would enter the new BA into the record, but would not change the date of consultation initiation.

On June 1, 2021, Caltrans clarified that all stream diversions will use pipes with gravity flow rather than pump systems as was indicated in some places in the BA.

On June 9, 2021, Caltrans confirmed that there is a typographical error on page 83 of the BA regarding the presence of steelhead at Butte Creek. However, Table 7, which indicates that no steelhead were observed during snorkel surveys, is correct.

On June 21, 2021, Caltrans staff discussed with NMFS staff the possibility of applying more restrictive hydroacoustic exposure standards (as detailed in Section 2.5.3) to all three locations until July 15 in each year of construction. Alternatively, if no fish less than 2 grams are found during fish relocation at a given location, the less restrictive standard should apply throughout the construction season. NMFS staff agreed that this change to the proposed action described in Caltrans' BA (Caltrans 2021) is reasonable, and is therefore incorporated as described in Section 2.5.3 of this opinion.

On June 23, 2021, Caltrans confirmed that estimates of salmonids that would be encountered during stream diversion and fish relocation are estimates for both construction seasons combined, and not for each construction season separately.

On June 25, 2021, Caltrans confirmed that a typo in section 2.4.1 of the BA indicate the incorrect footprint area of the existing pier at Butte Creek. The correct dimension is 120 square feet, as indicated elsewhere in the BA.

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 (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).

The proposed action is described in detail in Caltrans' BA (Caltrans 2021). Project elements that may affect salmonids, and accompanying measures to minimize impacts, are summarized below, while the remaining project description is incorporated by reference to Caltrans' BA. In the following descriptions, "Caltrans" refers to Caltrans and their construction contractor(s).

Caltrans proposes to replace the bridges over Hely Creek and Butte Creek, and to widen the bridge over Little Larabee Creek. Presently all three bridges do not meet current design

standards. The proposed action also includes restoration activities to mitigate for potential impacts to fish and habitat. Caltrans proposes to conduct activities within the stream channels at all three locations during two construction seasons between June 15 and October 15 beginning in 2022 and finishing in 2023.

Caltrans is still in the "bridge type selection" process, so final designs are not complete. However, Caltrans' BA describes the "worst case scenario" for each location, though they do not expect any substantial changes that would alter effects of the project on species or habitat.

1.3.1 Construction Staging, Access, and Vegetation Removal

Hely Creek

The site will be cleared of vegetation to provide access to the bridge, abutments, and work pads for the crane and drill rig at each end of the bridge. Surrounding vegetation and trees may also be trimmed or removed to allow for the swing radius of the crane. Caltrans estimates that approximately 22,000 square feet of ground will be cleared, including 35 trees, six of which are trees with a diameter at breast height (DBH) of at least two feet. Two of these larger trees are coast redwood, three are Douglas-fir, and one is a tanoak. Equipment will be staged in an existing pullout along the eastbound lane to the west of the bridge, or adjacent to the eastbound lane just east of the bridge. No vegetation clearing will be required within the staging areas. Impacted riparian areas will be revegetated with appropriate native plant and tree species. Caltrans also proposes to eradicate an infestation of English ivy at this location.

Work on the bridge and abutments will require foot and equipment access. Two temporary access roads with a minimum width of 12 feet will be constructed to accommodate equipment needed for foundation construction (e.g., cranes, excavators). Two crane pads of approximately 30 feet wide by 30 feet long each will be constructed, one near each end of the bridge. Crane pads will be constructed using lumber and base rock and will be graded for a flat surface.

Prior to construction, stream diversion and debris containment systems will be installed. Hely Creek will be temporarily dewatered during both years of construction. A cofferdam will be installed 92 feet upstream of the existing bridge's centerline and water will flow 84 feet downstream of the bridge centerline through a diversion pipe using a gravity system. This gravity system will allow full downstream passage of salmonids, and may provide upstream passage depending on final gradient and water velocity within the pipe. The contractor will prepare stream diversion and fish relocation plans, and Caltrans will provide these plans to NMFS for review of consistency with the anticipated effects analyzed in this opinion. See Section 1.3.6 for details of aquatic species relocation.

Little Larabee Creek

The site will be cleared of vegetation to provide access to the bridge, abutments, and work pads for the crane and drill rig at each end of the bridge. Surrounding vegetation and trees may also be trimmed or removed to allow for the swing radius of the crane. Caltrans estimates approximately 23,000 square feet will be cleared, including 37 trees, four of which have a DBH of at least two

feet. Two of these larger trees are non-native Monterey pines, one is a Douglas fir, and one is an unknown pine species. Equipment will be staged in graveled pullouts near the bridge: one to the west of the bridge, adjacent to the westbound shoulder, and one to the east of the bridge along the eastbound shoulder. No vegetation clearing will be required in staging areas. Impacted riparian areas will be revegetated with appropriate native plant and tree species.

Work on the bridge and abutments will require foot and equipment access. Two temporary stabilized access roads will be created with a minimum width of 12 feet to accommodate equipment needed for foundation construction (e.g., cranes, excavators). Two crane pads of approximately 30 feet wide by 30 feet long each will be constructed, one near each end of the bridge. Crane pads will be constructed with lumber and base rock and will be graded for a flat surface. Once the work area has been isolated from traffic, the existing bridge rails and approximately four feet of width from the outer edges of the bridge will be removed in preparation for the new bridge deck construction. A debris containment system will be installed prior to construction to ensure construction debris does not enter the stream channel.

Prior to construction, stream diversion and debris containment systems will be installed. Little Larabee Creek will be temporarily dewatered during both years of construction. A cofferdam will be installed 67 feet upstream of the bridge centerline and water will flow 129 feet downstream of the bridge centerline through a diversion pipe using a gravity system. The contractor will prepare stream diversion and fish relocation plans, and Caltrans will provide these plans to NMFS for review of consistency with the anticipated effects analyzed in this opinion. See Section 1.3.6 for details of aquatic species relocation.

Butte Creek

The site will be cleared of vegetation to provide access to the bridge, abutments, and work pads for the crane and drill rig at each end of the bridge Surrounding vegetation and trees may also have to be trimmed or removed to allow for the swing radius of the crane. Caltrans estimates approximately 22,000 square feet will be cleared, including 17 Douglas fir and ponderosa pines with a DBH of at least two feet. Equipment will be staged to the west of the bridge within Caltrans' right of way on either side of the road. No vegetation clearing will be required in staging areas. Impacted riparian areas will be revegetated with appropriate native plant and tree species.

Work on the bridge and abutments will require foot and equipment access. Two temporary stabilized access roads will be created with a minimum width of 12 feet to accommodate equipment needed for foundation construction (e.g., cranes, excavators). Two crane pads of approximately 30 feet wide by 30 feet long each will be constructed, one near each end of the bridge. Crane pads will be constructed with lumber and base rock and will be graded for a flat surface. Once the work area has been isolated from traffic, the existing bridge rails and approximately four feet of width from the outer edges of the bridge will be removed in preparation for the new bridge deck construction. A debris containment system will be installed prior to construction to ensure construction debris does not enter the stream channel.

Prior to construction, stream diversion and debris containment systems will be installed. Butte Creek will be temporarily dewatered during both years of construction. Approximately 10 feet of the 171-foot-long pool downstream of the bridge will be dewatered. A cofferdam will be installed approximately 55 feet upstream of the existing bridge's centerline, and a gravity-fed diversion pipe will outlet approximately 30 feet downstream of the bridge centerline. See Section 1.3.6 for details of aquatic species relocation.

1.3.2 Removing Old Bridges and Structural Elements

Hely Creek

Hely Creek Bridge will be built by half-width construction, which means that one lane of the bridge will be demolished while the other lane remains open to traffic. Then traffic will be transferred to the new half bridge while the second half is constructed. This method eliminates the need for a temporary detour bridge. Therefore, half of the bridge will be demolished in each of two construction seasons.

In the first season, the existing westbound bridge rail and approximately five feet of the westbound edge of the bridge will be removed. The east abutment and spread footing will be removed to a minimum of five feet below the original grade, where in conflict with proposed new abutment. Removal of existing bridge and abutments will be done with a hoe ram, jackhammer and backhoe, or stripping excavator. Additionally, shoring will be placed adjacent to the removed abutment to stabilize the existing bridge on the east side and allow the abutment to be graded. The second half of bridge demolition will be similar to the first stage, with removal of the remainder of the existing structure on the eastbound side.

