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

September 13, 2024 **Refer to NMFS No:** WCRO-2024-00878

Dereck Wilson
District Manager, Northern California District
Bureau of Land Management
6640 Lockheed Drive
Redding, California 96002-0910

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Northwest California Integrated Resource Management Plan (NCIP)

Dear Mr. Wilson:

Thank you for your letter of April 10, 2024, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Bureau of Land Management's (BLM) Northwest California Integrated Resource Management Plan (NCIP). Thank you also for your request for essential fish habitat (EFH) consultation. NMFS reviewed the proposed action for potential effects on EFH pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation.

The enclosed framework programmatic biological opinion describes NMFS' analysis of the potential effects of NCIP on threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*); endangered Central California Coast (CCC) coho salmon (*O. kisutch*); threatened California Coastal (CC) Chinook salmon (*O. tshawytscha*); endangered Sacramento River (SR) winter-run Chinook salmon (*O. tshawytscha*); threatened California Central Valley (CCV) spring-run Chinook salmon (*O. tshawytscha*); threatened Northern California (NC) steelhead (*O. mykiss*); threatened California Central Valley steelhead (*O. mykiss*); threatened Southern distinct population segment (DPS) green sturgeon (*Acipenser medirostris*); and designated critical habitat for these species, 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 these ESA-listed species, nor is it likely to adversely modify designated critical habitat for these species.

The proposed action is a framework programmatic action, which is a Federal action that approves a framework for the development of future actions that will be authorized, funded, or carried out at a later time. Any take of a listed species would not occur unless and until those future action(s) are authorized, funded, or carried out and subject to further section 7 consultation (50 CFR 402.02). Therefore, NMFS is not providing an incidental take statement with this framework programmatic biological opinion.

NMFS also reviewed the proposed action for potential effects on EFH designated under the MSA (16 U.S.C. 1855(b)). This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. NMFS concluded that the action would adversely affect EFH designated under the Pacific Coast Salmon Fishery Management Plan. Therefore, we have included the results of that review in this document. NCIP includes adequate measures to avoid and minimize potential adverse effects to EFH. Thus, no EFH conservation recommendations are provided.

Please contact Julie Weeder in the Northern California Office at 707-702-1584 or julie.weeder@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Zane Ruddy, BLM, Arcata, California; jruddy@blm.gov
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Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Northwest California Integrated Resource Management Plan (NCIP)

NMFS Consultation Number: WCRO-2024-00878

Action Agency: Bureau of Land Management

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	If likely to adversely affect, Is Action Likely to Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	If likely to adversely affect, is Action Likely to Destroy or Adversely Modify Critical Habitat?
Southern Oregon-Northern California Coast coho salmon (*Oncorhynchus kisutch*)	Threatened	Yes	No	Yes	No
Central California Coast coho salmon (*O. kisutch*)	Endangered	Yes	No	Yes	No
California Coastal Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Sacramento River Winter-Run Chinook salmon (*O. tshawytscha*)	Endangered	Yes	No	Yes	No
Central Valley Spring-Run Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	Yes	No
Northern California steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
California Central Valley steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
green sturgeon Southern DPS (*Acipenser medirostris*)	Threatened	Yes	No	Yes	No

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

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

Issued By:

Alecia Van Atta
West Coast Region
National Marine Fisheries Service

Date: September 13, 2024

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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 framework programmatic biological opinion (opinion) portion of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, and implementing regulations at 50 CFR part 402. NMFS did not provide an incidental take statement (ITS) with this opinion since the proposed action is a framework programmatic action for the development of future actions that will be authorized, funded, or carried out at a later time. Any take resulting from subsequent actions that proceed under the framework programmatic action will be subject to ESA section 7 consultation and an incidental take statement, as appropriate.

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at the NMFS Northern California Office in Arcata, California.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 Fed. Reg. 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the Act. 89 Fed. Reg. at 24268; 84 Fed. Reg. at 45015. We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

1.2. Consultation History

On December 7, 2022, Bureau of Land Management (BLM) and BLM contractors initiated monthly meetings with NMFS regarding NMFS ESA and EFH consultation on BLM's Northern California Integrated Plan (NCIP), with the last meeting occurring in October 2023.

On October 10, 2023, BLM emailed NMFS a draft Biological Assessment (BA) for NMFS' review and comments. On October 19, 2023, BLM notified NMFS that the draft BA was not adequate and required major revisions before it would be ready for NMFS review. BLM and NMFS agreed to have staff meet on a weekly basis, with BLM providing NMFS with individual sections of the latest draft of the BA as they were completed in lieu of NMFS commenting on the October 10 version of the BA or the draft Environmental Impact Statement. BLM and NMFS staff coordinated weekly throughout the remainder of the BA development, beginning with the Proposed Action.

On January 19, 2024, BLM emailed NMFS a draft Riparian Management Areas (RMAs) proposed action section for review, and BLM provided the remainder of the proposed action sections on January 23, 2024. NMFS provided comments on the entire proposed action section to BLM via email on February 13, 2024.

On February 22, 2024, BLM emailed NMFS a partial draft BA to review. NMFS reviewed and provided comments to BLM via email on March 5, 2024.

On March 15, 2024, BLM emailed NMFS a complete draft BA that also included an EFH Assessment. The draft BA portion of the document included NMFS comments as in-line edits and comment bubbles, and the changes BLM made to text in response to those comments were all visible.

On April 9, 2024, NMFS emailed BLM comments on the March 15 draft BA/EFH Assessment.

On April 12, 2024, NMFS received an email from BLM that included a letter requesting initiation of ESA formal section 7 consultation for potential impacts on threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*); endangered Central California Coast (CCC) coho salmon (*O. kisutch*); threatened California Coastal (CC) Chinook salmon (*O. tshawytscha*); endangered Sacramento River (SR) winter-run Chinook salmon (*O. tshawytscha*); threatened Central Valley (CV) spring-run Chinook salmon (*O. tshawytscha*); threatened Northern California (NC) steelhead (*O. mykiss*); threatened California Central Valley steelhead (*O. mykiss*); threatened Southern DPS green sturgeon (*Acipenser medirostris*); and designated critical habitat for these species. The letter also requested consultation on EFH for species managed under the Pacific Coast Salmon Fishery Management Plan, pursuant to section 305(b) of the MSA. The April 2024 NCIP BA was also provided in the April 12, 2024 email.

On April 29, 2024, NMFS emailed BLM to confirm that the BA was sufficient to initiate ESA and MSA consultation as of April 12, 2024, and attached NMFS's additional comments on the draft March 15, 2024 BA for BLM's consideration.

On June 12, 2024, BLM transmitted an updated, reformatted BA to NMFS. This BA included revisions based on NMFS' comments provided on April 29, 2024.

In July 2024, NMFS clarified and BLM agreed that the NCIP action area includes all lands within the NCIP planning area boundary, and that BLM's geographic decision areas within the action area are expected to change over time as BLM disposes of and acquires lands.

On August 12, 2024, NMFS clarified and BLM agreed that BLM may include bioengineering techniques in projects including bank stabilization that are carried out under NCIP, for example along a road or other infrastructure.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). BLM's Northern California District's Redding and Arcata Fields Offices (FOs) are revising and updating the framework from which land management decisions are set forth (i.e. management direction) in their respective current resource management plans (RMPs). The planning process will result in the development of a single new RMP that will cover both FOs, titled "The Northwest California Integrated Resource Management Plan", or NCIP. The purpose of the NCIP is to make land use decisions to guide the management of BLM-administered lands within the planning area. The NCIP is a planning-level action that provides a framework for the development of future activity, program, and project-level action(s) that would be authorized, funded, or carried out at a later time. We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not. Under the MSA, "federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a federal agency (see 50 CFR 600.910).

The proposed action for BLM to adopt NCIP is a framework programmatic action, which is a Federal action that approves a framework for the development of future action that will be authorized, funded, or carried out at a later time. This type of programmatic action (80 FR 26832; May 11, 2015) sets up a framework for future, site specific actions that are subject to section 7 consultations and ITSs, but it does not authorize, fund, or carry out those future site-specific actions; and it does not include sufficient site-specific information to inform an assessment of where, when, and how listed species are likely to be affected by the program. Due to the nature of the action, no incidental take results when a framework programmatic biological opinion is issued. Implementation of the framework programmatic action itself, by definition, only established a decision-making framework for later actions. ESA consultations will occur when subsequent actions may affect listed species or their critical habitats. If incidental take is reasonably certain to occur and the proposed action is compliant with the requirements of section 7(a)(2), then an action-specific biological opinion and ITS will be provided that ensures any incidental take from the subsequent action under the framework programmatic action is addressed. Biological opinions on framework programmatic actions allow for a broad-scale examination of a program's potential impacts on a listed species and its designated critical habitat—an examination that is not as readily conducted when the later, action-specific consultation occurs on a subsequent action developed under the framework (80 FR 26832, 26836; May 11, 2015).

NCIP is composed of multiple RMP categories and numerous programs, and not all of them are expected to affect ESA-listed salmon, steelhead, and green sturgeon species and their designated critical habitats. Four RMP categories are designations or protected areas rather than programs with management activities (BLM 2024). These designations or protected areas generally prohibit certain activities from occurring to protect resource values. Actions that may take place within lands with these designations, and their natural resource impacts and effects to ESA-listed species or designated critical habitat are attributed to specific management programs, and the effects of those management programs are analyzed in this consultation. For example, if vegetation is proposed to be treated within an Area of Critical Environmental Concern (ACEC), the effects are attributed to the Vegetation program. The list of designations and protected areas is:

- Areas of Critical Environmental Concern,
- Wilderness Areas, Wilderness Study Areas, and Lands with Wilderness Characteristics,
- National Scenic and Historic Trails System,
- Wild and Scenic Rivers.

In addition to designations, there are 12 management programs that have no causal mechanism to impact ESA-listed salmon, steelhead, and green sturgeon species and their designated critical habitats, or which have no BLM management discretion (BLM 2024); and are, therefore, not analyzed in this consultation. These management programs are:

- Air and Atmospheric Values
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Cave and Karst
- Coastal Resource Management
- Climate Change
- Visual Resources
- Socioeconomic and Environmental Justice
- Tribal Interests
- Public Health and Safety/Hazardous Materials
- Education and Interpretation.

The NCIP Biological Assessment (BLM 2024) describes the following key information for each of the 13 resource programs that are likely to adversely affect ESA-listed salmon, steelhead, and green sturgeon species and their designated critical habitats: the Goals and Objectives their management is intended to achieve; the Management Direction that describes how they will manage the resource program; the Potential Management Activities they may carry out to manage the program; and the Best Management Practices (BMPs) they will draw from to avoid and minimize disturbance resulting from management of the resource program across the decision area. This section presents each resource program's goals and objectives, management direction, and potential management activities, and incorporates BMPs by reference to Appendix B of BLM (2024). Appendix B represents a library of BMPs that can be incorporated at the project level to minimize effects to listed species. During project development and ESA consultation with NMFS, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve the goals and objectives for the respective resource program while limiting impacts to sensitive species and their habitats.

All instream activities to implement NCIP that may affect ESA-listed salmonids and/or sDPS green sturgeon or their designated critical habitat will be carried out from June 15 to November 1 each year (except work windows in the Central Valley may be adjusted to avoid or minimize exposure to adult SR winter-run Chinook salmon and CV spring-run Chinook salmon, which spawn during the dry season in the upper Sacramento River and tributaries). Specific detail is given below on the 13 resource programs described in BLM (2024).

1.3.1. Riparian Management Areas

Riparian Management Areas (RMAs) are designated portions of the watershed most tightly coupled with streams and rivers that provide the ecological functions and processes necessary to create and maintain habitat for aquatic and riparian dependent organisms over time, as well as habitat connectivity within and between watersheds.

Due to human impacts, riparian forests throughout the action area consist primarily of dense, overstocked stands with many having more than 300 trees per acre. Riparian vegetation composition has shifted towards small to medium conifers and a loss of hardwoods, a trend common throughout the Pacific northwest. These young conifers use large amounts of water and outcompete other species, resulting in less riparian vegetative diversity than would occur naturally. Recent high severity fires within the action area, including the Carr Fire and August Complex, had several areas that exhibited high mortality rates in riparian areas due to unnaturally dense pre-fire conditions that left them susceptible to crown fires. This trend is expected to worsen with climate change. Forest health treatments in riparian areas would focus on thinning unnaturally dense stands and improving instream habitat complexity and wildlife habitat while increasing overall ecosystem resiliency to disturbances, including fire, pests and pathogens, and climate change. The desired outcome of the proposed treatments would be to create riparian forests with a variety of size and age classes, spatial heterogeneity, and species diversity in the overstory and understory, which will result in forests that are more resilient to future disturbances. Projects would incorporate the best available science for the forest or vegetation type, as well as the existing stand age and stream conditions (e.g. current amount of instream wood) to ensure important riparian functions such as stream shading and large wood recruitment are maintained or restored.

To accomplish the desired outcomes BLM will carry forward the Aquatic Conservation Strategy (ACS) Objectives from the Northwest Forest Plan (NWFP; USDA FS and USDI BLM 1994) as well as the NWFP RMA framework (USDA FS 2008), and proactively implement watershed restoration projects. As described in the BA (BLM 2024), Management Direction within RMAs is based on the ACS Standards and Guidelines, with the added requirement to incorporate all practicable BMPs at the project implementation level.

In addition, any activities to manage resources occurring within RMAs may not retard or prevent attainment of ACS objectives. This includes management of timber, roads, grazing, recreation, minerals, fire/fuels, and lands as well as watershed and habitat restoration, fish and wildlife management, and research. Wherever one of the following resource programs is managed within an RMA, the ACS objectives will restrict activities, rather than the management direction described under that specific resource program.

1.3.1.1. Goals and Objectives: RMAs

ACS Objectives

BLM will manage lands within the NCIP action area to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling the life history requirements of aquatic and riparian-dependent species.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
4. Maintain and restore the water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Where the BLM has the ability to influence water quality, water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of the individuals composing aquatic and riparian communities.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Additional Goals and Objectives

1. Contribute to the conservation and recovery of ESA-listed fish species and BLM Special Status aquatic or riparian-dependent species.
2. Manage forests to approximate the natural range of evapotranspiration in order to ensure water to riparian areas.

3. Maintain water quality and stream flows within the range of natural variability to protect water quality for water-based recreation and drinking water sources.
4. Meet water quality criteria identified in regional Water Quality Control Plans (Basin Plans).
5. Maintain high quality water and contribute to the restoration of degraded water quality for 303(d)-listed streams.

1.3.1.2. Management Direction: RMAs

Management direction defines the boundaries of RMAs and prohibits or regulates activities in RMAs that retard or prevent attainment of the ACS objectives. A site-potential tree height is the average maximum height of the tallest dominant trees (200 years or older) for a given site class. Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria. Fish-bearing streams are distinguished from intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the RMA boundaries for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.

Riparian Management Area Widths

RMAs are specified for the following five categories of streams or waterbodies:

Fish-bearing streams (including perennial, intermittent, and ephemeral) - RMAs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Permanently flowing (perennial) non fish-bearing streams - RMAs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Constructed ponds and reservoirs, and wetlands greater than 1 acre – RMAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

Lakes and natural ponds - RMAs consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.

Seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas - This category applies to features with high variability in size and site-specific characteristics. At a minimum, the RMAs must include:

- The extent of unstable and potentially unstable areas (including earthflows),
- The stream channel to the top of the inner gorge,
- The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation, and
- Extension from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest.

Specific protective measures relevant to each category of resource management within RMAs are described below.

Timber Management within RMAs

TM-1. Prohibit timber harvest, including fuelwood cutting, in RMAs, except as described below:

- Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting if required to attain ACS objectives.
- Salvage trees only when site-specific analysis determines that present and future coarse woody debris needs are met and other ACS objectives are not adversely affected.
- Apply silvicultural practices for RMAs to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain ACS objectives.

TM-2. Forest Health treatments would consider the placement of coarse woody debris in riparian areas where benefits have been identified and wood is available.

TM-3. Even-aged management would be prohibited.

Roads Management within RMAs

RF-1. Federal, state, and county agencies should cooperate to achieve consistency in road design, operation, and maintenance necessary to attain ACS objectives.

RF-2. For each existing or planned road, including temporary roads, meet ACS objectives by:

- Minimizing road and landing locations in RMAs.
- Completing site-specific analyses (including appropriate geotechnical analyses) prior to construction of new roads or landings in RMAs.
- Preparing road design criteria, elements, and standards that govern construction and reconstruction.

- Preparing operation and maintenance criteria that govern road operation, maintenance, and management.
- Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- Restricting sidecasting as necessary to prevent the introduction of sediment to streams.
- Avoiding wetlands entirely when constructing new roads.

RF-3. Determine the influence of each road on the ACS objectives. Meet ACS objectives by:

- Reconstructing roads and associated drainage features that pose a substantial risk.
- Prioritizing reconstruction based on current and potential impacts to riparian resources and the ecological value of the riparian resources affected.
- Closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to ACS objectives and considering short-term and long-term transportation needs.

RF-4. New culverts, bridges and other stream crossings shall be constructed, and existing culverts, bridges and other stream crossings determined to pose a substantial risk to riparian conditions will be improved, to accommodate at least the 100-year flood, including associated bedload and debris. Priority for upgrading will be based on the potential impact and the ecological value of the riparian resources affected. Crossings will be constructed and maintained to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

RF-5. Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.

RF-6. Provide and maintain fish passage for all life stages at all road crossings of existing and potential fish-bearing streams.

RF-7. Develop and implement a multi-tier sediment source assessment that would identify watersheds and determine current watershed condition and sediment inputs. BLM would use this information to prioritize watersheds for treatment to address sediment sources and reduce sedimentation.

Grazing Management within RMAs

GM-1. Adjust grazing practices to eliminate impacts that retard or prevent attainment of ACS objectives. If adjusting practices is not effective, eliminate grazing in RMAs.

GM-2. Locate new livestock handling and/or management facilities outside RMAs. For existing livestock handling facilities inside the Riparian Management Area, ensure that ACS objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities.

GM-3. Limit livestock trailing, bedding, watering, loading, and other handling efforts to those areas and times that will ensure ACS objectives are met.

Recreation Management within RMAs

RM-1. New recreational facilities within RMAs, including trails and dispersed sites, should be designed to not prevent meeting ACS objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within RMAs, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of ACS objectives.

RM-2. Adjust dispersed and developed recreation practices that retard or prevent attainment of ACS objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

RM-3. Wild and Scenic Rivers and Wilderness management plans will address attainment of ACS objectives.