Little Larabee Creek

Traffic will be able to use the bridge during demolition and replacement of the bridge edges and rails, so a temporary detour bridge will not be required. Once the work area has been isolated from traffic, the existing bridge rails and approximately four feet of width from the outer edges of the bridge will be removed using a combination of impact hammers (hoe rams and jackhammers) and concrete saws.

Butte Creek

Butte Creek Bridge will be built by half-width construction, which means that one lane of the bridge will be demolished while the other lane remains open to traffic. Then traffic will be transferred to the new half bridge while the second half is constructed. This method eliminates the need for a temporary detour bridge. Therefore, half of the bridge will be demolished in each of two construction seasons.

In the first season, the existing eastbound bridge rail and approximately 17.5 feet of the eastbound edge of the bridge will be removed. The east abutment and piles will be removed to a minimum of five feet below the original grade. Removal of existing bridge and abutments will be done with a hoe ram, jackhammer and backhoe, or stripping excavator. Additionally, shoring

will be placed adjacent to the removed abutment to stabilize the existing bridge on the east side and allow the abutment to be graded. The second half of bridge demolition will be similar to the first stage, with removal of the remainder of the existing structure on the westbound side.

1.3.3 Bridge Construction

Hely Creek

Caltrans proposes to replace the existing 25-foot-wide by 41-foot-long bridge with a 36-foot-wide by 75-foot-long structure. The centerline of the bridge will be shifted to the north, which will require realignment and widening of the roadway approaches. With the longer new bridge, grading of the banks of Hely Creek is needed to provide a stable transition to the finished grade of the embankment. During field reviews, Caltrans and CDFW observed a protruding bank on riverbank right, which is causing higher flows to be redirected towards the eastern abutment and slopes causing localized scour and bank instability. At CDFW's recommendation (pers. comm. Rick Macala, CDFW Hydraulics Engineer), Caltrans proposes to contour the bank and grade the channel at this location to alleviate scour. This will stabilize the bank, reducing the potential for erosion and sedimentation to the stream. The thalweg will be shifted approximately 10 feet to the west to flow under the center of the bridge. A large wood revetment consisting of one or two redwood pieces and rootwads will be placed at the northeast quadrant of the bridge to help maintain the new alignment, protect the eroding bank, and enhance habitat for salmonids.

The bridge foundation (abutments) will require either twelve 24-inch diameter cast-in-drilled-hole (CIDH) piles, or twelve 14-inch impact-driven steel H-piles. Therefore, there will be six piles along the centerline of each abutment. However, spread footings may also be considered during the final design phase. Up to 12 impact-driven H-piles may also be required for temporary falsework depending on the final bridge design. (Caltrans assumes that impact-driven piles will be required, and they have provided a hydroacoustic analysis to support their effects determinations.)

The eastern abutment will be shifted approximately 20 feet to the east away from the creek to maintain creek width. The new abutment piles will be placed, and a new abutment formed and poured. The western abutment will be constructed to minimize impacts to a cluster of large redwood trees. A new abutment will then be formed and poured in front of the existing abutment (on the stream side). The existing abutment will be left in place, but the top portion and wing walls will be removed to be below the roadway grade section. New wing walls will extend approximately 25 feet beyond each abutment. Approximately 80 square feet of existing rock slope protection (RSP) will be removed, which will reduce the total amount of RSP along the creek. Additionally, the new Abutment 2 will be farther from the stream than the existing abutment and will result in approximately 750 square feet of restored in-stream habitat.

The proposed bridge deck drainage design (similar to current drainage patterns) will flow along the curb and be directed to drain down the abutment or sheet flow down the embankment. The existing bridge and the new bridge design do not include scuppers, so stormwater will not drain directly to the creek. Existing roadside ditches will be shifted to accommodate shoulder

widening. Two bioswales will be created adjacent to the shoulders of the bridge for treatment of stormwater runoff. An existing culvert that conveys a roadside ditch under Redwood House Road will be cleaned out to improve flow. The existing vegetated swale between the culvert crossing and creek will be regraded as needed to maintain existing flow patterns.

For pre-cast construction, Stage 1 would occur approximately June through September of the first year, and Stage 2 would be completed June through October of the following year over 405 working days. For cast-in-place construction, Stage 1 of construction would occur approximately June through October of the first year, and Stage 2 would be completed June through December of the following year over 450 working days.

Little Larabee Creek

Caltrans proposes to widen the existing bridge from 30.5 feet to 44 feet and to upgrade the bridge rails. A new column will be constructed on either side of each of the three bridge piers, for a total of six new columns. For the purposes of this consultation, Caltrans assumes that each of the new columns will be supported on four 14-inch impact-driven steel H-piles, though the column at piers 2 and 3 may be supported on spread footings in the same manner as the existing columns at these locations. Spread footings would not require impact-driven piles. The existing abutments will be widened and the new portions will be supported on two 14-inch impact-driven steel H-piles on either side of the abutment, for a total of four new piles at each of the two abutments. The total number of piles will be between 16 and 32 depending on the final design of supports at piers 2 and 3. New wing walls will be constructed approximately 25 feet beyond each abutment. The existing RSP next to the west abutment will be repaired and replaced within the existing footprint. Both abutments and associated wingwalls and RSP are above the ordinary-high-water mark (OHWM). The new pier columns will result in approximately 120 square feet of new structure below the OHWM. The roadway approaches will also be widened to match the new bridge width.

Temporary falsework will be placed for construction of the new girders and deck. Falsework will use the newly-placed substructure for support, so no piles or spread footings are anticipated. A new barrier rail will be installed, and a three-foot-wide concrete section will be added between the new section of the bridge and existing structure. Then the new bridge deck will be overlaid with polyester concrete.

Two soldier pile retaining walls will be constructed at each end of the bridge beyond the abutments. The eastern retaining wall will be 232 feet long and eight to 10 feet tall. The western wall will be 100 feet long and 10 to 12 feet tall. The retaining walls will be supported on 24-inch piles inserted in drilled holes spaced at eight feet. This will be followed by soldier pile installation, placing of timber lagging, anchor stud installation, and backfill. Concrete facing will be applied, and a concrete barrier, cable railing, and concrete gutter will be installed.

Existing roadside ditches will be shifted to accommodate road widening. A drainage ditch will be added atop the proposed retaining wall at the western end of the bridge. In addition, an existing 24-inch corrugated steel pipe culvert on a non-fish bearing ephemeral drainage will be replaced. Permanent stormwater treatment in the form of bioswales and a biostrip will be created

adjacent to the shoulders west and east of the bridge. The new bridge rails will not have scuppers, so stormwater on the bridge will continue to drain toward the abutments and into the new bioswales.

Bridge widening is anticipated to occur June through January over approximately 206 working days. The retaining walls will be constructed June through September over 178 working days.

Butte Creek

Caltrans proposes to replace the existing 30.5-foot-wide by 114-foot-long bridge with a 44-foot-wide by 137-foot-long structure. The new bridge will be either cast in place, which would require falsework and concrete pours, or precast with elements trucked in and placed by crane. For the purposes of this consultation, Caltrans assumes the cast-in-place option because potential impacts would be greater. Both options will be single spans, so no piers will be placed between the abutments, and an existing pier in the channel will be removed.

Construction of the cast-in-place option will require falsework, which may be supported on impact-driven H-piles, or on spread footings. Caltrans estimates that a maximum of 18 piles will be required to support the falsework. After falsework is constructed, concrete will be poured, and then the bridge deck and back walls will be constructed. This will be followed with an approximately 3-foot-wide closure pour between the two new halves of the bridge. The roadway approaches will also be widened to match the new bridge width.

Both options would require the same abutments with permanent piles located along the centerline of the abutment footings. Abutment 1 will require 12 CIDH piles, and Abutment 2 will require either 12 CIDH piles or will be built on a spread footing if the ground is too hard for drilling.

The roadside drainage ditches will be graded to perpetuate the existing drainage pattern and match the new width of the roadway. A 24-inch diameter, 60-foot-long CSP culvert on a non-fish bearing roadside ditch will be replaced in-kind. The existing lined drainage channel at the outlet of the small stormwater drainage culvert crossing under the driveway will be removed and replaced with a vegetated swale, including 1.6 cubic yards of rock (spread across 30 square feet) as an energy dissipator. A 110-foot-long bioswale with trapezoidal channel will be created in the southwestern portion of the project area. The bioswale will have a downdrain and RSP placed at the outlet. Another existing culvert on a non-fish bearing intermittent steam to the east of the bridge will be replaced in-kind. The new bridge rails will not have scuppers, so stormwater on the bridge will continue to drain from the deck and into the new bioswale.