Minerals Management within RMAs

MM-1. Require a reclamation plan, approved Plan of Operations, and reclamation bond for all locatable minerals operations that include RMAs. Such plans and bonds must address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-mining topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvage and replacement of topsoil; and seedbed preparation and revegetation to meet ACS objectives.

MM-2. Locate structures, support facilities, and roads outside RMAs. Where no alternative to siting facilities in RMAs exists, locate them in a way compatible with ACS objectives. Road construction will be kept to the minimum necessary for the approved mineral activity. Such roads will be constructed and maintained to meet roads management standards and to minimize damage to resources in the Riparian Management Area. When a road is no longer required for mineral or land management activities, it will be closed, obliterated, and stabilized.

MM-3. Avoid solid and sanitary waste facilities in RMAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RMAs exists, and releases can be prevented, and stability can be ensured, then:

- Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.
- Locate and design the waste facilities using best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in RMAs.
- Monitor waste and waste facilities after operations to ensure chemical and physical stability and to meet ACS objectives.

- Reclaim waste facilities after operations to ensure chemical and physical stability and to meet ACS objectives.
- Require reclamation bonds adequate to ensure long-term chemical and physical stability of mine waste facilities.

MM-4. For leasable minerals, prohibit surface occupancy within RMAs for oil, gas, and geothermal exploration and development activities where leases do not already exist. Where possible, adjust the operating plans of existing contracts to eliminate impacts that retard or prevent the attainment of ACS objectives.

MM-5. Salable mineral activities such as sand and gravel mining and extraction within RMAs will occur only if ACS objectives can be met.

MM-6. Include inspection and monitoring requirements in mineral plans, leases or permits. Evaluate the results of inspection and monitoring to affect the modification of mineral plans, leases and permits as needed to eliminate impacts that retard or prevent attainment of ACS objectives.

Fire/Fuels Management within RMAs

FM-1. Design fuel treatment and fire suppression strategies, practices, and activities to meet ACS objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuels management activities could be damaging to long-term ecosystem function.

FM-2. Locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of RMAs. If the only suitable location for such activities is within the Riparian Management Area, an exemption may be granted following review and approval by an authorized officer. The officer will prescribe the location, use conditions, and rehabilitation requirements. Use an interdisciplinary team to predetermine suitable incident base and helibase locations.

FM-3. Minimize delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following review and approval by an authorized officer, when an escape would cause more long-term damage.

FM-4. Design prescribed burn projects and prescriptions to contribute to attainment of ACS objectives.

FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan needed to attain ACS objectives whenever RMAs are significantly damaged by wildfire or a prescribed fire burning outside prescribed parameters.

FM-6. Manage upland ecosystems adjacent to riparian areas to reduce the risk of high severity fire, as the health of adjacent upland vegetation plays a crucial role in the resiliency of riparian areas to fire and other disturbances.

FM-7. In areas at risk for high severity fire, apply fuels reduction treatments in RMAs to manage the risk of high severity fire impacts in RMAs while working towards desired vegetation characteristics needed to acquire ACS objectives.

FM-8. Where RMA and fuels management Interface Zone overlap, projects would be designed to prioritize Interface Zone goals and objectives while not preventing or retarding the attainment of ACS objectives. Where projects may affect listed species, the projects would be coordinated with the appropriate regulatory agency [NMFS or U.S. Fish and Wildlife Service (USFWS)].

FM-9. In RMAs, the goal of wildfire suppression is to limit the severity of all fires. When fire management plans are completed and approved, some fires may be allowed to burn under prescribed conditions. Rapidly extinguishing smoldering coarse woody debris and duff should be considered to preserve these ecosystem elements. In RMAs, water drafting sites should be located and managed to minimize adverse effects on riparian habitat and water quality, as consistent with ACS objectives.

Land Management within RMAs

LH-1. Identify in-stream flows needed to maintain riparian resources, channel conditions, and fish passage.

LH-2. For hydroelectric and other surface water development proposals, require in-stream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies and Tribes. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require flows and habitat conditions that maintain or restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate state agencies.

LH-3. Locate new ancillary facilities outside RMAs. For existing ancillary facilities inside RMAs that are essential to proper management, provide recommendations to FERC that ensure ACS objectives are met. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Existing ancillary facilities that must be located in the RMAs will be located, operated, and maintained with an emphasis to eliminate adverse effects that retard or prevent attainment of ACS objectives.

LH-4. For activities other than surface water developments, issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of ACS objectives. Adjust existing leases, permits, rights-of-way, and easements to eliminate adverse effects that retard or prevent the attainment of ACS objectives. If adjustments are not effective, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact and the ecological value of the riparian resources affected.

LH-5. Use land acquisition, exchange, and conservation easements to meet ACS objectives and facilitate restoration of fish stocks and other species at risk of extinction.

General Riparian Area Management within RMAs

RA-1. Identify and attempt to secure in-stream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

RA-2 Fell trees in RMAs when they pose a safety risk. Keep felled trees on-site when needed to meet coarse woody debris objectives.

RA-3. Herbicides, insecticides, and other toxicants, and other chemicals shall be applied only in a manner that avoids impacts that retard or prevent attainment of ACS objectives.

RA-4. Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.

RA-5. Apply BMPs as applicable to minimize ground disturbance and meet ACS objectives.

RA-6. Remove invasive, nonnative species from riparian areas as necessary to maintain riparian health and function.

Watershed and Habitat Restoration within RMAs

WR-1. Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains ACS objectives.

WR-2. Cooperate with federal, state, local, and agencies, Tribes, and private landowners to develop cooperative agreements to meet ACS objectives.

WR-3. Do not use mitigation or planned restoration as a substitute for preventing habitat degradation.

WR-4. Use silvicultural practices to grow large trees in riparian areas. Appropriate practices may include planting unstable areas such as landslides along streams and flood terraces, thinning densely-stocked young stands to encourage development of large conifers, releasing young conifers from overtopping hardwoods, and reforesting shrub and hardwood-dominated stands with conifers. These practices can be implemented along with silvicultural treatments in uplands areas, although the practices will differ in objective and, consequently, design.

WR-5. Thin dense non-riparian vegetation to return evapotranspiration to natural levels of variability and increase dry season low flows.

WR-6. Prioritize restoration on guidance found in resources such as state and federal recovery plans, watershed assessments and plans developed by partner entities, current watershed restoration science, and through consultation with NMFS and USFWS. These resources will be used to identify areas of greatest benefit-to-cost relationships for restoration opportunities and greatest likelihood of success and can also be used as a medium to develop cooperative projects involving various landowners.

Fish and Wildlife Management within RMAs

FW-1. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of ACS objectives and the recovery of threatened and endangered species.

FW-2. Design, construct and operate fish and wildlife interpretive facilities in a manner that does not retard or prevent attainment of ACS objectives. For existing fish and wildlife interpretive facilities inside RMAs, ensure that ACS objectives are met. Where ACS objectives cannot be met, relocate or close such facilities.

FW-3. Cooperate with federal, and state fish management agencies and Tribes to identify and eliminate impacts associated with habitat manipulation, fish stocking, harvest and poaching that threaten the continued existence and distribution of native fish stocks occurring on federal lands.

Research within RMAs

RS-1. A variety of research activities may be ongoing and proposed in RMAs. These activities must be analyzed to ensure that significant risk to the watershed values does not exist. If significant risk is present and cannot be mitigated, study sites must be relocated. Some activities not otherwise consistent with the objectives may be appropriate, particularly if the activities will test critical assumptions of these standards and guidelines; will produce results important for establishing or accelerating vegetation and structural characteristics for maintaining or restoring aquatic and riparian ecosystems; or the activities represent continuation of long-term research. These activities should be considered only if there are no equivalent opportunities outside of RMAs.

1.3.1.3. Potential Management Activities: RMAs

The primary management activities within RMAs will be aquatic habitat restoration projects and forest health treatments as described in the Vegetation/Forestry section. Potential treatments may include forest thinning and prescribed burning to promote late seral conditions and remove encroaching conifers from oak woodlands and prairies. In some cases, forest health objectives may be accomplished with handwork only with all thinned material left on-site (e.g., lop and scatter). However, in cases where fuel loading is a concern, pile or broadcast burning may be necessary. Use of fire will be limited to burn windows that account for weather and site conditions in order to minimize burn severity. Mechanized equipment may be used for instream restoration and forest health projects when it is necessary to accomplish project objectives, which must be consistent with ACS objectives. Temporary equipment access routes may be necessary and will be decommissioned upon project completion. Activities to manage roads, grazing, recreation, minerals, fuels/fires, lands, fish and wildlife, and research will also occur with RMAs, as described further in the effects section. For all projects within RMAs, BLM will use equipment that results in the least amount of ground disturbance necessary to achieve project objectives.

1.3.1.4. Best Management Practices: RMAs

Best Management Practices applicable to RMA management are outlined in Appendix B of BLM (2024). The primary objective of these BMPs is to avoid and minimize disturbance across the decision area, with an emphasis on protecting water courses and aquatic habitat. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Restoration Activities (RST-01 to RST-13), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Recreation Management (REC-01 to REC-35), Livestock (G-01 to G-12), and Minerals Development (M-01 to M-09) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to soils and listed species to the maximum extent practicable.

Additional BMPs and minimization measures referenced in Appendix B include references to the BLM Integrated Vegetation Management Handbook, H-1740-2, Burned Area Emergency Stabilization and Rehabilitation Handbook, H-1472-1, and several large-scale programmatic EAs like the Statewide Wildland Urban Interface (WUI) Fuels Treatment Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve goals and objectives for RMAs while limiting impacts to sensitive species and their habitats.

1.3.2. Water Resources

The action area encompasses a variety of large rivers with heavily regulated flow, unregulated free-flowing watercourses, constructed ponds, and seeps and springs. The BLM manages on-the-ground activities to help minimize impacts on water resources both for resource values (e.g., watershed function, wildlife, fisheries, and riparian systems) within a framework of applicable federal water laws and agency policies. The BLM complies with applicable State water laws in the management of on-the-ground activities, as stated in the BLM Water Rights Manual Section 1.2.B (BLM 2013 in BLM 2024). States have primary authority and responsibility for the allocation and management of water resources within their borders except as otherwise specified by Congress. The BLM cooperates with State governments and complies with applicable state laws to the extent consistent with federal law to acquire, perfect, protect, and manage water rights to protect water uses identified for public land management purposes.

The proposed action contains several broad goals and objectives to improve the connectivity, condition, and resilience of waterways in the action area. These include restoring and reconnecting floodplains, limiting development in current and historical floodplains, and promoting hydrologic resilience in the face of climate change. Many water resources activities will occur adjacent to or within RMAs.

1.3.2.1. Goals and Objectives: Water Resources

- Restore previously disturbed floodplains to functional, hydrologically connected settings, where feasible given the possibility of other impacts and conflicts (example potential limitations: mercury in mine tailings, cultural sites, existing infrastructure).
- Avoid development in current and historical floodplains unless project design can retain or restore floodplain connectivity and function.
- Acquire water rights to protect sensitive aquatic species (e.g. listed anadromous fish).
- Develop guidance for new right of ways (ROWs) to avoid and minimize impacts to stream flows and aquatic resources.
- Ensure land management decisions consider stream flows and groundwater levels, conditions, and ecological impacts in project design and implementation.
- Develop opportunities for improving stream flows, particularly summer low flows, through project implementation, collaboration, and education.
- Identify management actions that promote hydrologic resilience and adaptive capacity in the face of climate change.
- Protect source water and identify other watersheds in need of special protection.

1.3.2.2. Management Direction: Water Resources

- Process-based restoration
    - Use low-tech methods, such as beaver dam analogs, as applicable, to improve habitat quality in perennial riparian areas, with goals that include decreasing sedimentation and increasing summer low flows, and increasing cold water.
    - Use stage-zero methods (e.g., filling stream channels with sediment), where appropriate, to help reset floodplains.
    - Coordinate with the State of California and other applicable agencies in supporting beaver reintroduction for riparian restoration, including habitat improvement.
- Develop and implement a multitier sediment source assessment that would identify watersheds and determine current watershed condition and sediment inputs. Use this information to prioritize watersheds for treatment to address sediment sources and reduce sedimentation.
    - Screen watershed priorities identified through the multitier sediment source assessment for restoration for those that provide opportunities to support basin-wide watershed restoration or management efforts of federal, State, local, Tribal, and other organizations.
    - Screen watershed priorities to provide opportunities to support BLM resource management needs, such as fisheries and wildlife, climate resilience, fire management, recreation, and public health and safety.
- Monitor water resources in coordination with river advocacy groups and other entities. Suggested variables include flow data, sediment flux, cyanotoxins, temperature, and maximum pool depth. Conduct water quality monitoring, as necessary, to comply with applicable laws and total maximum daily loads. Work with partners to continue water quality monitoring, as appropriate.
- Use watershed monitoring programs to educate the public and inform policy decisions.
- Where practicable, maintain hydrologic connections to vernal pool systems.

- Monitor water quality in and around formal and informal shooting areas on BLM-managed lands; if lead concentrations exceed standards, then implement the following options:
    - Limit target shooting on BLM-managed lands to non-lead or fully jacketed bullets.
    - If contamination continues, sign informal shooting areas to discourage further shooting.
    - If contamination continues, identify designated shooting ranges that are not adjacent to surface water resources and close informal shooting areas to shooting and if necessary, public access.
- Work with local government and stakeholders to address aquifer depletion and recharge, as applicable.
- Promote water quality in summer refugia consistent with recovery plans for anadromous salmonids to the extent feasible and consistent with federal law.
- Comply with the NMFS guidelines for diversions and screening to avoid or minimize the adverse effects of water diversion on ESA-listed salmonids.
- Manage watersheds to make progress toward meeting the goals of total maximum daily loads.
- Implement BMPs as detailed in the California BLM Best Management Practices Handbook (BLM 2021 in BLM 2024).
- Identify measures to ensure water availability for multiple-use management and functioning, healthy riparian systems.
- Pursuant to the Sustainable Groundwater Management Act, coordinate with groundwater sustainability agencies
- Continue to work to obtain water rights for the maintenance of natural resource values, as applicable and where available.
- Protect BLM-managed land, as applicable, to mitigate any impacts climate change may have on water sources.
- Where practicable, maintain and construct existing and new roads and trails to be hydrologically disconnected with frequent drainage, surface runoff dispersal, and appropriate surfacing.
- Reclaim any temporary roads to the BLM standards upon completion of specific projects. In some cases, this may include complete restoration to pre-disturbance conditions. Winterize temporary roads if they remain on the landscape during the wet season.
- For postfire road rehabilitation, stabilization, and upgrades, size drainage facilities to handle postfire runoff and the associated debris and sediment.
- Initiate filings with the State Water Resources Control Board to assert the BLM's federal water right under the Wild and Scenic Rivers Act (16 USC 1284(b) and (c)) to protect the free-flowing condition and outstandingly remarkable values.
- Initiate filings with the State Water Resources Control Board to assert the BLM's federally reserved water rights under the Wilderness Act (16 USC 1131, et seq.) to preserve the wilderness characteristics of designated wilderness areas.
- Ensure water diversions are subject to transparent, enforceable limits that prevent dry-season diversions entirely, and ensure wet-season diversions comply with the Department of Water Resources and CDFW regulations in relation to diversion rate, mechanisms, and water storage. If available and applicable, use the information in the BLM's Regional

Ecological Assessments for assessing drought and mitigation measures, and modify management per BLM policy to lessen impacts from drought.

- Implement measures to ensure adequate groundwater recharge, stream baseflow, water temperature, and water quality for native and ESA-listed fish and wildlife, with the goal of mimicking the natural flow regime in timing, magnitude, and duration.
- Wherever floodplain and riparian restoration is prioritized, exclude surface disturbing activities that damage restored (or to be restored) areas.
- Consider the withdrawal of floodplain restoration areas from locatable mineral entry (subject to valid existing rights) to allow for their recovery.
- Prioritize stream restoration projects for streams supporting anadromous fish habitat.
- Acquire additional water rights, where feasible, to manage and maintain wetland function. Examples include, but are not limited to, the Bend District and Battle Creek.

1.3.2.3. Potential Management Activities: Water Resources

The BLM may implement management activities to preserve water quality and function of watercourses on BLM lands. These activities may include adding in-stream wood, reconnecting floodplains, improving fish passage, low-tech instream structures (e.g., beaver dam analogs), adding sediment to channels as part of stage-zero restoration methods, removing invasive vegetation and planting native species, strategically removing levees, and targeted levee breaches to restore natural water flow. Low-tech structures can often be installed using hand tools and pounding stakes into the stream bed. Heavy equipment may be used in some cases to excavate off channel habitat or create structures to improve water quality and ecosystem function. Water rights-of-way requests may be authorized and are subject to a case-by-case analysis and must comply with applicable regulations.

1.3.2.4. Best Management Practices: Water Resources

BMPs applicable to water resources management are outlined in Appendix B of BLM (2024) and come from numerous handbooks and reference documents cited there. The primary objective of the water resources BMPs is to protect water quality and quantity. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Restoration Activities (RST-01 to RST-13), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Recreation Management (REC-01 to REC-35), Spill Prevention and Abatement (SP-01 to SP-08), Livestock (G-01 to G-12), and Minerals Development (M-01 to M-09) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to water resources and listed species to the maximum extent practicable.

The BMPs in Appendix B represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, resource availability, and potential impacts to water quality; to achieve water quality goals and objectives.

1.3.3. Soils

Soils vary greatly across the action area, with soil physical and morphological characteristics reflecting differences in topography (elevation, slope, and aspect), soil parent material (geology), living organisms (including soil organisms, wildlife, and vegetation communities), climate, and time. Variability in soil characteristics strongly influences land use and management as well as the relative resilience of soils to impacts from land use activities. Because of the complex topography and geology of the action area, differences in soil properties can be observed within short distances. Soils in the action area provide the foundation for habitat (e.g., vegetation or wildlife) and for resource uses (e.g., livestock grazing or recreation). Soil properties drive decision-making for optimal siting of infrastructure such as roads, trails, and facilities. Surface land uses can compact or displace topsoil and damage or remove vegetation or other ground cover, which may result in accelerated erosion and loss of soil productivity.

The proposed action contains broad goals and objectives to maintain proper functioning, site-appropriate soil conditions, and protect soil conditions from disturbances resulting from BLM management activities. In general, meeting these goals and objectives would help conserve the physical and biological properties of suitable habitats for listed plant and wildlife species and their critical habitats. Where these activities would occur within RMAs, the manner in which they would be carried out is described under Section 1.3.1 of this document and Section 2.2.1 of BLM (2024).