For pre-cast construction, Stage 1 would occur approximately June through October of the first year and Stage 2 would be completed June through December of the following year over 451 working days. For cast-in-place construction, Stage 1 of construction would occur approximately June through October of the first year and Stage 2 would be completed June through January of the following year over 475 working days.

1.3.4 Monitoring

Water Quality
The contractor's Storm Water Pollution Prevention Plan will identify a site inspection schedule. Inspections will include all areas cleared, graded, or excavated where stabilization measures have been implemented, all material or equipment storage and maintenance areas; all areas where stormwater flows, including catchment/treatment areas; and all water discharge points. All stormwater controls, including pollution prevention measures, will be monitored to ensure they are operational, and working as intended. Inspections must identify all noncompliance incidents observed, and corrective action initiated if appropriate. If discharge is occurring during the site inspection, it is required that the inspector identify all points of the property where discharge is occurring and observe and document the visual quality of discharge (including color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of pollutants). Caltrans will notify NMFS and CDFW if any discharges affect species/habitat in a manner or extent not considered in this opinion.

Additionally, a qualified biologist will monitor in-stream construction activities such as installation and removal of dewatering or diversion systems, bridge removal, pile-driving and hoe-ramming, and drilling for bridge foundations.

Hydroacoustics
Sound energy levels above 150 dB (re: 1 μPa) can accumulate to cause barotrauma in exposed fish. This cumulative sound exposure level is abbreviated as cSEL. Based on accepted standards of the Fisheries Hydroacoustic Working Group (2008), fish under two grams may suffer barotrauma at a cSEL of 183 dB, and fish over two grams may experience barotrauma at a cSEL of 187 dB. However, levels below these thresholds do not continue to accumulate if fish are not re-exposed within 12 hours.

Caltrans believes that juvenile salmonids at all three creeks may be under two grams during the time of pile driving and demolition. This is particularly true for steelhead, which spawn and hatch later in the year than coho salmon: therefore, Caltrans will use the cSEL standard of 183 dB to evaluate whether injury is likely. However, based on professional judgement, NMFS believes that all salmonids should be over two grams by July 15. Therefore, Caltrans will use the cSEL standard of 187 dB to evaluate whether injury is likely during pile driving or demolition beginning July 15. Additionally, due to the uncertainty of whether any fish under two grams would be present at a given site, if no fish under 65 millimeters fork length is encountered at a given site during relocation efforts, then the 187 dB cSEL standard will apply beginning June 15. (The length/weight relationship is conservatively estimated using measurements of juvenile SONCC coho salmon and NC steelhead provided by CDFW (2021)). NMFS agrees that these provisions are reasonable given that they may facilitate faster construction with less potential to require construction later in the season or potentially a third year of construction at a given site.

Hydroacoustic monitoring will be conducted during construction activities that have the potential to produce impulsive sound waves within the creeks. This includes work that requires land-based pile driving, and hoe ramming or jackhammering associated with bridge widening/removal and partial removal of rock. Hydroacoustic monitoring will ensure that sound pressures considered to

be injurious to fish will not be exceeded. A Hydroacoustic Monitoring Plan will be prepared by a qualified hydroacoustic specialist prior to construction. NMFS will be provided the draft hydroacoustic plan for review. The Hydroacoustic Monitoring Plan will describe the monitoring methodology, frequency of monitoring, positions where hydrophones will be deployed, techniques for gathering and analyzing data, quality control measures, and reporting protocols.

1.3.5 Conservation Measures and Best Management Practices

Water pollution control scheduling and methods will be specified in the contractor's Storm Water Pollution Prevention Plan. Specific methods are indicated in Caltrans' Construction Site Best Management Practices Manual (Caltrans 2017). Caltrans' BA provides details on specific measures. Most of these measures are standard practices that have proven efficacy and are familiar to NMFS' staff. Please refer to Caltrans' BA and the above-referenced manuals for details.

1.3.6 Aquatic Species Relocation

Stream diversions may require relocation of juvenile coho salmon and steelhead, and other aquatic species. Caltrans will prepare an Aquatic Species Relocation Plan for NMFS' review a minimum of 30 days prior to project implementation. Methods may include seining gear, electrofishing gear, and dip nets. Dewatering drawdown will occur incrementally to fully assess any fish not captured during initial efforts. Any remaining fish will then be removed from the area and released to suitable habitat. Electrofishing for salmonids will comply with Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act (NMFS 2000), and any seining or other capture and removal techniques will adhere to the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010). A qualified biologist will be present during all phases of in-stream construction to assist with relocation efforts as they arise.

1.3.7 Mitigation and Habitat Enhancement

CDFW will require Caltrans to fully mitigate for incidental take of SONCC coho salmon and NC summer-run steelhead as part of an Incidental Take Permit or Consistency Determination on this opinion pursuant to the California Endangered Species Act (CESA). Mitigation for incidental take, as defined under State of California Fish and Game Code, would be implemented on site through habitat creation and enhancement.

Caltrans proposes to create and enhance habitat for salmonids by placing large woody debris (LWD) in Hely Creek and Butte Creek. LWD installation would occur during the dry-season work window while the channel is dewatered. At the Hely Creek Bridge, a rootwad revetment would be installed at the northeast quadrant of the bridge to help maintain the new alignment of the channel and provide habitat and embankment protection. The structure would be constructed with up to two large conifer rootwads. The habitat provided by the LWD is intended to offset CESA-defined take of juvenile SONCC coho salmon at this location. At the Butte Creek Bridge location, habitat creation and enhancement would be implemented for CESA-defined take of NC summer steelhead by installing LWD within the channel, likely downstream of the bridge. The

installations would be designed by a licensed hydraulic engineer and plans would be provided to NMFS and CDFW for review prior to construction.

These mitigation measures will be incorporated into the final construction plans and sufficient funds will be in the contract to implement these measures. Prior to beginning construction, Caltrans will submit to CDFW proof that Caltrans has contracted and provided funding to the contractor for the explicit purpose of implementing the required mitigation measures.

1.3.8 Other Activities Caused by the Proposed Action

We considered whether the proposed action would cause any other activities and determined that it would not. The new crossings will serve the same function as the current crossings without inducing additional traffic or facilitating use by types of vehicles unable to use the current road.

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 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 non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

Caltrans determined the proposed action is not likely to adversely affect CC Chinook salmon. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1. Analytical Approach

This biological opinion includes a jeopardy analysis which 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 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:

- Evaluate the rangewide status of the species expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species in the action area.
- 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, analyze whether the proposed action is likely to 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.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "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 function of the PBFs that are essential for the conservation of the species.

2.2.1 Species Description and General Life History

SONCC coho salmon: Coho salmon have a generally simple 3-year life history. The adults typically migrate from the ocean and into bays and estuaries towards their freshwater spawning

grounds in late summer and fall, and spawn by mid-winter. Adults die after spawning. The eggs are buried in nests, called redds, in the rivers and streams where the adults spawn. The eggs incubate in the gravel until fish hatch and emerge from the gravel the following spring as fry. These young-of-year fish typically rear in fresh water for about 15 months before migrating to the ocean during the spring months. The juveniles go through a physiological change during the transition from fresh to salt water called smoltification. 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.

NC Steelhead: Steelhead exhibit the most complex suite of life history strategies of any salmonid species. They have both anadromous and resident freshwater life histories that can be expressed by individuals in the same watershed. The anadromous fish generally return to freshwater to spawn as 4- or 5-year-old adults. Unlike other Pacific salmon, steelhead can survive spawning and return to the ocean to return to spawn in a future year. It is rare for steelhead to survive more than two spawning cycles. Steelhead typically spawn between December and May. Like other Pacific salmon, the steelhead female deposits her eggs in a redd for incubation. The 0+ age fish emerge from the gravel to begin their freshwater life stage and can rear in their natal stream for 1 to 4 years before migrating to the ocean between March 1 and July 1 each year, although they have been observed as late as September (Ricker et al. 2014).

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 coho salmon and steelhead 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 Evolutionarily Significant Unit (ESU) (NMFS 2014) and the Coastal Multispecies Recovery Plan (NMFS 2016) for NC steelhead Distinct Population Segment (DPS), to determine the general condition of each population and factors responsible for their current status. We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.20).

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, most of the 30 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.

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). 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 and is inadequate to contribute to a viable ESU, given the significant reductions in abundance and distribution. The SONCC coho salmon ESU is currently considered likely to become endangered within the foreseeable future in all or a significant portion of its range, and there is heightened risk to the persistence of the ESU as Viable Salmonid Population (VSP) parameters continue to decline and no improvements have been noted since the previous status review (Williams et al. 2016).

Status of NC Steelhead

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

NC Steelhead Spatial Structure and Diversity: NC steelhead remain broadly distributed throughout their range, with the exception of habitat upstream of dams on both the Mad River and Eel River, which has reduced the extent of available habitat. Extant summer-run steelhead populations exist in Redwood Creek and the Mad, Eel (Middle Fork and Van Duzen,) and Mattole Rivers. The abundance of summer-run steelhead was considered “very low” in 1996 (Good et al. 2005), indicating that an important component of life history diversity in this DPS is at risk. Hatchery practices in this DPS have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. However, abundance and productivity in this DPS are of most concern, relative to NC steelhead spatial structure and diversity (Williams et al. 2011).

Status of Critical Habitat

NMFS considers the action areas at each of the three bridge locations to be designated critical habitat for SONCC coho and NC steelhead.

The condition of SONCC coho and NC steelhead critical habitat, specifically the 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: overfishing, artificial propagation, 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, 64 FR 24049, 70 FR 37160). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the ESU and DPS. Altered flow regimes can delay or preclude migration, dewater aquatic habitat, and strand fish in disconnected pools, while unscreened diversions can entrain juvenile fish.

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

The factors that caused declines 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 of listed salmonids (Good et al. 2005). The sustained drought in California reduced stream flows and increased temperatures, further exacerbating stress and disease. Ocean conditions have been unfavorable in recent years due to the El Niño in 2015 and 2016. 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. Information since these species were listed suggests that the Earth's climate is warming, and that this change could significantly impact ocean and freshwater habitat conditions, which affect survival of coho salmon and steelhead subject to this consultation. In the coming years, climate change will influence the ability to recover these species in most or all of their watersheds. Coho salmon and steelhead are particularly vulnerable to climate change due to their need for year-round cool water temperatures (Moyle 2002). Through effects on air temperatures and stream flows, climate change is expected to increase water temperatures to the detriment of these species. 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 50-80 cm rise by the end of the 21st century (IPCC 2019). This rise in sea level will alter the habitat in estuaries and either provide 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 coho salmon and steelhead in Northern California.

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 specific action area for each site is summarized below.

Hely Creek
The action area for the bridge replacement at Hely Creek encompasses the entire construction footprint that would be subject to direct impacts from ground disturbance and vegetation clearing, including where staging and material storage may occur. This includes the State Route (SR) 36 roadway and shoulders from Post Mile (PM) 11.57 to PM 11.82, access road areas extending approximately 45 feet north and 45 feet south of the roadway in vegetated areas, and the staging areas to the east and west of the bridge. The action area would also include the Hely Creek channel and its adjacent wetlands and waters within the vicinity of the bridge that could be exposed to localized, minor pulses of turbidity stemming from ground disturbance, and the extent of potential underwater noise transmittal that could result in hydroacoustic behavioral impacts to fish. This action area has been defined at 115 feet upstream and 328 feet downstream of the bridge for potential hydroacoustic sound propagation, and 300 feet downstream of the bridge for potential sediment and turbidity effects. This action area would also encompass temporary water diversions at 92 feet upstream and 84 feet downstream.

Little Larabee Creek
The action area for the bridge widening at Little Larabee Creek encompasses the entire construction footprint that would be subject to direct impacts from ground disturbance and vegetation clearing, and where staging and material storage may occur, including the SR 36 roadway and shoulders from PM 25.40 to PM 25.63. It also includes access road areas extending approximately 90 feet northwest and 25 feet southeast of the roadway in vegetated areas, and the staging areas to the east and west of the bridge. The action area would also include the Little Larabee Creek channel and its adjacent wetlands and waters within the vicinity of the bridge that could be exposed to localized, minor pulses of turbidity stemming from ground disturbance, and the extent of potential underwater noise transmittal that could result in behavioral hydroacoustic impacts to fish. This action area has been defined at 66 feet upstream and 328 feet downstream of the bridge for potential hydroacoustic sound propagation, and 300 feet downstream of the bridge for potential sediment and turbidity effects. This action area would also encompass temporary water diversions at 67 feet upstream and 129 feet downstream from the bridge.

Butte Creek
The action area for the bridge replacement at Butte Creek encompasses the entire construction footprint that would be subject to direct impacts from ground disturbance and vegetation clearing, including where staging and material storage may occur. It also includes the SR 36 roadway and shoulders from PM 34.42 to PM 34.72, access areas extending approximately 35 feet north and 50 feet south of the roadway in vegetated areas, and the staging areas to the southeast and northwest of the bridge. The action area would include the Butte Creek channel, a

171-foot-long pool within the channel, a large rock the existing bridge structure is partially supported by, and adjacent wetlands and waters within the vicinity of the bridge that could be exposed to localized, minor pulses of turbidity stemming from ground disturbance, and the extent of potential underwater noise transmittal that could result in hydroacoustic behavioral impacts to fish. For potential hydroacoustic sound propagation, the action area has been defined at 180 feet upstream and 328 feet downstream of the bridge. For potential sediment and turbidity effects, the action area has been defined as 600 feet downstream of the bridge. (Caltrans estimates 600 feet at Butte Creek in comparison to 300 feet at Hely and Little Larabee creeks, which are located adjacent to the confluence with the Van Duzen River where significant dilution of the creek flow would occur.) This action area would also encompass temporary water diversions at 55 feet upstream and 30 feet downstream from the Butte Creek bridge; this dewatering includes a small portion of the pool (approximately 10 feet) at the head of the pool next to the boulder.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its habitat in the action area, without the consequences to the listed species or 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 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 and NC steelhead from climate change is likely to include a continued increase in average summer air temperatures; more extreme heat waves; and an increased frequency of drought (Lindley et al. 2007). In future years and decades, many of these changes are likely to further degrade habitat throughout the watershed by, for example, reducing streamflow during the summer and raising summer water temperatures. Many of these impacts will likely occur in the action area via reduced flows and higher water temperatures.

Additionally, the NMFS NC Steelhead Recovery Plan (NMFS 2016) describes all summer-run populations as being at the highest level of threat due to climate change compared to winter-run populations.

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

SONCC coho salmon in the action area belong to the Lower Eel and Van Duzen River population, which the NMFS SONCC Coho Salmon Recovery Plan indicates is at high risk of extinction and is likely below the depensation threshold (NMFS 2014). Steelhead in the action area belong to the Van Duzen River population of NC steelhead, which the NMFS NC Steelhead Recovery Plan indicates is likely well below the population level needed to be at a low risk of extinction (NMFS 2016).

Some of the following observations of steelhead in the action area could be observations of resident rainbow trout. However, each location is within the anadromous range of steelhead, so we consider all observed juvenile "trout" to be NC steelhead.

Hely Creek

SONCC coho salmon may be present at the Hely Creek location based on a 2017 CDFW Stream Inventory Report (CDFW 2017), which found five young-of-year coho salmon in a reach that included the action area. Also, monitoring conducted by Humboldt Redwoods Company (HRC) since 2003 has detected coho salmon approximately 200 feet upstream of the action area (K. Lackey, HRC. pers. comm. to Caltrans, 2019). However, a Caltrans snorkel survey in June of 2019 did not find coho salmon, and CDFW Stream Inventory Reports from 2006 and 2018 (CDFW 2006, 2018a), which included the action area, indicate that no coho were found. Based on temperature data collected between June and October of 2019 (Caltrans 2021), average water temperatures ranged from 51.5 °F to 59.2 °F, which indicates that temperatures in the action area are suitable for rearing coho salmon and steelhead throughout the summer. Given these temperatures, Hely Creek may serve as non-natal rearing habitat by salmonids seeking cool water refuge from the warm mainstem river.

The presence of juvenile steelhead in the action area is confirmed by the various surveys mentioned in the previous paragraph, including the 2019 Caltrans snorkel survey (Caltrans 2021). However, genetic data provided by CDFW, as well as the position of the site within the Van Duzen watershed, indicate that only winter-run steelhead are expected in Hely Creek (Kannry et al., 2020).

The site is immediately upstream of the Hely Creek confluence with the mainstem Van Duzen River, and both adult and juvenile salmonids should be able to access the site under typical flow conditions. However, this position adjacent to the mainstem river appears to result in deposition of bedload in the action area when the Van Duzen creates a backwater effect in the action area during high flows (Mike Kelly, NMFS, personal observation). However, high flows on Hely Creek in the absence of the backwater effect could scour pools in the action area. A periodic scour and deposition like this may result in highly variable pool availability in a given year, which could alter the action area's suitability for rearing juvenile salmonids. Additionally, the action area has a suitable riparian canopy, and satellite images indicate that the Hely Creek watershed is well forested, which would support the observed water temperatures and provide adequate food resources in the action area. The action area could provide spawning habitat for salmonids; however, no known spawning has been observed.