1.3.3.1. Goals and Objectives: Soils

- Manage BLM-authorized activities to make progress toward properly functioning soil conditions with soil properties appropriate to specific climate and landform. These properties include, but are not limited to, bulk density, infiltration and permeability rates, and moisture storage.
- Manage actions on BLM-managed lands in the action area to provide for long-term sustainability of soil, including protection from vegetation trampling and removal, soil compaction, and accelerated soil erosion.
- Maintain appropriate soil characteristics for carbon sequestration.
- Assist in the protection of prime and unique farmlands under the federal Farmland Protection Policy Act.
- Wherever practicable, encourage surface-disturbing development to be located in previously developed or disturbed areas.
- Implement proactive stabilization or other appropriate rehabilitation measures in response to human-caused or non-human-caused events that would impact public health and safety or sensitive ecosystem values.
- Prioritize proactive reclamation on abandoned mine lands subject to historic value considerations, and to reduce toxicity to streams.
- Prioritize road maintenance activities to reduce sediment and promote resiliency to storm impacts, administrative and public use.

1.3.3.2. Management Direction: Soils

- Surface-disturbing permitted activities would be determined on a case-by-case basis and would comply with a subset of chosen BMPs from the BMPs listed in Appendix B.
- Apply BMPs to avoid, minimize, and mitigate for BLM-permitted ground-disturbing activities that have the potential to generate nonpoint source sediment discharges.

- On a case-by-case basis, harden identified preferred routes that provide primary access to available resources, allowing for rehabilitation and restoration of redundant routes to reduce accelerated soil erosion and increased soil compaction. Implement this through implementation-level travel planning.
- In areas designated as open or limited for Off Highway Vehicle (OHV) use, monitor and identify thresholds for evaluating vulnerability to accelerated erosion and use BMPs and/or closures to limit erosion and delivery of sediment to aquatic resource areas, including anadromous fish streams.
- Promote maintenance of soil properties and vegetation conditions consistent with the potential/capability of the site.
- Conduct regular and routine monitoring of areas affected by BLM-permitted activities. Determine monitoring requirements on a project-by-project basis.
- To the extent possible, monitor changes to the landscape from wildfire and climate change. Use this information to prioritize stabilization and rehabilitation to protect human health and safety, important resource values, and the functions of critical ecosystems.
- Avoid, minimize, and reduce accelerated erosion and compaction from mining and other activities through use of BMPs, concurrent reclamation, and frequent monitoring.
- Contaminated soils would be remediated and disposed of per federal regulations.
- Restrict application of retardant foams and chemical suppressants consistent with applicable fire and resource management requirements.
- Unless otherwise stated by the BLM Authorized Officer, design roads to Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM, Forest Service, 2007), commonly referred to as the Gold Book, and require road construction to follow specifications mandated in the Updated Handbook for Forest, Ranch and Rural Roads (Pacific Watershed Associates 2015), as necessary.
- Prioritize high-severity burn areas, steep slopes, and areas with high erosion potential ratings for soil stabilization and erosion control efforts. Implement treatments commensurate with the values at risk.
- To minimize the loss of serpentine soils, prioritize restoration of impacted serpentine soils where practicable and where consistent with management goals for natural and cultural resources.
- Promote maintenance of soil properties and vegetation conditions consistent with the potential and capability of the site.
- Manage to avoid and minimize water quantity and quality impacts in RMAs and to be consistent with riparian habitat objectives (see the Riparian Management Area section).
- Develop and implement a multitier sediment source assessment that would identify watersheds and determine current watershed condition and sediment inputs. Use this information to prioritize watersheds for treatment to address sediment sources and reduce sedimentation.
- The following sensitive soil types/areas would be closed to mineral leasing, mineral material development, and ROW avoidance:
    - Decomposed granite,
    - Ultramafic/Serpentine,
    - Biological soil crusts.

- During implementation-level travel planning, close redundant routes in identified priority areas of the Grass Valley Creek Watershed to facilitate rehabilitation of sediment-impaired areas.

1.3.3.3. Potential Management Activities: Soils

Specific management activities for soils include the use of standard road maintenance equipment including dump trucks, graders, and excavators for activities including re-surfacing, promoting drainage, and upgrading and replacing culverts. Other activities could include planting vegetation using seeds or plugs to stabilize areas prone to run-off or erosion. Post fire burned area emergency rehabilitation, also addressed in the Wildland Fire Management section, would include additional activities like the installation of water bars, spreading mulch and other materials to reduce run-off and stabilize soils affected by high severity fire.

1.3.3.4. Best Management Practices: Soils

Best Management Practices applicable to soils management are outlined in Appendix B and come primarily from the BLM California BMPs for Water Quality. The primary objective of the soil BMPs is to avoid and minimize soil disturbance across the decision area, with an emphasis on protecting water courses from mobilized sediment. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Restoration Activities (RST-01 to RST-13), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Recreation Management (REC-01 to REC-35), Livestock (G-01 to G-12), and Minerals Development (M-01 to M-09) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to soils and listed species to the maximum extent practicable.

Additional BMPs and minimization measures referenced in Appendix B include references to the BLM Integrated Vegetation Management Handbook, H-1740-2, Burned Area Emergency Stabilization and Rehabilitation Handbook, H-1472-1, and several large-scale programmatic EAs like the Statewide WUI Fuels Treatment Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species.

1.3.4. Vegetation (including Special Status Species and Invasive, Nonnative Species) and Forestry

The proposed action describes a range of vegetation and forest management activities to maintain desirable conditions where they exist and improve conditions where they are degraded, or opportunities exist to increase resiliency and ecosystem function. Where these activities would occur within RMAs, the manner in which they would be carried out is described under Section 1.3.1 of this document and Section 2.2.1 of BLM (2024).

The proposed action would define and manage for the desired conditions for each vegetation cover type in the action area. Management actions (namely, vegetation treatments) would be implemented to facilitate movement toward desired conditions, including increased resistance and resilience to disturbance factors in the face of climate change. Vegetation treatments would be conducted to varying degrees in upland and riparian vegetation types. Potential treatments may include forest thinning to promote late seral conditions in Late Successional Reserves (LSRs), and removing encroaching conifers from oak woodlands and prairies. Treatment methods may include prescribed fire and manual, biological, chemical, and mechanical treatments. The proposed action does not specify the acres or miles of anticipated treatments; however, it includes goals and objectives to move ecological conditions toward desired outcomes. In general, management would result in long-term improvements in the condition and function of federally recognized plant and wildlife habitats.

Under the proposed action, all forest management projects will be for forest restoration or fuels reduction. Timber management activities in LSRs will be implemented with the primary objective of accelerating the development of late seral stage forest characteristics. No even aged management is proposed in this RMP and revenue generated from forest management activities will be a byproduct of forest restoration and fuels reduction goals. Post-treatment canopy cover will vary throughout the plan area due to variation in ecosystems in the region but will be driven by wildlife, riparian, and aquatic habitat needs.

The proposed action includes numerous management actions to incorporate managed and prescribed wildland fire for resource benefit, including to improve vegetation conditions and function, improve wildlife habitat, and help listed species' recovery. Uncharacteristically intense and large wildfires have become a significant threat to federally listed species in the action area. Over the long term, promoting fire resilience would improve wildlife habitat by reducing the risk of catastrophic wildfire, which is a threat to many wildlife species. Prioritizing treatments in and around ACECs and late-successional forests, and in cases to increase Northern spotted owl habitat, would make these areas more resilient to disturbances such as wildfire, insects, and disease. This would result in increased forest health, habitat availability, and habitat quality for late-successional and old-growth-related species, particularly in areas such as the Butte Creek ACEC and mapped LSRs.

The boundaries of mapped LSRs (78,600 acres) would remain the same as they are under current management; these areas would be managed to protect and enhance LSR conditions and to remain resilient to disturbances. The BLM will maintain key ecological features, such as snags and large downed logs, and retention of late-seral characteristics. Protecting old-growth forest characteristics would ensure old-growth habitat remains in sufficient quantity to support dependent species, even as treatments may alter some features in the vegetation community (for example, a reduction in fuels loading may reduce understory density).

The BLM would manage non-LSR forests for habitat heterogeneity rather than focusing on late-successional forest and mature forest. The BLM would provide for a variety of forest structural stages distributed both spatially and temporally, including complex early successional ecosystems. Providing heterogeneity in forest structure would increase habitat diversity and resilience. Structural heterogeneity and diversity of forest habitats support aspects of habitat for multiple special status species. Over the long term, this would contribute to the maintenance and recovery of species that require heterogeneous habitat for cover and prey species, and high canopy cover.

1.3.4.1. Goals and Objectives: Vegetation/Forestry

- Identify the desired composition and range of conditions for vegetation communities throughout the decision area.
- Manage vegetation and native plant communities in order to optimize plant community health and resilience to landscape-wide impacts.
- Engage local, state, tribal, and federal partners in program and project design to address vegetation management issues, while minimizing or avoiding impacts and proactively conserving special status plant species and their habitats across jurisdictional boundaries, or in essential connectivity corridors.
- Inventory and monitor special status species and their habitats to contribute to a greater understanding of their abundance and distribution and to facilitate implementation of conservation and recovery actions within the action area.
- Implement recovery actions for listed species with NMFS and USFWS recovery plans such that the measurable results of these actions contribute to meeting delisting criteria for a given species.
- Limit impacts on sensitive plant species from OHV use in high-use OHV areas.
- Manage vegetation to support fish and wildlife habitat, and healthy watersheds.
- Manage vegetation to support sustainable resource uses and economic stimulation, such as recreational hunting and fishing, special forest products, forestry, livestock grazing use, or carbon offsets or credits.
- Enable forests to recover from inadequate past management measures.
- Enable forests to respond beneficially to climate-driven stresses, wildfire, and other disturbance with resilience.
- Ensure beneficial or neutral ecological impacts from wildfire.
- Enable forests to contribute to the recovery of federally listed species, including salmonids and Southern DPS green sturgeon.
- Identify the desired composition and desired range of forest health conditions throughout the forests and woodlands.
- Identify which characteristics (indicators) BLM should use to describe healthy forest conditions (that is, desired outcomes) for forest and woodland types found within the action area.
- Identify the desired level of forest health treatments.
- Continue to place emphasis on a proactive fuels management program.
- Allow fire to play a more natural role in the action area’s ecosystems.
- Reduce or modify fuel loads to prevent harm caused by catastrophic wildfires.
- Reduce the potential for conversion of forests to non-forests.

1.3.4.2. Management Direction: Vegetation/Forestry

Management Direction: Vegetation

All Vegetation Cover Types

- Manage vegetation cover types in the action area for a heterogenous patchwork of habitat types that provides for conservation of federally listed and BLM sensitive plant species.
- Incorporate BMPs for rare habitats into fire response activities.

- Prioritize active management needs for BLM sensitive species, including those that are adapted to disturbance.
- Implement actions to promote the recovery of threatened and endangered species.
- Implement actions to prevent sensitive species from becoming threatened and endangered.
- Implement actions to prevent species from being added to the BLM sensitive or federally listed species list.

Chaparral Shrubland

- Manage resilient, diverse, and heterogeneous chaparral communities that provide wildlife habitat.
- Implement strategic vegetation treatments (prescribed fire and mechanical treatments) to promote regeneration and provide habitat heterogeneity, where appropriate.

Coastal Forests

- Continue to manage coastal forest (Sitka spruce and beach pines) while maintaining recreational access.
- Protect coastal grassland communities with targeted conifer removals, including converting forests in historical grassland areas to functioning prairies, where appropriate.
- Manage to maintain Sitka spruce and allow for natural processes to occur.
- Allow dunes and associated vegetation communities to migrate into coastal forests in response to sea level rise.

Coastal Prairies

- Implement woody vegetation removal projects to enhance and restore coastal grassland communities.
- Use prescribed burning to promote native grassland species and restoration outcomes.
- Plant native grassland vegetation, including native forbs, which support pollinator habitat.
- Where appropriate, promote below-ground carbon sequestration through both soil amendment and planting of native vegetation.

Douglas Fir and Tanoak-Dominated Forest

- Where appropriate, implement restoration of Douglas-fir tanoak forest conducting projects to promote late seral stand characteristics.
- Focus treatments in areas with sudden oak death (SOD) and at risk of SOD spread to slow the spread of SOD, encourage resistance to SOD, and mitigate the effects of mortality.
- To decrease the hardwood component, conduct proactive planting strategies for conifers.
- Conduct vegetation treatments to reduce evapotranspiration and provide for increased summer stream flows, where appropriate.

Fallow Fields and Croplands (Walnut Orchards, Abandoned Fields, Etc.)

- Restore agricultural fields or areas of degraded habitat to healthy communities of native vegetation.
- Use mechanical and chemical treatments to remove nonnative crop species.
- Implement native seeding treatments to maintain or improve the native seed bank and natural regeneration.
- Permit prescribed fire to combat nonnative and invasive populations and promote native species regeneration.

Oak Woodland

- Reduce conifer encroachment and enhance regeneration of oak species and the associated understory plant communities.
- Preserve patches of oak found in conifer forests. Retain mature, healthy oak trees as seed trees whenever possible.
- Manage oak woodland, where appropriate, to maintain functionality of riparian habitat.

General Riparian

- This cover type is a subset of all previously mentioned vegetation cover types. Refer to the Riparian Management Area section for further detail.

Grasslands, Vernal Pools, and Wetlands

- Promote native species diversity to support pollinator and wildlife habitat.
- Implement prescribed fire treatments, where applicable, to stimulate native species growth.
- Maintain, enhance, and restore native perennial grassland community composition, including forbs and other grassland species.
- In grasslands connected to vernal pool habitat, maintain and improve hydrologic connectivity and flow, where appropriate.
- Restrict fire suppression activities in vernal pools to minimize resource damage, unless otherwise approved by the BLM Authorized Officer.
- Maintain and improve hydrologic connectivity and flow in wetland habitat. Implement water projects, as practicable, to enhance and restore wetland habitat.

Juniper and Sagebrush

- Control juniper expansion into historical sagebrush habitat.
- Maintain a diverse ecosystem of sagebrush steppe with native perennial grass understory.
- Maintain old-growth juniper for wildlife habitat.

Knobcone

- Where knobcone stands are close to communities and infrastructure, manage these stands to reduce the impact of high-intensity wildfire on the communities and infrastructure.

- Manage vegetation communities to reduce the risk of high-severity fire, which could lead to the establishment of a knobcone monoculture.

Late-Successional Forest

- Manage for older, more structurally complex, multilayered forests using a mix of treatment methods, as appropriate.
- Manage for snag and coarse woody debris components in the ecosystem.
- Manage late-succession conifer forest, where appropriate, to maintain the functionality of riparian habitat.

Mixed Conifer

- Manage for stand growth and decreasing stem density to develop late-successional forest characteristics, where feasible.
- Promote a heterogenous patchwork of structure types and compositions, maintaining oak components as appropriate.
- Implement projects that increase resilience to pests and pathogens.
- Conduct vegetation treatments to reduce evapotranspiration and provide for increased summer stream flows, where appropriate. Manage upland vegetation to support riparian function.
- Consider climate change, shifts in habitat suitability, and species distribution shifts in project design and implementation.

Oak Savannas and Open Woodlands

- In valley and blue oak areas, focus on ensuring adequate regeneration, especially in converted agricultural fields where natural regeneration is extremely limited. Whenever possible, retain mature, healthy oak trees as seed trees.
- Manage to encourage a healthy, heterogenous size class distribution of oak species.
- Reduce annual invasive species to the maximum extent possible, especially highly damaging species such as medusa head and cheatgrass.
- Continue the restoration, maintenance, and enhancement of native annual and perennial grass and forb populations, where feasible. Manage conifer and shrub encroachment by performing a mix of treatment methods. Manage oak woodland, where appropriate, to maintain functionality of riparian habitat, including vernal pools.

Rare Cypress Forest

- Manage to increase the frequency of disturbance to enhance regeneration and health.
- Manage for increased regeneration of rare cypress by addressing conifer encroachment through a mix of treatment methods.

Valley-Foothill Riparian

- Restore areas of degraded habitat to healthy, diverse native vegetation communities.
- Manage for elderberry maintenance and restoration.

- Prioritize acquisition and restoration of land that creates habitat connectivity.
- Manage riparian areas to allow for natural stream processes, including floodwater access to floodplains.
- Work with agency partners and surrounding landowners to mitigate and restore this habitat.
- Implement mechanical, chemical, and biological treatments to combat invasive plant populations.

Management Direction: Forestry

- Do not change the boundaries of mapped LSRs (78,600 acres; BLM 2024). Manage LSRs to protect and enhance conditions of late-successional forest ecosystems. Do not carry forward the concept of the "unmapped LSR" from the NWFP.
- Prioritize forest health and fuels treatments to increase resilience of stands from disturbance events, improve forest health, and reduce tree mortality. Special consideration would be given to ACECs and late successional forest communities.
- Implement forest health and fuels treatments that promote fire resilience, recognizing the role that natural fire regimes historically played in protecting forest stands from catastrophic fire. Consider climatic shifts in vegetation and identify reforestation plantings to best maintain ecosystem health and function.
- Consider climatic shifts in vegetation when determining what type of planting should be done. Prioritize restoring minor habitat types across the landscape.
- In harvested or disturbed areas, ensure the establishment and survival of desirable trees appropriate to the site and enhance their growth. Provide for complex early successional ecosystems.
- Provide for a variety of forest structural stages distributed both spatially and temporally. Increase the diversity of stocking levels and size classes within and among stands.
- Manage vegetation cover types in the action area for a heterogeneous patchwork of habitat types that provides for conservation of federally listed and BLM sensitive plant species.
- Incorporate BMPs for rare habitats into fire response activities.
- Prioritize active management needs for BLM sensitive species, including those that are adapted to disturbance.
- Implement actions to promote the recovery of threatened and endangered species.
- Implement actions to protect sensitive species from becoming threatened and endangered.
- Implement actions to prevent species from being added to the BLM sensitive or federally listed species list.

Management Direction: LSRs

- Do not change the boundaries of mapped LSRs (78,600 acres; Appendix A, BLM 2024). Manage LSRs to protect and enhance conditions of late-successional forest ecosystems, which serve as habitat for late-successional related species, including the NSO. Do not carry forward the concept of the "unmapped LSR" from the NWFP.
- All activities within RMAs would be subject to restrictions described in Section 2.2.1 of BLM (2024).