Little Larabee Creek

A report by CDFW (2013) mentions partial migration barriers that they believe are not passable by coho salmon. However, a survey conducted by the Humboldt Area Foundation (HAF 2011) detected Chinook salmon redds and carcasses in Little Larabee Creek above the action area. While partial migration barriers farther upstream on the Van Duzen River only allow passage of steelhead, passage of Chinook salmon past these lower partial barriers indicate that coho salmon may also pass the barriers during optimal flow conditions. CDFW Stream Inventory Reports (CDFW 1996, 2018b) and a Caltrans snorkel survey in 2019 did not detect coho salmon. Based

on the potential for adult coho to pass the partial barriers, the action area would be considered critical habitat for SONCC coho salmon. However, based on the survey results and the unsuitable habitat conditions in the action area (as described in the following paragraph), NMFS believe that juvenile SONCC coho salmon would not be encountered in the action area.

Little Larabee Creek is designated as critical habitat for NC steelhead. The surveys mentioned in the previous paragraph included the action area and found young-of-year and yearling steelhead in low numbers. The Caltrans snorkel survey found a single likely two-year-old steelhead in the action area in 2019. Little Larabee Creek in the action area is a cobble and boulder riffle that may provide suitable rearing habitat for young-of-year steelhead in low numbers. There are no pools or instream cover that would provide good habitat for older year classes of steelhead, though they could also be present in low numbers. Based on temperature data collected between June and October of 2019 (Caltrans 2021), average water temperatures ranged from 51.4 °F to 63.5 °F, which indicates that temperatures in the action area are suitable for rearing steelhead throughout the summer. Given these temperatures, Little Larabee Creek may serve as non-natal rearing habitat for steelhead seeking cool water refuge from the warm mainstem river. However, the action area does not provide suitable spawning habitat.

Genetic data (Kannry et al., 2020) reported presence of 28% allele frequency of summer-run steelhead. However, these summer-run steelhead likely entered Little Larabee from the Van Duzen and were likely not progeny of summer steelhead spawning in Little Larabee Creek (pers. comm. D. Kajtaniak and S. Kannry, February 2021)

Butte Creek

CDFW (2015) describes barriers on the Van Duzen River below the action area that are not passable by coho or Chinook salmon. Therefore, critical habitat for SONCC coho salmon is not designated in Butte Creek, and we do not expect coho salmon to be present in the action area during construction.

Butte Creek is designated critical habitat for NC steelhead, and genetic data indicate that the steelhead in Butte Creek are 70-80% summer-run and 20-30% winter-run (Kannry et al., 2020). The pool in the action area should provide excellent rearing habitat for juvenile steelhead; however, CDFW does not expect that it would provide suitable holding habitat for adult summer-run steelhead (pers. comm. D. Kajtaniak and S. Kannry, February 2021). But despite the seemingly good habitat, Caltrans snorkel surveys in June 2019 and November 2020 did not detect any juvenile salmonids in the action area. However, a CDFW Stream Inventory Report (CDFW 1992) indicate the presence of 20 juvenile steelhead in a reach that included the action area.

The absence of rearing juvenile steelhead in the Butte Creek action area may be explained by unsuitable flow conditions that may periodically prevent migration above the partial barriers downstream. Alternatively, the overall scarcity of summer-run steelhead, combined with the low frequency of winter-run steelhead in Butte Creek, as indicated by genetic analysis (Kannry et al., 2020), may simply mean there are not enough adult steelhead in some years to fully seed the available habitat. However, given that steelhead are known to spawn upstream of the action area,

NMFS expects that under favorable conditions, a large number of juvenile steelhead could rear in the action area.

A Stream Inventory Report (CDFW 1992) reports water temperatures in Butte Creek, including the action area, of 52 °F to 62 °F in August and September of 1992. Unfortunately, Caltrans temperature logger in Butte Creek disappeared, so no recent temperature data are available. However, the Caltrans snorkel surveyors characterized the water as cold (Pers. comm. Jason Frederickson, Caltrans), and given the mostly intact riparian forest in the upper watershed, we expect that water temperatures are suitable for steelhead rearing year-round.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species 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).

2.5.1 Stream Diversion and Fish Relocation

Data on fish relocation efforts from water diversion activities since 2004 shows most average mortality rates are below three percent for salmonids. Therefore, given the measures that would be implemented to avoid and minimize impacts to fish during relocation efforts, NMFS expects no more than three percent of all relocated fish would be subject to potential injury or mortality.

As detailed in section 1.3.1, Caltrans proposes to construct temporary stream diversion structures in order to protect the three creeks from construction work and hydroacoustic sound energy during pile driving. Caltrans staff estimated numbers of salmonids that may be handled during relocation efforts based on technical assistance with NMFS and CDFW staff as described in Caltrans' BA (Caltrans 2021). As described in section 2.4 of this opinion, fish numbers at each location may be highly variable between years. Caltrans estimates are therefore conservative. Additionally, stream characteristics at each location (e.g., lack of significant complex cover) should allow the use of a seine and block nets to effectively "herd" many of the fish to areas outside of the diversion footprint without the need to handle these fish. The following subsections provide Caltrans' fish handling estimates and NMFS' conclusions, including the number of mortalities expected at each location. The estimated number of fish to be handled represents the number remaining in the dewatering zone after attempts to herd fish out.

While both summer-run and winter-run steelhead are listed within the NC steelhead population, these life history variants represent important ecological diversity within the overall population of NC steelhead, as described in section 2.2 of this opinion. So, we believe it makes sense to consider any impacts to them both together as a single population and as separate sub-populations. Therefore, we present the numbers of fish handled and potentially injured separately for each life history variant. The results of separately considering potential effects to each sub-

population, and what this means to the overall NC steelhead population, are presented in section 2.7 below.

Hely Creek

Caltrans' estimate for the number of fish that will be handled at Hely Creek is 15 juvenile coho salmon and 30 winter-run steelhead in each of two construction seasons. NMFS believes this is a reasonable conservative estimate. (Summer-run steelhead are not expected at this location.)

If we apply the three-percent mortality rate (rounded up to the nearest whole number) to the total number of juvenile coho salmon and winter-run steelhead that we estimate could be captured and relocated during both construction seasons combined, we would expect that no more than one juvenile SONCC coho salmon and two juvenile winter-run NC steelhead would be injured or killed during relocation for both construction seasons combined.

Little Larabee Creek

Caltrans' estimate for the number of fish that will be handled at Little Larabee Creek is 35 juvenile winter-run and 15 juvenile summer-run steelhead in each of two constructions seasons. NMFS believes this is a reasonable conservative estimate. (Coho salmon are not expected at this location.)

If we apply the three-percent mortality rate (rounded up to the nearest whole number) to the total number of juvenile steelhead that we estimate could be captured and relocated during both construction seasons combined, we would expect that no more than two juvenile winter-run NC steelhead and one juvenile summer-run NC steelhead would be injured or killed during relocation for both construction seasons combined.

Butte Creek

Caltrans' estimate for the number of fish that will be handled at Butte Creek is two winter-run and 80 summer-run steelhead in each of two work seasons. NMFS believes this is a very conservative estimate, but it is not unreasonable if there are strong returns of steelhead in the years prior to and during construction. (Coho salmon are not expected at this location.)

If we apply the three-percent mortality rate (rounded up to the nearest whole number) to the total number of juvenile steelhead that we estimate could be captured and relocated during both construction seasons combined, we would expect that no more than one juvenile winter-run steelhead and five juvenile summer-run NC steelhead would be injured or killed during relocation for both construction seasons combined.

2.5.2 Water Quality

Pollutants from construction operations, or from the mobilization of sediment both during and after construction, have the potential to impact water quality within the action areas.

Turbidity and Sedimentation
Short term increases in suspended sediment and turbidity are anticipated during construction and removal of the stream diversions. Additionally, there is likely to be an increase in suspended sediment and turbidity in the action area during the first flow-producing rainfall of the season as disturbed sediments mobilize and adjust.

Increases in suspended sediment or turbidity can affect water quality, which in turn can affect fish health and behavior. Salmonids typically avoid areas of higher suspended sediment, which means they displace themselves from their preferred habitat in order to seek areas with less suspended sediment. Fish unable to avoid suspended sediment can experience negative effects from exposure.