- Management activities could include commercial timber harvest and harvest of special forest products to ensure LSRs remain resilient to fire, pests, pathogens, and climate change.
- Timber and other forest products would only be removed as a byproduct of restoration.
- Thinning treatments must maintain or protect wildlife habitat and corridors or plant habitat, which could include increasing stand heterogeneity.
- Post-treatment canopy cover will be maintained to promote late seral characteristics, fire resilience, and wildlife habitat.
- Maintain sufficient snag and downed woody debris to provide nesting, roosting, and foraging habitat for federally listed species. Maintain the complexity of habitat types within stands and across the landscape. Avoid uniform treatment of stands.
- Even-aged management would not be conducted in LSRs.

Management Direction: Forested Areas (Not LSRs)

- The promotion of late-seral characteristics and habitat heterogeneity that collectively benefit wildlife and riparian habitats, recreational needs, cultural resources, community stability, and commodity production, including commercial timber and other forest products would be prioritized.
- Increase stand and landscape-level heterogeneity, including species, size, and age class diversity.
- Where appropriate, promote late successional forest development by decreasing density which helps increase stand growth and the development of multi-cohort stands.
- Prepare stands for the reintroduction of fire into historically fire-dependent ecosystems.
- Consider climate change, shifts in habitat suitability, and species distribution shifts.
- The primary goal(s) of all thinning treatments are to create or maintain forest health and fire resilience, while protecting wildlife habitat and corridors or plant habitat, which could include increasing stand heterogeneity.
- Increase stand and landscape-level heterogeneity, including habitat type, species, size, and age class diversity.
- Maintain sufficient snag and downed woody debris to provide nesting, roosting, and foraging habitat for federally listed species. Maintain the complexity of habitat types within stands and across the landscape. Avoid uniform treatment of stands.
- Post-treatment canopy cover will be maintained to promote late seral characteristics and wildlife habitat.
- In areas adjacent to infrastructure, thinning treatments may be conducted, where necessary, to reduce risk of catastrophic fire.
- All activities within RMAs would be subject to restrictions described in Section 2.2.1 of BLM (2024).
- Even-aged management would not be conducted.
- Moderately thin early to mid-seral stage stands to accelerate the growth of the remaining trees, thus developing them into structurally diverse, more open stands dominated by large trees that are more resilient to fire, insects, disease, and wind.
- Late-seral stands that are not designated as LSRs would only be thinned to increase the resilience to fire and protect late-seral stand characteristics.
- Create vertical and horizontal heterogeneity and develop spatial heterogeneity, including gap creation.

- Where feasible, recover economic value from timber following disturbances, such as fires, windstorms, disease, or insect infestations.
- Provide for complex early successional ecosystems.

Management Direction: Nonnative and Invasive Terrestrial and Aquatic Species

Any herbicide use will:

- be consistent with guidance documents detailed in Section 2.2.4 of BLM (2024) and follow state regulations and guidelines.
- comply with the applicable management objectives, standards, and guidelines of the NWFP. Those standards and guidelines providing the most benefits to late-successional forest-related species will apply.

1.3.4.3. Potential Management Activities: Vegetation Management

Vegetation management serves various objectives for ecological restoration, timber harvest, reforestation, fuels treatments to reduce fire hazards, forest health enhancement, range land improvement, watershed restoration, and enhancement of wildlife habitats. Potential treatments for vegetation management include mechanical and manual treatments that would vary based on site-specific conditions and goals but would involve the use of hand pulling, mechanical tools, such as plows, chainsaws, mowers, masticators, and harrows. When conducting restoration or reclamation efforts for a variety of vegetation cover types, planting of native seed may occur through temporary irrigation, berming (to improve drainage and soil aeration), broadcast seeding, disking, drill seeding, tilling, mechanical planting, planting tree plugs, and performing seed collection. Invasive plant removal may occur through a variety of methods, including biocontrol (i.e., use of approved insects or organisms), burying of plants (i.e., Himalayan blackberry), approved application of herbicide use, fencing off areas from use, and hand or mechanical means of removal. Targeted grazing (i.e., sheep or goats) or terminal leader thinning may also be employed for reduction of invasive plant species. Under the NCIP, herbicide and pesticide use would be consistent with programmatic guidance cited in Section 2.2.4 of BLM (2024) and applicable subsequent programmatic guidance. The BLM would adhere to design features in these documents, which include measures to reduce potential effects of herbicide use on listed plants and wildlife.

To reduce soil erosion and promote seed growth when performing vegetation management activities, straw wattles, silt fences, and weed mats may be used. Monitoring would be performed to determine if additional treatments are needed to achieve the identified objectives for vegetation treatments or to determine if seed growth is successful. When conducting monitoring efforts, visual inspections, installing cameras to remotely view progress, and undertaking research to be up to date with the latest methods and science could be performed to better achieve project objectives on a case-by-case basis.

Forest health projects may include commercial thinning in overstocked stands and areas with dead and dying trees. Various timber harvest methods could be used, which may involve the installation of temporary roads and landings, cutting and falling of trees, skidding (dragging or pulling trees to a central location), yarding or forwarding (moving trees from the stump to an accessible central location) using a skidder, forwarder or cable yarder, and decking to arrange downed trees in a pile at a landing after being harvested. Helicopters may be used in unique circumstances to assess forest health and monitor tree populations or to employ selective logging in difficult-to-reach or environmentally sensitive areas. Reforestation may be conducted in a variety of vegetation types, particularly in conifer stands where timber harvesting has occurred, to improve stand heterogeneity and improve wildlife habitat diversity. Activities may include preparing sites to remove excess fuels and competing vegetation through mechanical means (as described above) or manual piling, lop/scatter, piling and burning, broadcast burning, tree planting (by placement of tree plugs or natural seeding), applying biochemical or herbicide treatments to reduce competing vegetation, and managing stands to thin or replant specific areas gradually (typically those areas that are recovering from wildfire).

1.3.4.4. Best Management Practices: Vegetation Management

Best Management Practices applicable to vegetation management are outlined in Appendix B of BLM (2024) and come primarily from the BLM California BMPs for Water Quality. The primary objective of the vegetation resources BMPs is to protect water quality. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Livestock G-01 to G12), Restoration Activities (RST-01 to RST-13), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Spill Prevention and Abatement (SP-01 to SP-08), Wildland Fire (WF-1 to WF-3) and Pesticide Application (P-1) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to listed species from vegetation management to the maximum extent practicable.

Additional BMPs and minimization measures referenced in Appendix B of BLM (2024) include references to the BLM Integrated Vegetation Management Handbook, H-1740-2, Burned Area Emergency Stabilization and Rehabilitation Handbook, H-1472-1, and several large-scale programmatic EAs like the Statewide WUI Fuels Treatment Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs and Minimization measures represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve goals and objectives for vegetation resources management while limiting impacts to sensitive species and their habitats.

1.3.5. Wildlife (including Special Status Species and Invasive, Nonnative Species)

BLM (2024) includes sections (see section 2.2.5) that focus on wildlife species and species groups for which management direction affects the recovery, maintenance, control, or improvement of wildlife populations and their habitats. These include special status species (ESA-listed and BLM sensitive species), invasive wildlife species, and other/general wildlife, including bats, migratory birds, game birds, waterfowl, big game, small game, reptiles, and amphibians. The large area and diverse ecosystems in the action area provide habitat for a multitude of wildlife species, including numerous birds, bats, mammals, reptiles, amphibians, and insects.

The proposed action includes wildlife-specific management direction to implement actions that comply with protections provided under the ESA (16 USC 1531–1544), species-specific recovery plans, and BLM sensitive species policies (BLM Manual Section 6840 in BLM 2024). These all include guidance on how to limit effects on and maintain or improve habitat for special status species, including listed species and critical habitats. The goals and objectives, management direction, potential management activities, and BMPs for BLM's Wildlife program are detailed in BLM (2024) rather than enumerated here, because the effects of this program are less relevant to NMFS species and their designated critical habitats than those of other programs, so the effects analysis in this opinion does not refer to these specific details of the Wildlife Program.

1.3.6. Fish (including Special Status Species and Invasive, Nonnative Aquatic Species)

Aquatic habitats within the action area are diverse and consist of rivers, streams, springs, seeps (generally referred to as lotic or flowing systems) and lakes, reservoirs, and ponds (generally referred to as lentic or still water systems), which provide year-round (perennial) or seasonal (intermittent) habitat for fish, aquatic invertebrate, amphibian, and reptile species. Management direction for fish is largely the same as described for RMAs, above. This includes riparian and aquatic habitat conservation that would provide protections for listed fish species and their habitats.

1.3.6.1. Goals and Objectives: Fish

- Manage the NCIP action area to protect and restore watershed conditions to support populations of fish and other aquatic species.
- Coordinate fisheries management with Tribes, NMFS, and CDFW.
- Seek to conserve endangered and threatened aquatic species and use the BLM's authority in a manner that assists in the conservation and recovery of listed species. This includes conducting actions recommended in State and federal recovery plans, to improve conditions and abate threats to listed species on BLM-managed lands.
- Manage for riparian habitat objectives, which can be found in the RMAs section (0).

1.3.6.2. Management Direction: Fish

- For all BLM internal projects and all BLM-permitted activities, implement pertinent BMPs (see Appendix B of BLM 2024).
- Continue to coordinate with the Trinity River Restoration Program.
- Work with Tribes to identify strategic land for future acquisition by the BLM to protect anadromous fish habitat.
- Continue to develop cooperative management relationships with private landowners, stakeholders, Tribes, and State and federal agencies to effect coordinated management consistent with restoration of anadromous fisheries.
- Continue to prioritize the removal and suppression of nonnative and invasive species where removal and suppression can be effectively implemented to support native species populations.
- Continue to prioritize restoration remediation to maintain the health of aquatic ecosystems.
- Manage RMAs as described in the RMAs section (0).

1.3.6.3. Potential Management Activities: Fish

The BLM may implement a variety of activities to restore sensitive fish and aquatic species populations and their habitats. These activities would promote natural processes to enhance the aquatic ecosystem, and may include instream wood structures and beaver dam analogs to create natural habitats, invasive plant removal to mitigate threats to fish habitats, floodplain reconnection and restoration, and levee breaching or removal to restore natural water flow to enhance fish habitats. Through a comprehensive approach, the BLM aims to protect and restore the ecosystems that support ESA-listed fish and other aquatic species.

1.3.6.4. Best Management Practices: Fish

Best Management Practices applicable to fish and aquatic species management are outlined in Appendix B of BLM (2024) and come primarily from the BLM California BMPs for Water Quality. The primary objective of the fish and aquatic species management BMPs is to protect water quality and quantity during and following restoration activities. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27) and Restoration Activities (RST-01 to RST-13) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to listed species to the maximum extent practicable.

Additional BMPs and minimization measures referenced in Appendix B include references to the BLM Integrated Vegetation Management Handbook, H-1740-2, Burned Area Emergency Stabilization and Rehabilitation Handbook, H-1472-1, and several large-scale programmatic EAs like the Statewide WUI Fuels Treatment Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs and Minimization measures represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve goals and objectives for fish resources management while limiting impacts to sensitive species and their habitats.

1.3.7. Wildland Fire Management

The NCIP action area comprises fire-adapted vegetation communities that range from Oak Savanna and Chaparral Shrubland to Coastal Forests and Late Successional Conifer Forest. The fuels complex in the NCIP action area consists of a wide variety of vegetation due to the area consisting of both inland and coastal vegetation types. These vegetation types exhibit a range of fire regimes and fire return intervals, from frequent to infrequent. In the absence of disturbance, current vegetation composition is prone to type conversion such as conifer expansion into oak woodlands, and substantial build up in fuels increasing wildfire hazard. Nonnative species invasions also contribute to changes in fuel type and fire regime. Treating nonnative species and regular monitoring are key to maintaining healthy landscapes.

The proposed action would define and manage for desired conditions for each vegetation cover type in the action area. Management actions would be implemented to facilitate movement toward desired conditions, including increased resistance and resilience to disturbance factors such as catastrophic fire in the face of climate change. Treatments would be done to varying degrees in upland and riparian vegetation types. Categories of treatments would broadly include fuels reduction, prescribed fire, management of naturally occurring wildfires, fire suppression, and postfire management. The proposed action does not specify the acres or miles of anticipated treatments; however, it includes goals and objectives to move vegetation conditions toward desired outcomes.

The NCIP divides the action area into three fuels management zone categories.

- The interface Zone is defined as 200 feet from property lines within the WUI.
- WUI is defined as the line, area, or zone where structures and other human development meet to intermingle with undeveloped wildland or vegetation fuels.
- Non WUI is defined as all other lands in the action area.

The interface zone, WUI, and non WUI have different vegetation desired outcomes and management actions. In general, management would result in long-term improvements in the condition and function of federally listed plant and wildlife habitats.

1.3.7.1. Goals and Objectives: Wildland Fire Management

- Promote wildland fire that protects the WUI infrastructure; watershed function, and forest health; cultural and Tribal traditional values; and ecological and economic values, and promotes ecosystem diversity in support of other resource areas.
- Reduce or modify hazardous fuels buildup and associated wildfire risk.
- Employ a cost-effective and efficient fire and fuels management program that protects at-risk values and communities most vulnerable to wildfire impacts, while enhancing and maintaining the health of landscapes and providing the opportunity for vital ecological processes to occur.
- Manage wildland fire consistent with national policy directives.
- Establish priorities among the protection of human communities, property, infrastructure and natural resource objectives, Tribal heritage practices, and ecosystem function.
- Use methods (for example, mechanical and manual fuels reduction, prescribed fire, chemical or biological treatments, fire managed for resource benefit, and thinning and harvesting), as appropriate to site conditions, to reduce hazardous fuels contributing to catastrophic wildfire and to promote ecosystem health and resilience.
- Consider predicted climate change and incorporate it into fire management priorities, planning, and hazard fuels implementation.
- Create contiguous BLM ownership and reduce fragmentation by purchasing adjacent parcels which would improve fire, fuels, and vegetation management opportunities on a landscape or watershed level.
- Dispose of fragmented BLM lands where fire, fuels, and vegetation objectives cannot be met based on access issues, management strategy on adjacent lands, and deviation from desired condition class on adjacent lands.
- Manage wildfire for multiple objectives, including protection and resource benefit. Use naturally occurring wildfire to protect, maintain, and enhance resources; as nearly as possible, allow naturally occurring wildfire to function in its natural ecological role as a disturbance agent (see 2009 Guidance for the Implementation of Federal Wildland Fire Management Policy [USDA and DOI 2009 in BLM 2024]).

- Work with Tribal cooperators to identify areas of significance that may benefit from protection during fuels treatments.
- Work with cooperating landowners to manage fire and fuels at a landscape scale across jurisdictions, when feasible.
- Conduct outreach and education programs to increase the public's understanding of wildfire prevention, management, and the natural role of wildfire in California's ecosystems.
- Manage wildfires cooperatively on BLM-managed lands that threaten communities, Tribes, or other jurisdictions. For wildland fire management actions, take into account the risks and benefits that span jurisdictional boundaries. The BLM would promote community and homeowner involvement in planning and implementing actions to mitigate wildfire in the WUI; would emphasize proactive wildfire risk mitigation where new development and expansion into natural vegetation is occurring; and ensure wildfire mitigation strategies consider the protection of community infrastructure.
- Use wildland fire management as a tool to accomplish objectives for the following resources: Air and air quality-related values, soils, water resources and fisheries, vegetation, wildlife, nonnative and invasive species, cultural and tribal resources, paleontological resources, visual resources, lands with wilderness characteristics, and forestry and woodland products.
- Make wildland fire management decisions based on public and private values, natural resource objectives, risk of potential impacts, and the cost of protection. Wildfire management strategies and effectiveness, over time, would monitor and account for shifts in human development, vegetation distribution, and management priorities in response to a changing climate.
- Conduct wildland fire management and fire response activities that minimize damage to resources including the introduction and spread of nonnative and invasive species, introduction of suppression chemicals into waterways, disturbance to erodible soils or ecologically sensitive systems, and the degradation of air quality.
- Use emergency stabilization and burned area rehabilitation efforts to identify and mitigate threats to life or property, or unacceptable degradation to natural and cultural resources resulting from the natural effects of a wildfire.
- Implement post-wildfire response that includes mitigation of resulting hazardous fuels, standing, and fallen dead vegetation, and hazard trees adjacent to infrastructure on or near public lands.
- Prevent unauthorized human ignitions through collaborative prevention efforts with interagency partners and other affected groups and individuals.

1.3.7.2. Management Direction: Wildland Fire Management

Management Direction: Vegetation

Plan and implement vegetation management and fuels reduction treatments that meet multiple resource and fire protection objectives. Treatments would promote fire resilient vegetation communities that reduce the threat of adverse wildfire impacts to natural resources and human developments and values. Vegetation management has multiple resource objectives, including the following:

- Ensure fire suppression activities (for example, aviation or equipment drafting) do not allow inter-basin transfer of water from aquatic areas with known infestation of aquatic species.
- Evaluate fire control lines and other fire control features to identify those most appropriate for continued maintenance as control features instead of restoration to pre-disturbance conditions.
- Use fire as a management tool to improve vegetation and wildlife habitat and to address issues such as sudden oak death.
- In the following areas, restrict fire suppression activities to minimize resource damage, unless otherwise approved by the BLM Authorized Officer: Vernal pools, wilderness, wilderness study areas, known cultural sites, and lands with wilderness characteristics that are managed to protect wilderness characteristics as a priority over other multiple uses.

Management Direction: Interface Zone, Wildland Urban Interface, and Non-Wildland Urban Interface

- The action area would be divided into three fuels management zone categories:

    - WUI: Defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels (IFWRMP 2009 in BLM 2024). These alternatives would use the 2022 CAL FIRE FRAP WUI influence zone which is generally 1 mile from communities; however, dataset(s) and definitions may be updated throughout the lifetime of the plan. The decision area contains 44,600 acres of WUI.
    - Interface Zone: Defined as 200 feet from property lines within the WUI. The decision area contains 16,100acres of Interface Zone. The priority in this area is to reduce fire impacts to adjacent human development and to create pre-fire suppression features used in the suppression of wildfires within this zone.
    - Non-WUI: Defined as all other lands in the action area, 321,500 acres.
- Vegetation treatments for fuels management in Interface Zone and WUI would be prioritized over treatments in non-WUI. Vegetation treatments would be designed to reduce fuels, mitigate fire risk, increase fire suppression effectiveness and promote fire resiliency while considering other resource values.
- Interface Zone, WUI, and Non-WUI have different vegetation desired outcomes and management actions. Non-WUI outcomes and actions are described below and in the Vegetation section. Interface Zone and WUI outcomes and actions are described below.
- Interface Zone, WUI, and non-WUI would be managed as described in above, even If it intersects with the Essential Connectivity Corridor.
- Treatments would be determined on a case-by-case basis in areas of overlap where WUI and special designations conflict.
- Where Interface Zone and special designations overlap, projects would be designed to prioritize Interface Zone goals and objectives while avoiding negative impacts to the special designation resources to the extent practicable

- During implementation level planning, modify treatments on a case-by-case basis in WUI and non-WUI to meet resource objectives in Essential Connectivity Corridors of High Biological Value.
- Maintain, as appropriate, suppression lines as long-term strategic fire breaks.

Specific treatments for each vegetation type in the Interface Zone, WUI, and Non-WUI are detailed in BLM (2024).

1.3.7.3. Potential Management Activities: Wildland Fire Management

Potential treatments related to wildland fire could include prescribed fire, manual treatments, mechanical treatments, biological treatments and or chemical treatments to manage fuel conditions. This may include building slash piles, broadcast burning (for site preparation, fire lines, and felling snags), use of masticators, use of heavy equipment, construction of temporary roads (for staging and/or fueling stations), hauling materials off site, airplane use, planting of native species (which could include drill seeding, manual planting, and creating tree planting holes). Invasive plants species removal could also be implemented which could include mechanical or hand removal, grazing, biocontrol, burying, and herbicide application. Fencing, use of straw wattles, weed mat installation are also potential activities. Potential fuel break activities could include use of heavy equipment or hand lines and site preparation could include slash piles and ladder fuel management. Burning activities could include broadcast burning, pile burning, jackpot burning, and use of drip torch fuel. Planting native species, invasive species removal (tree removal), fencing, terminal leader thinning, use of plugs, broadcast seeding, and identification of fire exclusion areas (by use of hand line construction, heavy equipment use, and water) are potential fire management activities.

1.3.7.4. Best Management Practices: Wildland Fire Management

BMPs applicable to fire management are outlined in Appendix B of BLM (2024). More specific BMPs referenced in Appendix B include references to the Statewide WUI Fuels Treatments Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve goals and objectives for wildland fire management while limiting impacts to sensitive species and their habitats.

1.3.8. Lands and Realty (Land Tenure and Use Authorizations)

In 1976, the passage of the Federal Land Policy and Management Act (FLPMA) fundamentally changed the BLM's mission concerning land tenure. Prior to passage, the BLM's primary land tenure goal and before that, the General Land Office, was to dispose of lands to allow development. Sections 102 and 202 of FLPMA require the Secretary of the Interior to develop land use plans for all public lands under the BLM's administration. After the passage of FLPMA, public land is to be retained in federal ownership unless disposal serves national interests. Past land use planning efforts, particularly for the lands under the Redding RMP, identified land tenure areas where the BLM would acquire and retain lands to meet specific management goals and other areas where disposal would best meet the public interest. Since the Redding and Arcata RMPs were approved, the BLM has actively worked toward acquisition and disposal actions to consolidate land ownership patterns.

Additionally, FLPMA provides authority for the issuance of use authorizations under various sections, depending on the activity to be authorized (for example, ROWs versus leases, easements, and permits) and who is applying (for example, private entities and municipalities versus federal agencies). Land acquisitions could prioritize enhancing species recovery by securing habitats for various listed species and promoting connectivity. This includes preserving key riparian corridors, WSR corridors, and sensitive habitats such as vernal pools and wetlands, with an emphasis on restoration potential.

The goals and objectives, management direction, potential management activities, and BMPs for BLM's Lands and Realty program are detailed in BLM (2024) rather than enumerated here because the effects of this program are less relevant to NMFS species and their designated critical habitats than those of other programs, so the effects analysis in this opinion does not refer to these specific details of the Lands and Realty Program.

1.3.9. Renewable Energy

Land use authorizations for renewable energy such as wind, solar, hydropower, and biomass are analyzed separately from land use authorizations due to the potential scale and complexity of these activities. Prior BLM planning documents that cover the action area did not specifically address renewable energy. Factors that impact renewable energy include potential use or avoidance areas, general planning guidance for the various types of renewable energy authorizations, and specific actions related to biomass harvesting. The factors that determine the potential for use are the proximity of renewable power resources (for example, sun, wind, water, and geothermal) to transmission infrastructure or areas of concentrated local demand, such as residential and commercial uses.

The goals and objectives, management direction, potential management activities, and BMPs for BLM's Renewable Energy program are detailed in BLM (2024) rather than enumerated here because the effects of this program are less relevant to NMFS species and their designated critical habitats than those of other programs, so the effects analysis in this opinion does not refer to these specific details of the Renewable Energy Program.

1.3.10. Minerals—Leasable Minerals (Including Fluid and Nonenergy Minerals), Locatable, and Mineral Materials Development

The minerals on federal lands are divided into three categories, each subject to different laws and regulations.

1. Locatable, which are subject to the Mining Law of 1872, as amended, include gold, silver, copper and other hard rock minerals. Locatable mineral development within the action area consists almost entirely of casual use mining in the form of gold panning and metal detecting. Small-scale panning and metal detecting are considered casual use and

protected under the Mining Law of 1872. While the Mining Law of 1872 does protect casual use mining, there are specific requirements that define what constitutes casual use. Most notably, casual use mining is defined as having little to no permanent impact on the land 43 CFR 3809.5).

2. Leasable minerals, such as coal and a host of other commodities, are subject to various Mineral Leasing Acts. No development of any leasable minerals is occurring within the action area, and there is little future development potential. Several identified small oil and gas fields are present within the action area, but there are no active or idle oil or gas wells in the planning area. The Arcata Field Office (FO) has four oil and gas fields, while the Redding FO has 12. None of these oil and gas deposits are of significant size and are unlikely to see any future development. Within the action area there are neither geothermal leases nor licenses for geothermal exploration nor have any been applied for in the past 20 years. The Redding FO does not encompass the geology necessary for geothermal potential. While the Arcata FO has extremely low geothermal potential in the southern section of the action area, these geothermal resources have minimal development potential. There is no ongoing or historical nonenergy leasable mineral development, and there are no known economically viable nonenergy leasable mineral deposits within the action area (BLM 2021a in BLM 2024).
3. Saleable minerals or mineral materials, such as sand and gravel that are essential to construction and road building, are subject to the Materials Act of 1947, as amended. There have been no recent sales of mineral materials in either the Redding or Arcata FOs. However, the BLM provides mineral materials free of charge to state, county, and federal agencies for use in public projects under a FUP. Currently the Arcata FO has one authorized FUP, and the Redding FO has seven authorized FUPs. The current authorized FUPs within the Redding FO are used by Reclamation for salmon habitat restoration within the Trinity River (DOI 2020 in BLM 2024). These FUPs are the only current mineral materials development within the action area. The BLM authorizes disposals of mineral materials through both noncompetitive and competitive sales, whenever possible and environmentally sensible. The BLM has not authorized mineral materials disposals in either the Redding or Arcata FOs in the last 20 years, and there are no existing community use areas or community pits. There is potential for further mineral development of sand and gravel for use in concrete aggregate and construction projects within the action area.

The goals and objectives, management direction, and potential management activities, as well as protective measures, for BLM's Minerals program are detailed in BLM (2024) rather than enumerated here because the effects of this program are less relevant to NMFS species and their designated critical habitats than those of other programs, so the effects analysis in this opinion does not refer to these specific details of the Minerals Program.

1.3.11. Travel, Transportation Management, and Recreation

Recreation in the action area includes hiking, backpacking, mountain biking, horseback riding, rock climbing, riding OHVs, hunting, fishing, panning for gold, whitewater rafting, kayaking, rowing, surfing, hang-gliding, camping, sightseeing, photography, wildlife viewing, and historic site visitation. Current management strategies for the decision area focus on these activities. Recreation is managed through established RMAs and by the issuance of special recreation permits, individual special recreation permits, and recreation use permits The variability of recreation use rates within the decision area depends on the location and seasonality.

Travel management pertains to the infrastructure and legal requirement to provide the public with the opportunity to access and use BLM-managed lands within the action area. The BLM's travel management program addresses transportation and access needs for recreationists, ranchers, miners, energy developers, and others. The transportation network in the action area consists of federal and state highways, paved and unpaved county roads, paved and unpaved BLM roads built to facilitate industrial development, unpaved two-track roads, single-track trails for OHVs, and single-track trails for hiking, biking, and equestrian use. There is an extensive network of BLM roads, which consists of graded gravel roads with associated stormwater ditches that are regularly maintained, and user-created routes that rarely receive maintenance. Nonmotorized transportation networks include trails for pedestrian, equestrian, and cycling activities. New road construction, primarily designed to facilitate recreation access, will be limited and avoid sensitive habitat to the extent possible and with project level consultation.

The proposed action would manage, promote, and develop recreational resources while maintaining areas for other resources (for example, wildlife and fish). As a result, the BLM would consider federally recognized species and manage to avoid or mitigate impacts on these species when action recreational resources. The NCIP would allow for diverse recreational opportunities, with different management areas to support different recreational opportunities. Developed and dispersed recreation, as well as administrative functions to maintain motorized access and recreational opportunities, may result in effects on federally recognized species.

1.3.11.1. Goals and Objectives: Travel, Transportation Management, and Recreation

- Designate travel and transportation systems to be consistent with commercial, social and environmental needs.
- Develop new trails or connections between trails for motorized and nonmotorized users.
- Consider opportunities to connect with regional trail network.
- Provide for a full range of public resource management and administrative access needs.
- Provide for travel management consistency as it pertains to neighboring federal agencies' public lands.

1.3.11.2. Management Direction: Travel, Transportation Management, and Recreation

Travel and Transportation Management

- All lands within the action area would be designated as OHV limited, with the exceptions of areas listed as OHV closed and OHV open in other resource sections.
- Specific route designations would be made in an implementation-level travel and transportation management planning process following the completion of the RMP. Until route-specific designations are made, the designation of "OHV limited" will limit all OHV use to the same manner and degree occurring at the time of the designation in the RMP.

The “OHV limited area” designation will prohibit any new surface disturbance, such as cross-country travel, unless subsequently authorized through another implementation-level decision.

- Any land acquired by the BLM would be managed similarly to the existing OHV area designations of adjoining BLM-managed lands or as stated, or implied, in the transfer. Where clarification is absent, the BLM will manage acquired lands under the OHV limited area designation. The type of limitation will be set by implementation-level decisions; until these decisions are made, use may continue in the same manner and degree consistent with the purposes for which the acquisition was made.
- Mechanized vehicles (bicycles) would be subject to OHV area designations (that is, open, closed, limited). In OHV limited areas, bicycles would be limited to existing routes and trails until routes are designated, then bicycles would be limited to designated routes.
- New road construction would be restricted to areas where it required to provide access to high value recreation sites, in response to outside applications, or to provide access or egress for fire safety, or in response to emergencies such as road failures and emergency bypass construction. Access for vegetation management treatments would be limited to temporary roads that can be removed when work is completed.

Management of OHV use is detailed in BLM (2024).

Management Direction: Recreation Management

- Acquire available unimproved lands that expand legal public access to adjoining public lands, complete segments of recreational trails, enhance protection of sensitive resources, provide opportunities for public interpretation, enhance reforestation efforts (including habitat improvement for sensitive species), or enhance long-term administration of the area.
- Prioritize development of parking lots at trailheads.
- Prioritize development of trails to provide for various levels of difficulty for skill development.
- In the Chappie/Shasta OHV Area SRMA, camping would be limited to 14 days per 4-month period.

Management direction for the Swasey ERMA and the Redding Trails SRMA is detailed in BLM (2024).

1.3.11.3. Potential Management Activities: Travel, Transportation Management, and Recreation

Specific management activities related to travel management and recreation that could have effects to listed species may include the construction of temporary roads to facilitate vegetation management treatments. New road construction, primarily designed to facilitate recreation access, will be limited and avoid sensitive habitat to the extent possible and with project level consultation. Standard road maintenance activities, also described in the soils section, include the use of graders and dump-trucks to harden and re-surface roads and promote drainage. Excavators can be used to upgrade or replace culverts.

Other specific recreation related activities could include the construction of new trails, parking lots, and campgrounds. These activities all require the use of light to heavy equipment, ranging from hand tools and chainsaws to heavy equipment like dozer and excavators in some circumstances. Additional activities include sign installation, and activities conducted by the public when utilizing public lands. These activities include hiking, bicycle use, boating, kayaking and paddle boarding. The public may conduct activities like collecting minerals, foraging and geo-caching. Other common recreation activities include hunting and fishing, OHV use (only on approved routes), paragliding and drone use. Research and education projects are generally allowed with a permit that regularly includes special stipulations to protect natural resources.

1.3.11.4. Best Management Practices: Travel and Transportation Management

Best Management Practices applicable to travel and transportation management are outlined in Appendix B of BLM (2024) and come primarily from the BLM California BMPs for Water Quality. The Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Recreation Management (REC-01 to REC-35) and Spill Prevention and Abatement (SP-01 to SP-08) BMPs contain program-specific examples of measures that will be taken to avoid and minimize effects to water resources and listed species to the maximum extent practicable.

Additional BMPs referenced in Appendix B include references to the BLM Integrated Vegetation Management Handbook, H-1740-2, Burned Area Emergency Stabilization and Rehabilitation Handbook, H-1472-1, and several large-scale programmatic EAs like the Statewide WUI Fuels Treatment Project and the Hazard Removal and Vegetation Management Project Programmatic Environmental Assessment. These BMPs represent a library of conservation measures that can be incorporated at the project level to minimize effects to listed species. During project development, the BLM will select BMPs based upon site-specific conditions, technical feasibility, and resource availability, to achieve goals and objectives for travel and transportation management while limiting impacts to sensitive species and their habitats.

1.3.12. Livestock and Grazing

Livestock grazing on public lands is an important part of the local economy and supports local farming communities. The BLM intends to continue to manage public lands for livestock grazing to support both rangeland health as well as local ranching families. The management of livestock grazing will follow prescriptions of the Yokayo Grazing ROD (BLM 1983a in BLM 2024), the Final Redding Grazing EIS (BLM 1983 in BLM 2024), and allotment management plans (AMPs) that specify grazing systems, management facilities, and land treatments.

The BLM is currently managing 27 active livestock grazing allotments within the action area, as well as 33 vacant allotments with no current permit or lease associated with them. Additionally, five of the vacant grazing allotments have pending applications. Regardless, all livestock grazing use must meet the standards set forth in Rangeland Health Standards and Guidelines for California and Northwestern Nevada Final EIS (BLM 1998b in BLM 2024) to ensure that range condition and productivity are stable.

The goals and objectives, management direction, potential management activities, and BMPs for BLM's Livestock and Grazing program are detailed in BLM (2024) rather than enumerated here because the effects of this program are less relevant to NMFS species and their designated critical habitats than those of other programs, so the effects analysis in this opinion does not refer to these specific details of the Livestock and Grazing Program.

1.3.13. Fish Handling

Fish handling may occur as part of fish relocation prior to dewatering at project sites, or as part of fish sampling during effectiveness monitoring of projects carried out under NCIP.

1.3.13.1. Fish Relocation

Some projects that implement the NCIP resource programs described above will require dewatering at the project site. Prior to dewatering, ESA-listed fish will be captured, handled and relocated.

Goals and Objectives: Fish Relocation

Fish will be relocated prior to stream dewatering to protect them from harm or death when water is removed.

Management Direction: Fish Relocation

- In stream reaches where ESA-listed fish are present during construction, efforts will be made to design construction activities to avoid complete dewatering of a channel cross-section in a manner that maintains fish passage through the construction area.
- For projects where the entire channel cross-section must be dewatered, during ESA consultation on the specific project requiring dewatering, BLM, in coordination with NMFS, will develop a dewatering and relocation plan that has the least impact on ESA-listed fish.

Potential Management Activities: Fish Relocation

A qualified biologist will capture fish in the immediate project area using gear approved by NMFS, which typically includes seines, dip nets, and electrofishing. Captured fish will then be transported and released to suitable instream locations.

Best Management Practices: Fish Relocation

In stream reaches where listed fish are present during construction, efforts will be made to design construction activities to avoid complete dewatering of a channel cross-section in a manner that maintains fish passage through the construction area. In cases where the entire channel cross-section must be dewatered, the protection measures listed above in the dewatering section will be implemented as applicable. The least invasive monitoring and handling measures necessary to achieve project objectives will be taken to minimize effects to listed species. As projects are developed, the BLM will consult with NMFS and will be required to include BMPs relevant to the site.

1.3.13.2. Fish Sampling

Some projects to implement NCIP resource programs will undergo pre- and post-implementation effectiveness monitoring. Fish handling will occur if this monitoring includes fish sampling. Effectiveness monitoring may occur at any time of year.

Goals and Objectives: Fish Sampling

The BLM will monitor the application of BMPs through implementation and effectiveness monitoring. Pre- and post-project-implementation effectiveness monitoring may be conducted at select sites. Where effectiveness monitoring will occur, fish will be sampled.

Management Direction: Fish Sampling

The least invasive monitoring and handling measures necessary to achieve project objectives will be taken to minimize effects to listed species.

Potential Management Activities: Fish Sampling

Where effectiveness monitoring will occur, fish will be sampled utilizing accepted techniques including electrofishing, seine, minnow trapping, and dip net, and will then be processed (e.g., enumerated, weighed, measured) and released to a suitable location. Fish sampling will generally require wading by individuals operating the sampling gear and would possibly agitate the stream bottom substrate where the gear is deployed. Captured fish will be held in cool, oxygenated freshwater.

Best Management Practices: Fish Sampling

As projects are developed, the BLM will consult with NMFS and will be required to include BMPs relevant to the site, including BMPs to minimize harm to fish during fish sampling.

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

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency’s actions would affect listed species and their critical habitats. NMFS does not provide an ITS with this opinion addressing a framework programmatic action because adoption of the framework will not itself result in the take of listed species. Any incidental take resulting from subsequent actions that proceed under the framework programmatic action will be subject to section 7 consultation and an ITS, as appropriate. For those subsequent actions, NMFS will, as appropriate, provide a biological opinion with ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

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

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

The designations of critical habitat for SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CCV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon use the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their critical habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce

appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, five-year reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" for the jeopardy analysis. The opinion also examines the condition of designated critical habitat, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated critical habitat, and discusses the function of the PBFs that are essential for the species' conservation.