Research has shown that length of exposure to total suspended solids (TSS) plays a more dominant role than TSS concentration (Anderson et al. 1996). Long term exposure to elevated TSS conditions may cause an endocrine stress response (elevated plasma cortisol, glucose, and hematocrits), suggesting an increased physiological burden that could influence growth, fecundity, and longevity (Redding et al. 1987). Therefore, when considering the effects of TSS on listed fish, it is important to consider the frequency and the duration of the exposure, not just the TSS concentration (Newcombe and Jensen 1996).

Construction of the stream diversions at each of the three locations, and their removal at the end of the construction season, could generate turbidity. However, Caltrans proposes to use techniques and materials that are proven to minimize turbidity to minor levels and durations. Therefore, NMFS considers the potential amounts and duration of turbidity to be unlikely to reduce the fitness of listed salmonids in the action area.

The first streamflow-producing rains of the season will likely produce turbidity of short duration and low concentration, and will occur when the most vulnerable life stages are not present. Additionally, through project design and implementation of standard wet-weather BMPs, as described in detail in Caltrans' BA (Caltrans 2021) and Caltrans' Manual of Construction Site Best Management Practices (Caltrans 2017), levels of suspended sediment and turbidity during rain events are likely to be controlled sufficiently to avoid exposing salmonids to injurious durations and concentrations. Therefore, NMFS considers the potential amounts and duration of turbidity generated during rain events to be unlikely to reduce the fitness of listed salmonids in any of the three action areas.

Pollutants Associated with Stormwater Runoff and Spills
Contaminants generated by traffic, pavement materials, and airborne particles that settle may be carried by stormwater runoff into receiving waters. Stormwater runoff can introduce contaminants (e.g., copper, zinc, cadmium, lead, nickel, and other vehicle-derived chemicals) into waterways, where aquatic species can be affected. Copper and zinc are of particular concern due to their effect on salmonids at low concentrations. Dissolved copper and zinc in stormwater road runoff are difficult to remove, and have known negative effects on salmonids and other fishes (Sandahl et al. 2007). Additionally, Tian et al. (2021) found that a chemical called 6PPD-quinone, which derives from a preservative chemical used in tires, is associated with mortality of adult coho salmon when in high concentration.

None of the existing bridges or new bridges have scuppers that would drain stormwater directly into the stream channel below. The new bridge at Hely Creek and the widened bridge at Little Larabee Creek will have new bioswales added at either end of the spans. The bioswales are designed to provide stormwater treatment as the water infiltrates the ground. Therefore, road related contaminants and particles will be less likely to reach salmonid habitat in these streams.

At Butte Creek, stormwater will continue to flow from the roadway into roadside ditches and then down the embankment on the west end, and down the abutment on the east end. Similar to the current condition, stormwater flowing from the west end of the bridge will sheet-flow across approximately 50 feet of ground before reaching the stream, which will continue to provide some unknown level of stormwater infiltration and treatment. Water flowing from the east end will continue to receive very little treatment before flowing to the river. The bridge will be 23 feet longer than the current bridge, so some slight improvement in stormwater treatment may occur. Therefore, the new bridge will perpetuate delivery of stormwater and associated contaminants into the future at a level similar to the existing condition.

None of the new bridges will increase the amount of traffic on this highway, so NMFS does not expect increases of road-related contaminant deposition due to these projects. Potential delivery of traffic-related contaminants should be reduced at Hely and Little Larabee creeks, and remain similar to pre-project levels at Butte Creek. Existing levels of roadway-type contaminants on the highway are unknown, but are likely to be well below harm thresholds in these rural watersheds. Additionally, any rainwater that may contain contaminants would be immediately and significantly diluted upon entrainment into the flowing stream. Therefore, NMFS does not expect reductions in fitness of individual listed salmonids residing in the action areas due to toxic materials in stormwater runoff.

Accidental spills from construction equipment pose a significant risk to water quality, particularly for construction activities in or near watercourses, and at the onset of the rainy season when the first flush could trigger the discharge of spilled materials. However, in-stream activities would be suspended and all construction areas stabilized and cleaned prior to the onset of the rainy season. Furthermore, the proposed minimization measures are expected to prevent chemical contamination during construction. Given the proven minimization measures and BMP's proposed, NMFS expects the likelihood of an accidental spill of contaminants reaching a waterway at a level that would harm fish to be improbable.

2.5.3 Hydroacoustics

Caltrans conducted an analysis of potential hydroacoustic impacts that may expose fish to harmful levels of sound energy during pile driving and demolition. The analysis is provided in a report as Appendix C in Caltrans' BA (Caltrans 2021). The following effects analyses are based on this report, as well as NMFS staff's personal experience with pile driving operations. Additionally, the stream diversion at each site will limit exposure of coho salmon and steelhead to sound pressures.

Vibratory Pile Driving
Caltrans may use vibratory pile driving for initial installation of all temporary piles, and for any necessary sheet piles used for shoring. Compared to impact pile driving, vibratory pile driving generally produces more continuous, lower energy sounds below the thresholds associated with injury. There are currently no established noise thresholds associated with continuous sound waves, and vibratory methods are generally considered effective measures for avoiding or minimizing the risk of injury of fish from pile driving noise. Vibratory installation may cause behavioral reactions; however, these behavioral impacts are likely to be minimal in terms of reducing an individual juvenile salmonids' survival and fitness.

Impact Pile Driving
Caltrans evaluated potential underwater noise levels generated by planned construction activities, and determined that impact pile installation is unlikely to exceed currently adopted hydroacoustic noise thresholds that may cause injury to fish. Based on analyses provided in Caltrans' BA and confirmed by NMFS, single strike noise levels that may cause injury to fish (>206 dB re: 1 µPa) would not reach wetted areas of the creeks. Therefore, salmonids would not be exposed to single strike injurious noise levels.

Caltrans' BA provides the calculations used to determine the distances from the piles over which injury may be possible. (Injury thresholds and evaluation criteria are explained in section 1.3.4 of this opinion.) Based on conservative assumptions, Caltrans predicts that injurious cSEL's created during impact driving of H-piles could extend up to 35 meters from each pile at Hely Creek, 20 meters at Little Larabee Creek, and 55 meters at Butte Creek, and could therefore reach waters containing juvenile salmonids. However, Caltrans proposes hydroacoustic monitoring during impact pile driving to confirm avoidance of injurious levels of sound pressure, and activity will cease before injurious cSEL's are reached in a given day. (Details of the monitoring criteria are presented in section 1.3.4 of this opinion.) Therefore, NMFS agrees that real time monitoring will ensure that exposure of coho salmon and steelhead to injurious sound levels during pile driving will not occur.

Additionally, juvenile salmonids could be exposed to underwater noise levels exceeding the behavior thresholds (150 dB) without reaching the injurious cSEL threshold. Caltrans' analysis predicts that exposure to 150 dB sound levels would occur over a radius of no more than 100 meters from percussive activity. As explained in Caltrans' hydroacoustic analysis, transmission of sound in shallow water is limited compared to transmission is deeper open water, and this estimate is likely conservative and applies at all three sites.

Temporary behavioral changes that fish may exhibit in response to percussive noise include startling, altering behavioral displays, avoidance, displacement, and reduced feeding success. Observations of juvenile coho and steelhead exposed to pile driving noise above the 150 dB behavioral threshold at the Mad River Bridges Highway 101 project indicate that juvenile salmonids quickly habituate to the noise and resume normal surface-feeding behavior within a few minutes of the fist pile strikes (Mike Kelly, NMFS, personal observations 2009, 2011). Therefore, NMFS believes that periodic behavioral changes caused by sub-injurious sound exposure will not result in decreased fitness or survival of individual juvenile salmonids.

Demolition
Caltrans' hydroacoustic analysis found that potential noise from demolition that may affect salmonids is limited to work at Butte Creek where an impact hammer (hoe ram) will be used to remove a portion of the existing large boulder on the east bank. This work is necessary to accommodate the new abutment. Hydroacoustic analysis for this type of work is difficult to perform due to a lack of example data. However, due to the proximity of the boulder to waters outside of the stream diversion area, Caltrans assumes that injury threshold could be exceeded. Therefore, similar to the pile driving activity, underwater sound levels will be monitored, and work will cease before injury thresholds are exceeded. Also, as discussed above, NMFS believes that periodic behavioral changes caused by sub-injurious sound exposure will not result in decreased fitness or survival of individual juvenile salmonids.