2.2.1. Species Description and Life History

Threatened Southern Oregon/Northern California Coast (SONCC) coho salmon

- Listing determination (70 FR 37160; June 28, 2005)
- Critical habitat designation (64 FR 24049; May 5, 1999)

Endangered Central California Coast (CCC) coho salmon

- Listing determination (70 FR 37160; June 28, 2005)
- Critical habitat designation (64 FR 24049; May 5, 1999)

Threatened California Coastal (CC) Chinook salmon

- Listing determination (70 FR 37160; June 28, 2005)
- Critical habitat designation (70 FR 52488; September 2, 2005)

Endangered Sacramento River (SR) winter-run Chinook salmon

- Listing determination (59 FR 440; January 4, 1994)
- Critical habitat designation (58 FR 33212; June 16, 1993)

Threatened Central Valley (CV) spring-run Chinook salmon

- Listing determination (70 FR 37160; June 28, 2005)
- Critical habitat designation (70 FR 52488; September 2, 2005)

Threatened Northern California (NC) steelhead

- Listing determination (71 FR 834; January 5, 2006)
- Critical habitat designation (70 FR 52488; September 2, 2005)

Threatened California Central Valley (CCV) steelhead

- Listing determination (71 FR 834; January 5, 2006)

- Critical habitat designation (70 FR 52488; September 2, 2005)

Threatened North American Green Sturgeon sDPS

- Listing determination (71 FR 17757; April 7, 2006)
- Critical habitat designation (74 FR 52300; October 9, 2009).

2.2.1.1. Coho Salmon

The life history of coho salmon in California has been well documented by Shapovalov and Taft (1954) and Hassler (1987). In contrast to the life history patterns of other anadromous salmonids, coho salmon in California generally exhibit a relatively simple three-year life cycle. Adult coho salmon typically begin the freshwater migration from the ocean to their natal streams after heavy late fall or winter rains breach the sandbars at the mouths of coastal streams (Sandercock 1991). Delays in river entry of over a month are not unusual (Salo and Bayliff 1958, Eames et al. 1981). Migration continues into March, generally peaking in December and January, with spawning occurring shortly after arrival to the spawning ground (Shapovalov and Taft 1954). Coho salmon are typically associated with medium to small coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool, high-quality water; dense riparian canopy; deep pools with abundant overhead cover; instream cover consisting of large, stable woody debris and undercut banks; and gravel or cobble substrates.

Female coho salmon choose spawning areas usually near the head of a riffle, just below a pool, where water changes from a laminar to a turbulent flow and small to medium gravel substrate are present. The flow characteristics surrounding the redd usually ensure good aeration of eggs and embryos, and flushing of waste products. The water circulation in these areas also facilitates fry emergence from the gravel. Preferred spawning grounds have: nearby overhead and submerged cover for holding adults; water depth of 4 to 21 inches; water velocities of 8 to 30 inches per second; clean, loosely compacted gravel (0.5 to 5-inch diameter) with less than 20 percent fine silt or sand content; cool water ranging from 39 to 50 degrees Fahrenheit (° F) with high dissolved oxygen of 8 mg/L; and inter-gravel flow sufficient to aerate the eggs. Lack of suitable gravel often limits successful spawning.

Each female builds a series of redds, moving upstream as she does so, and deposits a few hundred eggs in each. Fecundity of female coho salmon is directly proportional to size; each adult female coho salmon may deposit from 1,000 to 7,600 eggs (Sandercock 1991). Briggs (1953) noted a dominant male accompanies a female during spawning, but one or more subordinate males may also engage in spawning. Coho salmon may spawn in more than one redd and with more than one partner (Sandercock 1991). Coho salmon are semelparous meaning they die after spawning. The female may guard a redd for up to two weeks (Briggs 1953).
The eggs generally hatch after four to eight weeks, depending on water temperature. Survival and development rates depend on temperature and dissolved oxygen levels within the redd. According to Baker and Reynolds (1986), under optimum conditions, mortality during this period can be as low as 10 percent; under adverse conditions of high scouring flows or heavy siltation, mortality may be close to 100 percent. McMahon (1983) found that egg and fry survival drops sharply when fine sediment makes up 15 percent or more of the substrate. The newly-hatched fry remain in the redd from two to seven weeks before emerging from the gravel

(Shapovalov and Taft 1954). Optimal egg rearing water temperatures occur from 40°F to 46°F. Stream temperatures in excess of 53.6°F are lethal to coho salmon eggs (Beacham and Murray 1990). Upon emergence, fry seek out shallow water, usually along stream margins. As they grow, juvenile coho salmon often occupy habitat at the heads of pools, which generally provide an optimum mix of high food availability and good cover with low swimming cost (Nielsen 1992). Chapman and Bjornn (1969) determined that larger parr tend to occupy the head of pools, with smaller parr found further down the pools. As the fish continue to grow, they move into deeper water and expand their territories until, by July and August; they reside exclusively in deep pool habitat. Juvenile coho salmon prefer: well shaded pools at least 3.3 feet deep with dense overhead cover, abundant submerged cover (undercut banks, logs, roots, and other woody debris); water temperatures of 62°F to 70°F (Lusardi et al. 2019), but not exceeding 73°F to 77°F (Brungs and Jones 1977) for extended time periods; dissolved oxygen levels of 4 to 9 mg/L; and water velocities of 3.5 to 9.5 inches per second in pools and 12 to 18 inches per second in riffles. Water temperatures for good survival and growth of juvenile coho salmon range from 50° to 59° F (Bell 1973, McMahon 1983). Growth is slowed considerably at 64° F and ceases at 68° F (Bell 1973).

Preferred rearing habitat has little or no turbidity and high-sustained invertebrate forage production. Juvenile coho salmon feed primarily on drifting terrestrial insects, much of which are produced in the riparian canopy, and on aquatic invertebrates growing within the interstices of the substrate and in leaf litter in pools. As water temperatures decrease in the fall and winter months, fish stop or reduce feeding due to lack of food or in response to the colder water, and growth rates slow. During December through February, winter rains result in increased stream flows. By March, following peak flows, fish resume feeding on insects and crustaceans, and grow rapidly.

In the spring, as yearlings, juvenile coho salmon undergo a physiological process, or smoltification, which prepares them for living in the marine environment. They begin to migrate downstream to the ocean during late March and early April, and out-migration usually peaks in mid-May, if conditions are favorable. Emigration timing is correlated with peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holtby et al. 1990). At this point, the smolts are about four to five inches in length. After entering the ocean, the immature salmon initially remain in nearshore waters close to their parent stream. They gradually move northward, staying over the continental shelf (Brown et al. 1994). Although they can range widely in the north Pacific, movements of coho salmon from California are poorly understood.

2.2.1.2. Chinook Salmon

Chinook salmon return to freshwater to spawn when they are three to eight years old (Healey 1991). Some Chinook salmon return from the ocean to spawn one or more years before they reach full adult size, and are referred to as jacks (males) and jills (females). Chinook salmon runs are designated on the basis of adult migration timing; however, distinct runs also differ in the degree of maturation at the time of river entry, thermal regime and flow characteristics of their spawning site, and actual time of spawning (Myers et al. 1998). Both winter-run and spring-run Chinook salmon tend to enter freshwater as immature fish, migrate far upriver, and delay spawning for weeks or months. For comparison, fall-run Chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few days or weeks of freshwater entry (Healey 1991). Fall-run CC Chinook salmon migrate upstream from September through November, with most migration occurring in September and October following early-season rain storms. Spawning largely occurs from early October through December, with a peak in late October. Adequate instream flows and cool water temperatures are more critical for the survival of spring-run Chinook salmon (compared to fall-run or winter-run Chinook salmon) due to over-summering by adults and/or juveniles.

Chinook salmon generally spawn in gravel beds that are located at the tails of holding pools (Bjornn and Reiser 1991). Adult female Chinook salmon prepare redds in stream areas with suitable gravel composition, water depth, and velocity. Optimal spawning temperatures range from 42°F to 50°F. Redds vary widely in size and location within the river. Preferred spawning substrate is clean, loose gravel, mostly sized between 1 and 10 cm, with no more than 5 percent fine sediment. Gravels are unsuitable when they have been cemented with clay or fine particles or when sediments settle out onto redds, reducing intergravel percolation (62 FR 24588). Minimum inter-gravel percolation rate depends on flow rate, water depth, and water quality. The percolation rate must be adequate to maintain oxygen delivery to the eggs and remove metabolic wastes. Chinook salmon require a strong, constant level of subsurface flow, as a result, suitable spawning habitat is more limited in most rivers than superficial observation would suggest. After depositing eggs in redds, most adult Chinook salmon guard the redd from 4 to 25 days before dying. Chinook salmon eggs incubate for 90 to 150 days, depending on water temperature. Successful incubation depends on several factors including dissolved oxygen levels, temperature, substrate size, amount of fine sediment, and water velocity. Maximum survival of incubating eggs and pre-emergent fry occurs at water temperatures between 42°F and 45°F. Egg-to-fry survival decreases exponentially at egg incubation temperatures above 53.6°F (Fitzgerald and Martin 2022). Chinook salmon fry emerge from redds during December through mid-April (Leidy and Leidy 1984).

After emergence, Chinook salmon fry seek out areas behind fallen trees, back eddies, undercut banks, and other areas of bank cover (Everest and Chapman 1972). As they grow larger, their habitat preferences change. Juveniles move away from stream margins and begin to use deeper water areas with slightly faster water velocities, but continue to use available cover to minimize predation risk and reduce energy expenditure. Fish size appears to be positively correlated with water velocity and depth (Chapman and Bjornn 1969, Everest and Chapman 1972). The optimal rearing temperature for Chinook salmon is from 61°F to 68°F (Araujo et al. 2023). If more food is available, these life stages can tolerate higher water temperatures. Chinook salmon feed on small terrestrial and aquatic insects and aquatic crustaceans. Cover, in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade, and protect juveniles from predation. Chinook salmon typically rear in freshwater for a few months and outmigrate during April through July (Myers et al. 1998), though important life history variation occurs including juvenile outmigration later in the year.

2.2.1.3. Steelhead

Steelhead are anadromous forms of *O. mykiss*, spending some time in both freshwater and saltwater. Steelhead young usually rear in freshwater for one to three years before migrating to the ocean as smolts, but rearing periods of up to seven years have been reported. Migration to the ocean usually occurs in the spring. Steelhead may remain in the ocean for one to five years (two to three years is most common) before returning to their natal streams to spawn (Busby et al. 1996). The distribution of steelhead in the ocean is not well known. Coded wire tag recoveries indicate that most steelhead tend to migrate north and south along the continental shelf (Barnhart 1986).

Steelhead can be divided into two reproductive ecotypes, based upon their state of sexual maturity at the time of river entry and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing steelhead enter fresh water in a sexually immature condition and require several months to mature and spawn, whereas ocean maturing steelhead enter fresh water with well-developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (i.e., summer [stream maturing] and winter [ocean maturing] steelhead). The timing of upstream migration of winter steelhead, the ecotype most likely encountered during the proposed action, is typically correlated with higher flow events occurring from late October through May. In central and southern California, significant river outflow is also often required to breach sandbars that block access from the ocean; for this reason, upstream steelhead migration in these areas can be significantly delayed, or precluded entirely during extremely dry periods. Adult summer steelhead migrate upstream from March through September; however, results from past capture/relocation efforts in the action area (CDFW 2014, 2015, 2016, 2017, 2018, 2019) suggest the chance of encountering adult summer steelhead during the Program's "work window" is extremely low and thus unlikely to occur. In contrast to other species of *Oncorhynchus*, steelhead may spawn more than one season before dying (iteroparity); although one-time spawners (semalparity) represent the majority.

Because rearing juvenile steelhead reside in freshwater all year, adequate flow and temperature are important to the population at all times [California Department of Fish and Game (CDFG 1997)]. Outmigration appears to be more closely associated with size than age. In Waddell Creek, Shapovalov and Taft (1954) found steelhead juveniles migrating downstream at all times of the year, with the largest numbers of young-of-year and age 1+ steelhead moving downstream during spring and summer. Smolts can range from 5.5 to 8 inches in length. Steelhead outmigration timing is similar to coho salmon (NMFS 2016a).

Survival to emergence of steelhead embryos is inversely related to the proportion of fine sediment in the spawning gravels. However, steelhead are slightly more tolerant than other salmonids, with significantly reduced survival when fine materials of less than 0.25 inches in diameter comprise 20 to 25 percent of the substrate. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986).

Upon emerging from the gravel, fry rear in edge-water habitats and move gradually into pools and riffles as they grow larger. Older fry establish territories which they defend. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, juvenile steelhead become less active and hide in available cover, including gravel or woody debris.

Water temperature can influence the metabolic rate, distribution, abundance, and swimming ability of rearing juvenile steelhead (Barnhart 1986, Bjornn and Reiser 1991, Myrick and Cech 2005). Optimal temperatures for steelhead growth range between 50° and 68° F (Hokanson et al. 1977, Wurtsbaugh and Davis 1977, Myrick and Cech 2005). Variability in the diurnal water temperature range is also important for the survivability and growth of salmonids (Busby et al. 1996).

Suspended sediment concentrations, or turbidity, also can influence the distribution and growth of steelhead (Bell 1973, Sigler et al. 1984, Newcombe and Jensen 1996). Bell (1973) found suspended sediment loads of less than 25 milligrams per liter (mg/L) were typically suitable for rearing juvenile steelhead.

2.2.1.4. Green Sturgeon

The life history of green sturgeon in California is summarized in Adams et al. (2002), Moser et al. (2016), NMFS (2018), and NMFS (2021). They are anadromous, making migrations as adults to the Sacramento River and its tributaries (i.e., Feather and Yuba rivers) in the spring (Moyle et al. 1995, Seesholtz et al. 2016, Beccio et al. 2019). As juvenile green sturgeon age, they migrate downstream and live in the lower delta and bays, spending from 3 to 4 years there before entering the ocean. Individuals are present in San Francisco Bay, and the estuary provides rearing habitat for juveniles and foraging habitat for non-spawning adults and subadults. Green sturgeon are also known to use the North Humboldt Bay heavily (Pinnix 2008, Goldsworthy et. al. 2016). Green sturgeon adults and subadults are temporary residents in Humboldt Bay from June through October, utilizing North Bay as summer-fall holding or feeding habitat, and the deeper waters of the North Bay Channel as a migratory corridor between the Pacific Ocean and Arcata Bay (Pinnix 2008). Southern DPS green sturgeon inhabit estuaries along the west coast during the summer and fall months (Moser and Lindley 2007). Green sturgeon likely optimize their growth opportunities in summer by foraging in the relatively warm waters of estuaries (Moser and Lindley 2007). Green sturgeon forage on benthic prey items throughout the estuary, notably shallow tidal flats dominated by burrowing shrimp and other benthic prey items (Dumbauld et al. 2008, Moser et al. 2017). Sub-adults range from 65-150 cm total length from first ocean entry to size at sexual maturity. Sexually mature adults range from 150-250 cm total length.

2.2.2. Status of the Species

NMFS assesses four population viability[1] parameters to discern the status of the listed ESUs and DPSs and to assess each species ability to survive and recover. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany et al. 2000). While there is insufficient data to evaluate these population viability parameters

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

quantitatively, NMFS has used existing information to determine the general condition of the populations, and factors responsible for the current status of these listed species.

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

Habitat requirements of salmonids generally depend on the life history stage. Salmonids encounter several distinct habitats during their life cycle. Water discharge, water temperature, and water chemistry must be appropriate for adult and juvenile migration. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning. Furthermore, dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. The presence of interspatial area between large substrate particle types is important for maintaining water-flow through the nest as well as dissolved oxygen levels within the nest. These spaces can become filled with sand and smaller particles. Additionally, juveniles need abundant food sources, including insects, crustaceans, and other small fish. Habitat must also provide places to hide from predators, such as under logs, root wads and boulders in the stream, and beneath overhanging vegetation. Salmonids also need places to seek refuge from periodic high-flow events (side channels and off channel areas), and may occasionally benefit from the availability of cold-water springs or seeps and deep pools during summer. Estuarine habitats can be utilized during the seaward migration of steelhead, as these habitats have been shown to be nurseries for steelhead. Estuarine or lagoon habitats can vary significantly in their physical characteristics from one another, but remain an important habitat requirement as physiology begins to change while juveniles become acclimated to a saltwater environment.

2.2.2.1. SONCC Coho Salmon

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 (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 species' 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 2016 viability assessment (Williams et al. 2016) determined that, although long-term data on coho salmon abundance are scarce, spawner abundance had declined since the last five-year review for this ESU. In fact, in 2016 most of the 30 independent populations in the ESU were 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. In its most recent status review, NMFS recommended that the SONCC coho salmon ESU remain listed as a threatened species (NMFS 2016b).

The latest viability assessment (Williams 2023) determined the extinction risk category is still moderate, but the trend in extinction risk is declining (i.e., less viable) since the previous assessment.

2.2.2.2. CCC Coho Salmon

Historically, the CCC coho salmon ESU was comprised of 76 coho salmon populations (Bjorkstedt et al. 2005). Most of these were dependent populations that needed immigration from other nearby populations to ensure their long-term survival. Eleven functionally independent populations and one potentially independent population of CCC coho salmon once existed (Spence et al. 2008, Spence 2012). Most of the populations in the CCC coho salmon ESU are currently not viable, hampered by low abundance, range constriction, fragmentation, and loss of genetic diversity.

None of the five CCC coho salmon diversity strata currently support viable coho salmon populations. According to the 2016 viability report (Williams et al. 2016), surveys suggested CCC coho salmon abundance had improved slightly since 2011 within several independent populations (including Lagunitas Creek), although all populations remained well below their high-risk dispensation thresholds identified by Spence et al. (2008). The Russian River and Lagunitas Creek populations are relative strongholds for the species compared to other CCC coho salmon populations, the former predominantly due to out-planting of hatchery-reared juvenile fish. The 2016 viability assessment (Williams et al. 2016) determined the overall risk of CCC coho salmon extinction remained high, and the 2016 status review recommended the ESU remain listed as an endangered species (NMFS 2016c).

Overall, new information available since 2016 indicates the extinction risk for CCC coho salmon has not changed appreciably and remains high, with slight improvements in the two northernmost diversity strata, but little change in the Coastal Diversity Stratum and perhaps worsening conditions in the Santa Cruz Mountain Stratum (Spence 2023). In its most recent status review, NMFS recommended that the CCC coho salmon ESU remain listed as an endangered species (NMFS 2023).

2.2.2.3. CC Chinook Salmon

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

In 1965, CDFG (1965) estimated escapement for this ESU at over 76,000 spawning adults. Most were in the Eel River (55,500), with smaller populations in Redwood Creek (5,000), Mad River (5,000), Mattole River (5,000), Russian River (500) and several smaller streams in Humboldt County (Myers et al. 1998). More recent data indicate abundance is far lower, suggesting an inability to sustain production adequate to maintain the ESU's populations. The one exception is the Russian River population, where escapement typically averages a few thousand adults.

CC Chinook salmon populations within the Action Area remain widely distributed. Populations south of the Action Area suffer poor distribution, specifically the area between the Navarro River and Russian River and the area between the Mattole and Ten Mile River populations (Lost Coast area). Concerns regarding the lack of population-level estimates of abundance, the loss of populations from one diversity stratum, and poor ocean survival contributed to the conclusion that CC Chinook salmon are "likely to become endangered" in the foreseeable future (Good et al. 2005, Williams et al. 2011, Williams et al. 2016). Spawning adults were discovered in several smaller, coastal Mendocino County streams (Williams et al. 2016), suggesting the ESU's spatial diversity at that time was likely greater than previously thought (NMFS 2016d). In its most recent status review, NMFS recommended that the CC Chinook salmon ESU remain listed as a threatened species (NMFS 2016d).

New information available since 2016 indicates that recent trends across the ESU have been mixed and that overall extinction risk for the ESU is moderate and has not changed appreciably since the previous viability assessment (Spence 2023).

2.2.2.4. SR Winter-Run Chinook salmon

The SR winter-run Chinook salmon ESU has been completely displaced from its historical spawning habitat by the construction of Shasta and Keswick dams. Approximately 300 miles of tributary spawning habitat in the upper Sacramento River is now inaccessible to the ESU. Most components of the SR winter-run Chinook salmon life history (e.g., spawning, incubation, freshwater rearing) have been compromised by the habitat blockage in the upper Sacramento River. The remaining spawning habitat in the upper Sacramento River is artificially maintained by cool water releases from Shasta and Keswick dams, and the spatial distribution of spawners is largely governed by the water year type and the ability of the Central Valley Project to manage water temperatures in the upper Sacramento River.

The SR winter-run Chinook salmon ESU includes winter-run Chinook salmon spawning in the mainstem Sacramento River downstream of Keswick Dam and the Livingston Stone National Fish Hatchery supplementation and captive broodstock programs (85 FR 81822). Within the established ESU delineations, new efforts were initiated in 2017 to establish a viable, self-sustaining, and locally adapted population of winter-run Chinook salmon in Battle Creek to add to the spatial diversity (i.e., spatial structure) and abundance of the ESU (Johnson et al. 2023).

The 2016 viability assessment (Williams et al. 2016) concluded the extinction risk of the SR winter-run Chinook salmon ESU had increased from moderate to high since the 2007 and 2010 assessments. Several listing factors contributed to NMFS' recommendation that the species remain listed as endangered, including drought, poor ocean conditions, and hatchery influence (NMFS 2016e).

The following summary is drawn from the 2023 SR winter-run Chinook salmon viability assessment (Johnson et al. 2023). The viability of the SR winter-run Chinook salmon ESU will be improved by re-establishing winter-run Chinook salmon in their historical spawning and rearing habitat. Projects to reintroduce SR winter-run Chinook salmon into Battle Creek are on-going while reintroduction to historical habitats upstream of Shasta Reservoir are in the planning and early implementation phases. In the summer of 2020, juvenile salmon were observed in Battle Creek indicating the first successful spawning of winter-run Chinook salmon in Battle Creek in over 100 years.

Until additional populations are established, the ESU will remain in the "High" biological extinction risk category. The overall viability of the ESU has continued to decline since the 2015 viability assessment, with the single spawning population on the mainstem Sacramento River now at high risk of extinction due to an increase in extinction risk from hatchery influence. In its most recent status review, NMFS recommended that the SR winter-run Chinook salmon ESU remain listed as an endangered species (NMFS 2024a).

2.2.2.5. CV Spring-Run Chinook Salmon

The CV spring-run Chinook salmon ESU includes spring-run Chinook salmon populations spawning in the Sacramento River and its tributaries and spring-run Chinook salmon in the Feather River Hatchery (FRH). The San Joaquin River watershed and Delta are excluded as critical habitat and San Joaquin basin populations are considered extirpated (NMFS 2013). In 2014, FRH brood stock was used to actively reintroduce CV spring-run Chinook salmon into the mainstem San Joaquin River as an ESA 10(j) experimental population (NMFS 2013). Several juveniles successfully survived to adulthood and returned to spawn in 2019.

The status of the CV spring-run Chinook salmon in 2016 was improved compared to the previous assessment in 2010 (NMFS 2016f). This improved status was attributed to extensive habitat restoration and improved spatial structure, with historically extirpated populations (Battle and Clear Creeks) trending in the positive direction. However, recent declines of many of the dependent populations, high pre-spawn and egg mortality during the 2012 to 2016 drought, and uncertain juvenile survival during the drought likely increased the ESU's overall extinction risk. Monitoring data showed sharp declines in adult returns from 2014 through 2020. In its most recent five-year review, NMFS recommended that the CV spring-run Chinook salmon ESU remain listed as a threatened species (NMFS 2016f).

The most recent viability assessment (Johnson et al. 2023) concluded that the viability of the ESU has declined since the 2015 assessment with an increased risk of extinction for all independent populations, and overall the species is at moderate to high risk of extinction. In fact, Mill, Deer, and Battle creeks changed from low/moderate to a high risk of extinction using one or more viability criteria. The total abundance of CV spring-run Chinook salmon for the Sacramento River watershed in 2019 was approximately half of the population size in 2014, and close to the decadal lows which occurred as recently as the last two years (Johnson et al. 2023). The Central Valley-wide abundance was driven largely by the annual variation in returns to Butte Creek. The Butte Creek population remains at low extinction risk, yet all viability metrics for the ESU (except hatchery influence) are trending in a negative direction relative to 2015.

2.2.2.6. NC Steelhead

With few exceptions, NC steelhead are present wherever streams are accessible to anadromous fish and have sufficient flows. 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 remain broadly distributed throughout their range, with the exception of habitat upstream of dams on both the Mad River and Eel River; these dams have reduced the extent of available habitat. Extant summer-run steelhead populations persist in Redwood Creek and the Mad, Middle Fork Eel, 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 negative 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). NMFS' previous five-year review for NC steelhead (NMFS 2016d) concluded that, despite recent conservation efforts, the species remained impacted by many of the factors that led to the species being listed as threatened. Specifically, low streamflow, illegal cannabis cultivation, and periods of poor ocean productivity continued to depress NC steelhead population viability.

The new information for NC steelhead available since the previous viability assessment indicates that overall extinction risk is moderate and has not changed appreciably since the prior assessment in 2016 (Spence 2023). In its most recent five-year review, NMFS recommended that the NC steelhead DPS remain listed as a threatened species (NMFS 2024b).

2.2.2.7. CCV Steelhead

The CCV steelhead distinct population segment (DPS) includes steelhead populations spawning in the Sacramento and San Joaquin rivers and their tributaries. Populations upstream of migration barriers remain excluded from this DPS. Hatchery stocks within the DPS include Coleman National Fish Hatchery, Feather River Hatchery, and Mokelumne River Hatchery.

In its most recent five-year review, NMFS determined the listing status of CCV steelhead had not improved since the previous five-year review and recommended that the DPS remain listed as a threatened species (NMFS 2016g). Most natural-origin CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to natural-origin fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead. While updated data on steelhead in the American River is mostly based on hatchery returns, natural spawning populations within the Sacramento River tributaries had fluctuated, but showed a steady decline from 2008 to 2018 (Scriven et al. 2018).

The most recent viability assessment (Johnson et al. 2023) determined that 11 of the 16 populations for which there are data available are at high risk of extinction based on abundance and/or hatchery influence, no populations are at low risk of extinction, and the overall viability of the ESU has not changed since 2016. Therefore, the species remains at moderate risk of extinction.

2.2.2.8. sDPS Green Sturgeon

The Sacramento River watershed is the only confirmed historical and present spawning area for sDPS green sturgeon. Adult sDPS green sturgeon spawn in the Sacramento River primarily from April through early July, although spawning may extend through October. Post-spawn adults hold for several months in the Sacramento River and out-migrate to the ocean in the fall or winter. Larval green sturgeon are suspected to remain near spawning habitats. Juveniles remain in upriver rearing habitats after metamorphosis. Some juveniles may travel to the ocean and transition to the subadult life stage in their first year, but data suggest ocean entry typically occurs at a later age. Subadults utilize riverine habitats in the Sacramento River watershed.

According to the most recent five-year review (NMFS 2021) and the final recovery plan for sDPS green sturgeon (NMFS 2018), some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of some passage barriers. Also, several habitat restoration actions have occurred in the Sacramento River Basin, and spawning was documented on the Feather and Yuba rivers. However, the species viability continues to face a moderate risk of extinction because many threats have not been addressed, and the only spawning location that is known to support the sDPS occurs in a single reach of the main stem Sacramento River. Current threats include poaching and habitat degradation. A recent method has been developed to estimate the annual spawning run and population size in the upper Sacramento River so the species can be evaluated relative to recovery criteria (Mora et al. 2018). In its most recent five-year review, NMFS recommended that sDPS green sturgeon remain listed as a threatened species (NMFS 2021).

2.2.3. Status of Critical Habitat

The designations of critical habitat for the species described above previously used the term primary constituent element or essential features. The new critical habitat regulations (81 FR 7214) replace 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 primary constituent elements, physical or biological features, 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.

In designating critical habitat, NMFS considers, among other things, the following requirements of the species: 1) space for individual and population growth, and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing offspring; and, generally; and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on PBFs and/or essential habitat types within the designated area that are essential to the conservation of the species and that may require special management considerations or protection (81 FR 7214).

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

PBFs for CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, and CCV steelhead critical habitat, and their associated essential features within freshwater are:

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

PBFs for sDPS green sturgeon are described in Section 2.2.3.8.

2.2.3.1. SONCC Coho Salmon Critical Habitat

SONCC coho salmon critical habitat covers approximately 10,413 square miles (in California) and includes coastal watersheds from Elk River (Oregon) in the north to Mattole River (California) in the south. Habitat within this geographic area has been degraded from historical conditions by ongoing land management activities. 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; 70 FR 37160; 64 FR 24049].

The condition of designated critical habitat for SONCC coho salmon, and its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. The water bodies that make up critical habitat for these species often have poor quality summer and rearing habitats due to lack of instream and riparian cover (large wood, deep pools, trees for shade, etc.), low summer stream flows, and high water temperatures. Spawning habitats are often degraded by high levels of fine sediments and lack of cover. Migration habitats often lack cover and resting areas and some spawning habitats are no longer accessible.

2.2.3.2. CCC Coho Salmon Critical Habitat

CCC coho salmon critical habitat includes 2,235 stream miles and is designated to include all river reaches assessable to listed coho from Punta Gorda in northern California south to the San Lorenzo River in central California, including Arroyo Corte Madera Del Presidio and Corte Madera Creek, which are tributaries to San Francisco Bay. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats).

Impacts of concern in this designated critical habitat include: alteration of streambank and channel morphology, alteration of ambient water temperatures, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of spawning gravels and large wood, removal of riparian vegetation resulting in increased stream bank erosion, and degradation of water quality (61 FR 56138). Of particular concern is increased sediment input into spawning and rearing areas resulting from the loss of channel complexity, degraded pool habitat, availability of suitable gravel substrate, and lack of large woody material (61 FR 56138). Decreased large woody material in streams has reduced habitat complexity and contributed to the loss of cover, shade, and pools which are required by juvenile coho salmon (60 FR 38011).

2.2.3.3. CC Chinook Salmon Critical Habitat

Critical habitat has been designated for CC Chinook salmon in rivers and streams from south of (but not including) the Klamath River in Humboldt County to (and including) the Russian River in Sonoma County. There are approximately 1,475 stream miles and 25 square miles of estuary habitat across 45 occupied watersheds within this ESU.

All life stages of CC Chinook are impaired by degraded habitat conditions such as reduced habitat complexity, riparian removal, sedimentation, altered instream flows, degradation of water quality, instream wood removal and poor estuarine habitats (NMFS 2016d). NMFS cited numerous factors driving these impairments, including agriculture, logging, ranching, recreation, mining, habitat blockages, water diversions, artificial propagation, estuarine destructions or modification, flooding, hydropower development, instream habitat problems, general land use activities, urbanization, and water management (NMFS 2016d). At the time of listing, NMFS reported that access to upstream spawning and rearing habitat was severely restricted by dams, especially for spring-run fish (NMFS 2016d). Since listing, NMFS reports that water quality has been further impaired and habitat function and availability have been further reduced by illicit agricultural practices (NMFS 2016d).

2.2.3.4. SR Winter-Run Chinook Salmon Critical Habitat

Critical habitat has been designated for SR winter-run Chinook salmon in the Sacramento River from Keswick Dam to Chipps Island at the westward margin of the Sacramento-San Joaquin Delta (Delta); all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and the Carquinez Strait all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay north of the San Francisco-Oakland Bay Bridge from San Pablo Bay to the Golden Gate Bridge. The critical habitat designation includes the river water, river bottom and adjacent riparian zones used by fry and juveniles for rearing.

PBFs considered essential to the conservation of the species include: access from the Pacific Ocean to spawning areas; availability of clean gravel for spawning substrate; adequate river flows for successful spawning, Incubation of eggs, fry development and emergence, and downstream transport of juveniles; water temperatures at 5.8–14.1°C (42.5–57.5°F) for successful spawning, egg incubation, and fry development; riparian and floodplain habitat that provides for successful juvenile development and survival; and access to downstream areas so that juveniles can migrate from spawning grounds to the San Francisco Bay and the Pacific Ocean. Although the current conditions of PBFs for SR winter-run Chinook salmon critical habitat in the Sacramento River are significantly limited and degraded, the habitat remaining is considered highly valuable.

2.2.3.5. CV Spring-Run Chinook Salmon Critical Habitat

Critical habitat has been designated for CV spring-run Chinook salmon in the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, and portions of the northern Delta. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water mark. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation.

PBFs considered essential to the conservation of the species include spawning habitat, freshwater rearing habitat, freshwater migration corridors, and estuarine areas. Although the current conditions of PBFs for CV spring-run Chinook salmon critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

2.2.3.6. NC Steelhead Critical Habitat

Critical habitat has been designated for NC steelhead in Redwood Creek and certain coastal watersheds southward to, but not including, the Russian River. There are approximately 3,028 stream miles plus 25 square miles of estuary habitat across 50 occupied watersheds in this DPS. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation (33 CFR 329.11).

All life stages of NC steelhead are impaired by degraded habitat conditions (NMFS 2016d). Numerous factors driving these impairments, including a lack of habitat complexity and shelter formed by instream wood, high sediment loads, lack of refugia during winter, low summer flows, reduced quality and extent of coastal estuaries and lagoons, and reduced access to historic spawning and rearing habitat (NMFS 2016d).

2.2.3.7. CCV Steelhead Critical Habitat

Critical habitat has been designated for CCV steelhead in the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, and portions of the northern Delta. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation.

PBFs considered essential to the conservation of the species include: Spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas. Although the current conditions of PBFs for steelhead critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

2.2.3.8. sDPS Green Sturgeon Critical Habitat

Critical habitat for sDPS green sturgeon has been designated in the stream channels and waterways in the Delta to the ordinary high-water line. Critical habitat also includes the mainstem Sacramento River upstream from the I Street Bridge to Keswick Dam, the Feather River upstream to the fish barrier dam adjacent to the Feather River Fish Hatchery, and the Yuba River upstream to Daguerre Dam.

Critical habitat in coastal marine areas include waters out to a depth of 60 fathoms, from Monterey Bay in California, to the Strait of Juan de Fuca in Washington. Coastal estuaries designated as critical habitat include San Francisco Bay, Suisun Bay, San Pablo Bay, and the lower Columbia River estuary. Certain coastal bays and estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor) are included as critical habitat for sDPS green sturgeon.

PBFs considered essential to the conservation of the species for freshwater and estuarine habitats include: food resources, substrate type or size, water flow, water quality, migration corridor; water depth, sediment quality. In addition, PBFs include migratory corridors, water quality, and food resources in nearshore coastal marine areas.

Although the current conditions of PBFs for sDPS green sturgeon critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

2.2.4. Additional Threats to Listed Species and Critical Habitats

2.2.4.1. Global Climate Change

Recent work by the NMFS Science Centers ranked the relative vulnerability of west-coast salmon and steelhead to climate change. In California, listed coho and Chinook salmon are generally at greater risk (high to very high risk) than listed steelhead (moderate to high risk) (Crozier et al 2019).

Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level increased in California over the last century (Kadir et al. 2013). Snowmelt from the Sierra Nevada has declined (Kadir et al. 2013). Although coastal salmonids are not dependent on snowmelt driven streams, they have likely already experienced some detrimental impacts from climate change through lower and more variable stream flows, warmer stream temperatures, and changes in ocean conditions. California experienced well below average precipitation during the 2012-2016 drought, as well as record high surface air temperatures in 2014 and 2015, and record low snowpack in 2015 (Williams et al. 2016). Paleoclimate reconstructions suggest the 2012-2016 drought was the most extreme in the past 500 to 1000 years (Williams et al. 2016, Williams et al. 2020, Williams et al. 2022). Anomalously high surface temperatures substantially amplified annual water deficits during 2012-2016. California entered another period of drought in 2020. These drought periods are now likely part of a larger drought event (Williams et al. 2022). This recent long-term drought, as well as the increased incidence and magnitude of wildfires in California, have likely been exacerbated by climate change (Williams et al. 2020, Williams et al. 2022, Diffenbaugh et al. 2015, Williams et al. 2019).

The threat to ESA-listed salmonids and sDPS green sturgeon from global climate change is expected to increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley et al. 2007; Moser et al. 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe et al. 2004; Moser et al. 2012; Kadir et al. 2013). Total precipitation in California may decline and the magnitude and frequency of dry years may increase (Lindley et al. 2007; Schneider 2007; Moser et al. 2012). Similarly, wildfires are expected to increase in frequency and magnitude (Westerling et al. 2011; Moser et al. 2012). Increases in wide year-to-year variation in precipitation amounts (droughts and floods) are projected to occur (Swain et al. 2018). Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia et al. 2002; Ruggiero et al. 2010).