2.5.4 Temporary Loss of Rearing Habitat

As described in Section 1.3.1 of this opinion, Caltrans will construct stream diversions at all three locations in both construction seasons. So, instream habitat in the stream diversion footprints will be unavailable to rearing salmonids between approximately June 15 through October 15 in each season. The unavailable habitat within the diversion at Hely Creek will be approximately 176 feet long. The unavailable habitat within the diversion at Hely Creek will be approximately 196 feet long. The unavailable habitat within the diversion at Hely Creek will be approximately 85 feet long.

The stream habitat that is temporarily unavailable is not high quality in terms of cover, depth, and structure, and significant rearing habitat is available elsewhere in the streams. Therefore, we believe this temporary loss of rearing habitat will not result in decreased fitness or survival of individual juvenile salmonids.

Additionally, given the proximity of the mainstem Van Duzen River (which becomes unfavorably warm in summer) to the bridge locations at Hely and Little Larabee creeks (which contain favorable water temperatures all summer) the creeks may serve as non-natal cool water rearing habitat in summer. NMFS believes that by June 15 most juvenile salmonids seeking cool water refugia would have likely migrated into these creeks, so we do not expect significant numbers of fish to have upstream passage blocked during construction. As described in section 1.3.1, downstream passage through the diversions will be provided through the gravity flow pipe, and upstream passage may be possible depending on the pipe's gradient and water velocity in the pipe. However, we do not expect enough juvenile coho or steelhead to be blocked by the diversions and overwhelm the available habitat downstream of the diversions, so individuals are unlikely to suffer decreased fitness or survival if upstream passage is blocked.

2.5.5 Effects to SONCC Coho and NC Steelhead Critical Habitat

Habitat requirements for both coho salmon and steelhead are very similar with only a few minor exceptions, as described in section 2.2. While critical habitat is designated only for SONCC coho salmon in the action area, we considered project-related effects to general steelhead habitat as they relate to survival of individual steelhead.

Riparian Vegetation Removal
Tree and vegetation removal at each site is described in section 1.3.1. Native species will be replanted and no net loss of plants is expected.

NMFS expects that the temporary loss of this riparian vegetation will have minimal impact on the functional values of existing riparian habitat given the small scale of the impact relative to the remaining trees in the action area; therefore, no measurable increase in water temperature or reduction in the amount of terrestrial food input into the streams is anticipated. Just one native conifer over three feet DBH at Hely Creek (4.5-foot DBH redwood) and one at Little Larabee Creek (3.5-foot Douglas fir) will be removed. Therefore, NMFS does not expect any appreciable changes to large woody debris recruitment to adjacent stream channels, so impacts to riparian vegetation are expected to be inconsequential to the overall value of salmonid habitat in the action area.

Additionally, as described in section 1.3.7 of this opinion, large wood habitat structures will be constructed at Hely Creek and Butte Creek. The installations will be designed by a licensed hydraulic engineer and plans will be provided to NMFS and CDFW for review prior to construction. The structure at Hely Creek is primarily intended to help reduce bank erosion, but structures at both sites would help offset any potential loss of large wood recruitment at these locations. (The channel at Little Larabee Creek is not appropriate for wood habitat structures due to stream energy caused by the gradient within the project limits.)

Streambanks and Streambed
Impacts to the banks and beds of the streams will be minimized per project design and BMP's, and we expect the beds and banks to naturally adjust to near pre-project conditions after the first high flows at Little Larabee and Butte creeks. As described in Section 1.3.3 of this opinion, the thalweg of Hely Creek will be rerouted to help reduce bank erosion in combination with the large wood structure described in the previous paragraph. The channel design will be submitted to NMFS and CDFW for review along with the large wood structure design. The adjustment of the channel at Hely Creek will depend on variables created by the design of the remaining channel. However, NMFS believes that a functional design that does not degrade habitat will result from agency collaboration. Therefore, NMFS believes that any impacts to the streambeds and streambanks due to construction of the large wood structures will not degrade habitat in the action area.

The new pier columns at Little Larabee Creek will result in approximately 120 square feet of new structure below the OHWM, but above the low flow channel. However, NMFS believes that covering 120 square feet of channel at this location will not have consequential impacts to habitat availability or stream hydrology.

2.5.6 Combined Effects

The potential exists for simultaneous construction-related impacts to have a synergistic effect that is greater or different than each stressor acting alone. Simultaneous project impacts may include visual impacts from workers and equipment working near or over the watercourses at the

same time that fish may be exposed to suspended sediment, for example. Most potential project impacts would not occur simultaneously due to logistics of construction that require one phase of the project to be completed prior to starting another. Because combined effects are either unlikely or of very low intensity, NMFS does not expect any reductions in listed salmonid fitness from any combined effects of individual construction elements at each site.

Additionally, we considered whether impacts at each location could be additive with the other locations. All three sites are in different subwatersheds and are no closer than 10 river miles apart. Therefore, NMFS believes that there will be no combined effects between individual locations.

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 in the environmental baseline (Section 2.4).

SONCC coho salmon and NC steelhead in the action areas are likely to be affected by future, ongoing non-federal activities, such as timber harvest, fishing activities, agriculture and rural development, and road construction. Water diversions contribute to diminished stream flows and warmer water temperatures, while agriculture may increase nutrients and degrade dissolved oxygen or water clarity. The future effects of 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 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 (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution.

2.7.1 Summary of Baseline, Status of the Species, and Cumulative Effects

We describe habitat for SONCC coho salmon and NC steelhead at the ESU and DPS scale as mostly degraded in section 2.2.2. Although there are exceptions, the majority of streams and

rivers in the ESU and DPS have impaired habitat. Additionally, this critical habitat often lacks the ability to establish fully functioning features due to ongoing and past human activities. While habitat generally remains degraded across the ESU and DPS, restorative actions have likely improved the conservation value of habitat throughout their ranges.

SONCC coho salmon in the action area belong to the Lower Eel and Van Duzen River population, which the NMFS SONCC Coho Salmon Recovery Plan indicates is at high risk of extinction and is likely below the depensation threshold (NMFS 2014). Steelhead in the action area belong to the Van Duzen River population of NC steelhead, which the NMFS NC Steelhead Recovery Plan indicates is likely well below the population level needed to be at a low risk of extinction (NMFS 2016).

The NC Steelhead Recovery Plan describes summer-run NC steelhead as a major life-history type and an important component of the DPS's viability. The California Fish and Game Commission (CFGC 2021) has recently listed summer-run steelhead as an endangered population within the NC steelhead DPS, and NMFS (2016) describes all summer-run populations as being at the highest level of threat due to climate change. Therefore, we pay particular attention to the proposed action's effects to summer-run steelhead in our assessment of the risk posed to NC steelhead as a result of implementing the proposed action.

The cumulative effects of those state and private activities that occur in the Van Duzen River watershed, as discussed in the environmental baseline section, may continue to impair, but not preclude the recovery of habitat in the action area. NMFS expects that ongoing improvements in legacy effects of poor timber harvest practices and agricultural development will result in improved habitat conditions for SONCC coho salmon and NC steelhead. Focused recovery actions as identified in the Recovery Plans (NMFS 2014, NMFS 2016) are expected to further improve habitat in the Van Duzen River. Additionally, due to the negligible nature of the proposed action's long-term impacts, NMFS does not expect the proposed action to exacerbate the effects of climate change on salmonids in the action area.

2.7.2 Summary of Effects to Individual Salmonids and Critical Habitat

NMFS anticipates miniscule effects to SONCC coho and NC steelhead, and their designated critical habitats from expected levels of hydroacoustic exposure, chemical contamination, temporary loss of riparian vegetation, disturbance of streambanks and streambed, or increased sediment and turbidity during various activities. However, adverse effects are likely due to capture, handling, and relocation efforts intended to protect fish from potential exposure to in-water work activity.

Hely Creek
NMFS predicts that up to 15 juvenile coho salmon and 30 juvenile winter-run steelhead could be handled during relocation in each of the two construction seasons. NMFS expects that no more than one juvenile coho salmon and two juvenile winter-run steelhead could be injured or killed due to handling and relocation during both construction seasons combined.

Little Larabee Creek
NMFS predicts that up to 35 juvenile winter-run and 15 juvenile summer-run steelhead could be handled during relocation in each of the two construction seasons. NMFS expects that no more

than two juvenile winter-run and one juvenile summer-run NC steelhead could be injured or killed due to handling and relocation during both construction seasons combined.

Butte Creek
NMFS predicts that up to two juvenile winter-run and 80 juvenile summer-run steelhead could be handled during relocation in each of the two construction seasons. NMFS expects that no more than one juvenile winter-run and five juvenile summer-run steelhead could be injured or killed due to handling and relocation during both construction seasons combined.

Overall Individual and Critical Habitat Effects
NMFS does not expect that the loss of one juvenile SONCC coho salmon would affect future adult returns. NMFS also does not expect the loss of five juvenile winter-run and six juvenile summer-run NC steelhead, which may be from a single cohort, or spread over multiple cohorts given the life history characteristics of steelhead, would affect future adult returns in any cohort. This loss of juveniles would represent a miniscule percentage of the overall number of individuals in each population. The overall number of individuals in the populations will likely provide a compensatory effect. Other areas of the Van Duzen and lower Eel River watersheds are expected to continue to contribute to the populations during the time period when some juveniles in the action area may be harmed or killed as a result of this proposed project. Therefore, NMFS does not expect any appreciable effects on VSP parameters, and thus, the proposed action is not expected to reduce the survival and recovery of the SONCC coho salmon ESU or the NC steelhead DPS, and the project is unlikely to appreciably diminish the value of designated critical habitat for the conservation of SONCC coho salmon and NC steelhead.

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 NC steelhead or destroy or adversely modify their designated critical habitats.

2.9. Incidental Take Statement

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

The take exemption conferred by this incidental take statement is based upon the proposed action occurring as described in section 1.3 of this opinion and in more detail in Caltrans' BA (Caltrans 2021).

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 juvenile coho salmon and steelhead may occur in the form of capture during fish relocation. For the total of all three sites combined, NMFS expects that no more than one juvenile coho salmon, five total juvenile winter-run steelhead, and six total juvenile summer-run steelhead would be injured or killed during capture and relocation to adjacent habitat, as detailed in sections 2.7.2 and 2.5.1 above.

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 and NC steelhead:

1. Undertake measures to ensure that harm and mortality to threatened coho salmon and steelhead resulting from fish relocation activities are low.
2. Ensure construction methods, minimization measures, and monitoring are properly implemented during construction.
3. Prepare and submit a post-construction report regarding the effects of fish relocation and construction activities.
4. Contact NMFS as soon as possible after final bridge designs are complete to ensure that the predicted impacts based on partial designs are as described in the BA and this opinion.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and Caltrans must comply with them in order to implement the RPMs (50 CFR 402.14). Caltrans 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. Qualified biologists with expertise in the areas of anadromous salmonid biology shall conduct fish relocation activities associated with construction. Caltrans will ensure that all biologists working on the project are qualified to conduct fish relocation in a manner which minimizes all potential risks to salmonids. A stream diversion and fish relocation plan that includes the qualifications of biologists conducting the fish relocation shall be submitted to the NMFS Arcata office not later than 30 days prior to stream diversion activities.
    b. Salmonids shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish must be kept in cool, shaded, and aerated water protected from excessive noise, jostling, or overcrowding or potential predators any time they are not in the stream, and fish will not be removed from this water except when released. Captured salmonids will be relocated as soon as possible to an instream location in which suitable habitat conditions are present to allow for adequate survival for transported fish and fish already present. Fish will be distributed between multiple areas if biologists judge that overcrowding may occur in a single area.
    c. If any salmonids are found dead or injured, the biologist will contact NMFS biologist Mike Kelly by phone immediately at (707) 825-1622. The purpose of the contact is to review the activities resulting in the take and to determine if additional protective measures are required. All salmonid mortalities will be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location, fork length, and be frozen as soon as possible. Frozen samples will be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS Northern California Office in Arcata, California without obtaining prior written approval from the South Coast Branch Chief. Any such transfer will be subject to such conditions as NMFS deems appropriate.

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

    a. Caltrans 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. Caltrans shall contact NMFS within 24 hours of meeting or exceeding take of listed species prior to project completion. Notify Mike Kelly by phone at 707-825-1622 or via email to Mike.Kelly@noaa.gov. This contact acts to review the

activities resulting in take and to determine if additional protective measures are required.

c. Caltrans shall make available to NMFS data from the hydroacoustic monitoring on a real-time basis (i.e., daily monitoring data should be accessible to NMFS upon request).

3. The following term and condition implements reasonable and prudent measure 3:

a. Caltrans shall provide a written report to NMFS by January 15 of the year following construction of the project. The report shall be sent to NMFS via email to Mike.Kelly@noaa.gov or via mail to Mike Kelly at 1655 Heindon Road, Arcata, CA 95521. The reports shall contain, at a minimum, the following information:

Construction related activities -- The report will include the dates construction began and was completed; a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects, and a statement as to whether or not any unanticipated effects had any effect on ESA-listed fish; the number of salmonids (by ESU and DPS) killed or injured during Project construction; and photographs taken before, during, and after the activity from photo reference points.

Fish Relocation – The report will include a description of the location from which fish were removed and the release site(s) including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding salmonid injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

4. The following term and condition implements reasonable and prudent measure 4:

a. Caltrans shall contact Mike Kelly via email at Mike.Kelly@noaa.gov or by phone at 707-825-1622 as soon as possible after the final bridge type selections and final designs are completed in order to discuss whether any changes from assumptions about potential impacts would require modification or reinitiation of this consultation.

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 regarding the development of information (50 CFR 402.02).

> NMFS recommends that larger trees removed to facilitate construction access be conserved for instream habitat enhancement. To maximize the habitat value of these trees they should have their root masses intact, which could be done by toppling with an excavator or other method, if feasible. Therefore, NMFS recommends that Caltrans coordinate with State Parks and other relevant agencies to place these trees in appropriate locations within project streams or other adjacent streams, or to use them as part of the proposed wood habitat structures.

2.11 Reinitiation of Consultation

This concludes formal consultation for the HUM-36 Three Bridges Project. As 50 CFR 402.16 states, 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 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 in a manner or to an extent not considered in this opinion, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion, or (4) a new species is listed that may be affected by the action.

2.12 "Not Likely to Adversely Affect" Determinations

Based upon known life history characteristics, stream access, and habitat conditions in the individual action areas, Caltrans does not expect CC Chinook salmon to be present during construction at Hely or Little Larabee creeks, or at any time of year at Butte Creek. Caltrans concludes that the Butte Creek action area lies outside of the range of Chinook salmon, and given the periodicity of rearing juvenile CC Chinook salmon, they would be expected to have outmigrated from Hely and Little Larabee creeks before construction begins in a given year. Therefore, no life stage of Chinook salmon would be present in the action areas during the construction season between June 15 and October 15 when adverse impacts are expected during dewatering and relocation. Caltrans concludes that potential impacts such as minor turbidity exposure post construction will have insignificant impacts to individual Chinook salmon. Additionally, Caltrans concludes that impacts to Chinook salmon critical habitat will be insignificant for the reasons detailed above for coho and steelhead habitat. Therefore, all of the effects of the proposed action would be discountable or insignificant for individual Chinook salmon.

Based on this analysis, NMFS concurs with Caltrans that the proposed action is not likely to adversely affect CC Chinook salmon or its designated critical habitat.

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 Caltrans 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 a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle. 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. Adverse effects may be 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.

There is suitable habitat for juvenile salmonid rearing, adult salmonid holding, and adult salmon spawning in the action area. Habitat Areas of Particular Concern (HAPC) are described as complex channel and floodplain habitat, spawning habitat, thermal refugia, estuaries, and submerged aquatic vegetation. HAPCs exist in the action area as: complex channel and

floodplain habitat, spawning habitat, and thermal refugia.

3.2 Adverse Effects on Essential Fish Habitat

The potential effects to salmonid habitat have already been described in the *Effects* section. The adverse effects to EFH and HAPCs in the action area include:

1. Temporary reduction in available habitat due to presence of stream diversion structures.
2. Noise and visual disturbance during construction activities.
3. Temporary reduction in water quality caused by increase in suspended sediments and turbidity during construction, and during the first rain events following construction.
4. Temporary loss of riparian vegetation.

3.3 Essential Fish Habitat Conservation Recommendations

The anticipated adverse effects from the proposed action are temporary and minor. However, NMFS has the following EFH recommendation:

> NMFS recommends that larger trees removed to facilitate construction access be conserved for instream habitat enhancement. To maximize the habitat value of these trees they should have their root masses intact, which could be done by toppling with an excavator or other method, if feasible. Therefore, NMFS recommends that Caltrans coordinate with State Parks and other relevant agencies to place these trees in appropriate locations within project streams or other adjacent streams, or to use them as part of the proposed wood habitat structures.

3.4 Supplemental Consultation

Caltrans 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 Caltrans. Other interested users could include CDFW and the Corps of Engineers. Individual copies of this opinion were provided to Caltrans. The document will be available within two 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 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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