In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008; Feely 2004; Osgood 2008; Turley 2008; Abdul-Aziz et al. 2011; Doney et al. 2012). Some of these changes, including an increased incidence of marine heat waves, are likely already occurring, and are expected to increase (Frolicher, et al. 2018). In fall 2014, and again in 2019, a marine heatwave formed throughout the northeast Pacific Ocean, which greatly affected water temperature and upwelling from the Bering Sea off Alaska, south to the coastline of Mexico. The marine waters in this region of the ocean are utilized by salmonids for foraging as they mature (Beamish 2018). Although the implications of these events on salmonid populations are not fully understood, they are having considerable adverse consequences to the productivity of these ecosystems and presumably contributing to poor marine survival of salmonids.

In the California's North Coast, North Central Coast and the Northern Central Valley, warm temperatures generally occur in July and August, but with climate change these events will likely begin in June and could continue through September (Cayan et al. 2012). Climate simulation models indicate the San Francisco region will maintain its Mediterranean climate regime for the 21st century; however, these models predict a high degree of variability in annual precipitation through at least 2050, leaving the region susceptible to drought (Cayan et al. 2012). These models of future precipitation suggest that, during the second half of the 21st century in this region, most years will be drier than the historical annual average (1950-1999).

2.2.4.2. Thiamine deficiency

A recent shift in food webs in the northeastern Pacific Ocean has led to increased abundance of anchovies in certain coastal regions. Anchovies produce an enzyme called thiaminase that breaks down thiamine, which typically supports nerve, muscle, and heart function. When adult salmonids consume large quantities of anchovies prior to their return to river entry, their offspring suffer from thiamine deficiency complex, substantially reducing their survival. Thiamine deficiency can occur in adult salmonids and influence their reproductive success and the health of their progeny (Harder et al. 2018). In fall and winter of 2019, Chinook salmon populations in the Central Valley of California (fall-, spring-, and late fall-run) were diagnosed with thiamine deficiency complex (TDC) resulting from parental diets high in anchovies (SWFSC 2022). More recently, steelhead sampled at Mad River Hatchery and Warm Springs Hatchery (Russian River) had low thiamine levels in 2022 (SWFSC unpublished data).

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 ESA action area encompasses almost 14.4 million acres in eight counties in northwestern California. For the purposes of this consultation, the ESA action area includes all areas within the NCIP planning area boundary, as shown in Map 1-1 of BLM (2024). The decision area is a subset of BLM-managed lands within the action area for which BLM has authority to make land use decisions. The decision area is currently approximately 382,200 acres of surface estates (shown in yellow on Figure 1) and 306,900 subsurface acres or mineral estates (shown as white outlined in pink on Figure 1) for an approximate total of 689,100 acres of BLM-managed lands. The decision area is expected to change over time when BLM disposes of lands (relinquishing the authority to make land use decisions) and gains authority to manage new lands through acquisitions. The action area spans from the Pacific coast to the Sierra Nevada. Diverse vegetation communities are represented, including coastal dunes, coniferous forests, chaparral, grasslands, and oak woodlands.

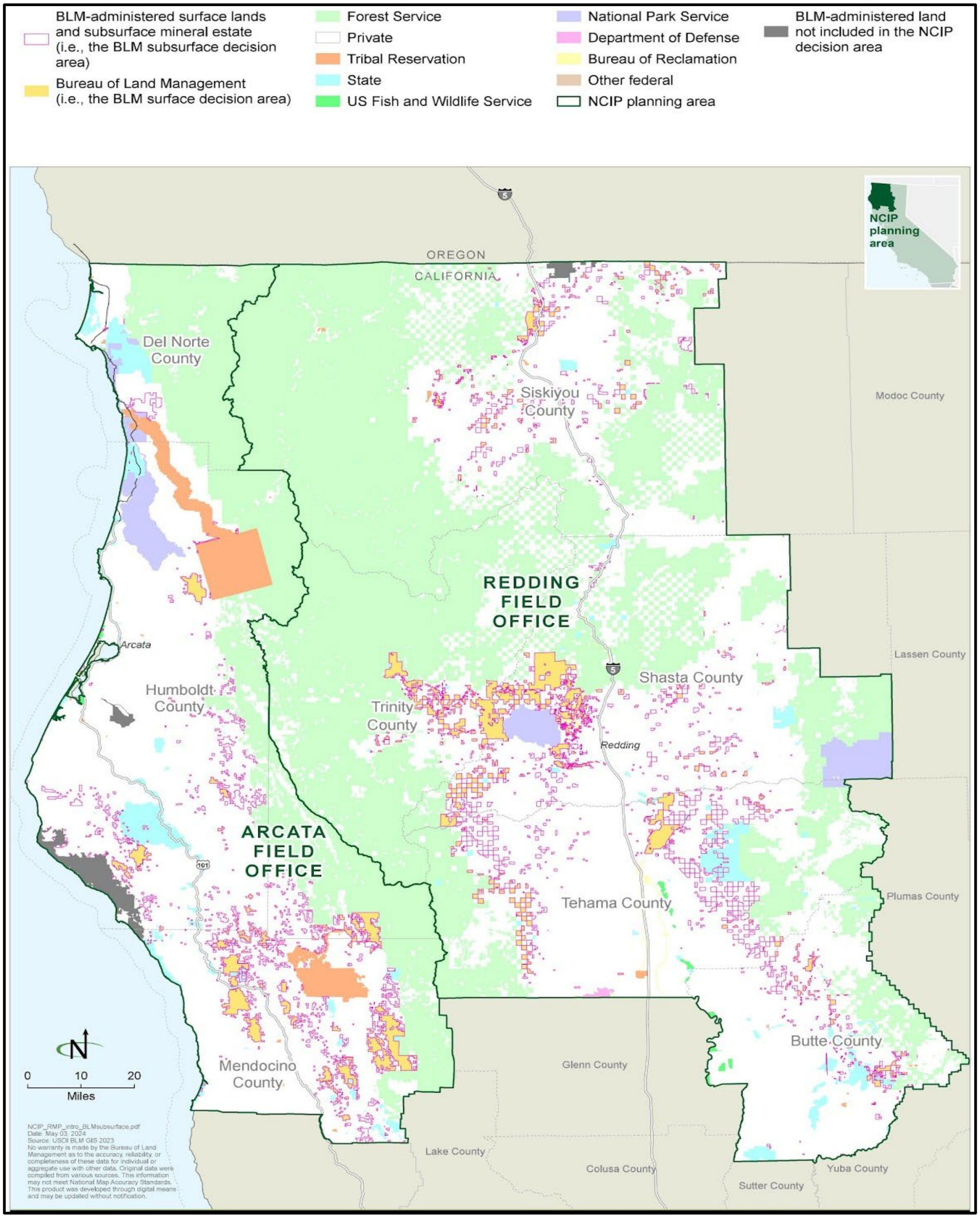

Figure 1: ESA action area for NCIP, with current BLM decision area shown as surface estates (in yellow) and subsurface estates (white with pink outline). Other colors depict lands owned by other entities.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from federal agency activities or existing federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The action area encompasses almost 14.4 million acres in eight counties in the North Coast, North Central Coast, and Northern Central Valley regions of northwestern California. Native plant communities within the action area include old-growth redwood (Sequoia sempervirens) forest along the coast, Douglas fir (*Pseudotsuga menziesii*) intermixed with hardwoods in the foothills, ponderosa pine (*Pinus ponderosa*), and Jeffrey pine (*Pinus jefferyi*) in the upper elevations; and grasslands, oak woodlands (*Quercus douglasii*, *Q. lobata*), and chaparral in the Central Valley.

For the most part, the action area has a Mediterranean climate characterized by cool, wet winters with typically high runoff and dry, warm summers characterized by low stream flows. Fog is a dominant climatic feature along the coast, generally occurring daily in the summer and not infrequently throughout the year. Higher elevations and inland areas tend to be relatively fog free. Most precipitation falls during the winter and early spring as rain, with occasional snow at higher elevations, especially in the interior mountainous regions of northern California. Average air temperatures range from 46° to 56° F along the coast. Further inland and in the southern part of the action area, annual air temperatures are much more varied, ranging from below freezing in winter to over 100° F during the summer months. The action area will change in the future due to climate change, as described in detail in section 2.4.3 below.

High seasonal rainfall on bedrock and other geologic units with relatively low permeability, erodible soils, and steep slopes contribute to the flashy nature (stream flows rise and fall quickly) of the watersheds within the action area. In addition, these high natural runoff rates have been increased by extensive road systems and other land uses. High seasonal rainfall and rapid runoff rates on unstable soils deliver large amounts of sediment to river systems. As a result, many river systems within the action area contain a relatively large sediment load, typically deposited throughout the lower gradient reaches of these systems.

2.4.1. Status of, and Factors Affecting, the Species and Critical Habitat in the Action Area

This section provides a synopsis of the geographic area of consideration, the ESUs, DPSs, and watersheds present, specific recent information on the status of salmon and steelhead in the action area, and a summary of the factors affecting the listed species residing within the action area (shown in Figure 1).

The best information currently available demonstrates that a multitude of factors, past and present, have contributed to the decline of west coast salmonids and sDPS green sturgeon. The most recent viability assessments for the ESA-listed species considered in this consultation species concluded that the extinction risk for all ESUs and DPSs had not improved since the last five-year review (Johnson et al. 2023, Spence 2023, Williams 2023, Williams et al. 2016). The following summarizes the factors affecting ESA-listed species and their designated critical habitat in the action area.

2.4.1.1. North Coast and North Central Coast Areas

The North Coast area includes all coastal streams entering the Pacific Ocean from the Oregon/California border south to Bear Harbor in Mendocino County. This area includes portions of the range of SONCC coho salmon, CC Chinook salmon, and NC steelhead. In addition, the North Coast Area contains critical habitat for these species in the following watersheds within the NCIP action area: Lower Klamath River, Shasta River, Upper Trinity River, Redwood Creek, Mad River, Mattole River, Lower Eel-Van Duzen River, Mainstem Eel River, Middle Mainstem Eel River, South Fork Eel River, North Fork Eel River, and Middle Fork Eel River.

The North Central Coast area includes all coastal California streams in Mendocino County entering the Pacific Ocean south of Bear Harbor. This area includes portions of the range of endangered CCC coho salmon as well as threatened CC Chinook salmon and NC steelhead. BLM currently has no holdings in the North Central Coast area, but is considering future acquisitions in watersheds in this area, which contain designated critical habitat for these species.

Urban development in these areas is found primarily on the estuaries of the larger streams, with small towns and rural residences scattered throughout. Timber production is the dominant land use. Agriculture, particularly cannabis production, has increased in recent years. Major issues limiting salmonid survival and recovery throughout the North Coast and North Central Coast areas include excessive fine sediment, poor water quality/quantity, lack of instream structure, low recruitment and abundance of large wood, and limited access to floodplain rearing areas (NMFS 2012, 2014, 2016a). Elevated water temperatures and low stream flows are common in the southern portions of the Eel and Mattole drainages, Shasta River, and watersheds draining the Mendocino coast. In recent years, diversions to support municipal water needs in Mendocino coast streams have impacted summer flows. Past logging and road building practices caused extensive hillside erosion within the Klamath River, Mad River, Redwood Creek, Eel River, and Mattole River watersheds. During the intensive logging period, massive floods (such as the 1955 and 1964 incidents) accelerated erosion rates, leading to fine sediment deposition and pool aggradation that remains to this day.

Agricultural water demand in the upper Klamath River, Trinity River, Shasta River, and Scott River watersheds has depressed SONCC coho salmon abundance and spatial diversity. Mainstem Klamath and Trinity River reservoirs historically blocked fish passage, interrupted natural river hydrology, and supported aquatic disease outbreaks by warming and enriching stored water (via eutrophication) before release downstream (NMFS 2014). In the Klamath River the lack of bedload-moving winter discharge and warm spring river flows have allowed a native salmon pathogen (*Ceratomyxa shasta*) to flourish, significantly depressing the survival of coho salmon smolts during their downstream migration. Removal of the four mainstem dams will improve hydrologic function, water quality, and disease conditions in the Lower Klamath River and estuary. Copco No. 2 Dam was removed in December 2023. As of August 2024, the removal of three remaining mainstem dams is underway (J.C. Boyle, Copco No. 1, and Iron Gate). Sediment that has accumulated behind these dams has been released and the river is transporting it downstream. Simultaneous demolition of all three dams is set to begin in June 2024 and end by September 2024.

Further south, within the Eel and Mattole Rivers and Mendocino County drainages, unregulated cannabis cultivation has denuded hillsides, reduced summer stream flows, and polluted waterways with chemical pesticides and fertilizers (NMFS 2012a, NMFS 2014, NMFS 2016b). State regulation of legal cannabis crops starting in 2016, and increased enforcement targeting illegal grows will likely minimize cannabis-related impacts in the future. However, most cannabis cultivators seeking permitting propose using groundwater pumping as their water source. Many of the wells drilled to provide this water are likely to be close to streams and rivers and so may be depleting hydraulically connected streamflow and significantly impairing salmonid instream habitat. Drought conditions from 2012-2015 and 2020-2022 were a major stressor to species in the North Coast and North Central Coast areas. Compared to the North Central Coast Area and the North Central Valley Area, North Coast salmon and steelhead populations exhibit greater abundance and spatial diversity, although abundance in these populations remains well below recovery targets according to the latest viability reports (Spence 2023, Williams 2023, Williams et al. 2016).

2.4.1.2. North Central Valley Area

The North Central Valley area includes the Sacramento River and tributaries from the Keswick Dam in Shasta County to the Feather River in Butte County. This area includes portions of the range of CV spring-run Chinook salmon, SR winter-run Chinook salmon, CCV steelhead, and southern DPS Green Sturgeon. In addition, the North Central Valley Area contains critical habitat for all four species in the following watersheds within the NCIP action area: Sacramento River, Clear Creek, Battle Creek, Cottonwood Creek, Paynes Creek, Inks Creek, and Butte Creek.

Urban development in this area is found primarily on the mainstem Sacramento River, with small towns and rural residences scattered throughout the area. Agriculture is the dominant land use on the valley floor. In the upper watersheds of the tributaries, timber harvest and recreation on public lands are the primary land uses.

Major factors limiting the survival and recovery of salmonids in the mainstem Sacramento River include passage barriers, fluctuating temperatures and stream flows, chemical contamination from urban runoff, lack of spawning gravel, hatchery influence, and loss of productive off-channel rearing areas due to bank fortification and flood control levees. Major limiting factors in the tributaries include high water temperatures and poaching in summer holding areas, low stream flows, passage barriers, water diversions, low recruitment and abundance of large wood, inadequate summer and winter rearing habitat due to a lack of instream structure, and high sediment load due to logging, roads, grazing, and catastrophic wildfire (NMFS 2016b, 2021, 2024).

SR winter-run Chinook salmon are particularly vulnerable to environmental conditions in the mainstem Sacramento River. In the 1940s, Shasta Dam blocked passage to historic cold-water summer spawning grounds in the McCloud River and other high-elevation streams. SR winter-run Chinook are now restricted to spawning in the mainstem Sacramento River below Keswick dam, where they depend on cold water releases from Shasta reservoir. This can result in catastrophic losses if the cold water pool is insufficient due to drought or water-use conflicts. According to the current viability report (Johnson et al. 2023), the ESU remains in the “High” biological extinction risk category, due primarily to its supporting only one spawning population as well as increasing reliance on production from the fish hatchery. The overall viability of the ESU has continued to decline since the last viability assessment in 2015, with the single spawning population on the mainstem Sacramento River now at high risk of extinction (Johnson et al. 2023). Efforts to recover the species include re-introduction to historic habitat in Battle Creek and trap and haul programs to truck both adult and juvenile winter-run Chinook salmon around Keswick, Shasta, and McCloud dams. Successful spawning of SR winter-run Chinook salmon has been documented in Battle Creek since 2020 (NMFS 2024a).

Southern DPS green sturgeon also depend on cold water releases from Shasta Reservoir. According to the current five-year review (NMFS 2021), the only consistent spawning population of southern DPS green sturgeon is found in the mainstem Sacramento River within the NCIP action area. There are no estimated population growth rates for this species, and current population trends are unclear due to inconsistent monitoring. However, based on the available data on abundance and demographic trends, no changes to the species status or threats are evident since the last review. Some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of passage barriers. However, the species viability continues to face a moderate risk of extinction. Because spawning adults congregate in a limited area, poaching and habitat loss are major concerns (NMFS 2021).

CCV steelhead and CV spring-run Chinook salmon are sensitive to environmental conditions in the tributaries due to their relatively long residence time in fresh water. The most recent viability assessment for CV spring-run Chinook salmon (Johnson et al. 2023) documented a decline in viability of the ESU since the 2015 assessment, with an increased risk of extinction for all independent populations and continued declines in dependent populations and a greater risk of extinction at the ESU scale. The overall viability of the CCV steelhead DPS remains unchanged since the 2015 assessment, and the species remains in the “Moderate” biological extinction risk category (Johnson et al. 2023). The lack of improved natural production by CCV steelhead, as estimated by exit at Chipps Island, and low abundances coupled with large hatchery influence in the Southern Sierra Nevada diversity group are cause for continued concern (Johnson et al. 2023).

2.4.1.3. Climate Change

The effects of climate change on ESA-listed coho salmon, Chinook salmon, steelhead, and green sturgeon in the North Coast and North Central Coast Areas will likely be lower compared to the effects on ESA-listed species in the Northern Central Valley area due to the benefits of cool, foggy weather in the North Coast Area and portions of the North Central Coast Area, including old growth redwood forests, dense riparian vegetation, and relatively low stream temperatures (NMFS 2014, NMFS 2016a). The effects of climate change will be more pronounced in the southern portion of the North Central Coast Area and in the Northern Central Valley Area, with greater impacts to CCC coho salmon, CV spring-run Chinook salmon, SR winter-run Chinook salmon, CCV steelhead, and southern DPS green sturgeon. Water temperatures will reach extremes during the summer months as stream flows decrease and air temperatures increase. Long-term effects may include loss of cold-water stream habitat, loss of tributary and flood-plain rearing habitat, alterations to migration patterns, accelerated embryo development, premature emergence of fry, increased bio-energetic and disease stresses on fish, and increased competition among species.

In coastal and estuarine ecosystems, threats from climate change are largely due to sea level rise and the loss of coastal wetlands. Sea levels will likely rise exponentially over the next 100 years; possibly 43-84 cm by the end of the 21st century (IPCC 2023). Estuaries are crucial rearing areas for listed salmonids and green sturgeon. Rising sea levels will move ocean and estuarine shorelines by inundating lowlands, displacing wetlands and altering the tidal range in rivers and bays. Increased frequency and intensity of rainfall can lead to greater stormwater runoff, erosion and sedimentation. Increased nutrient, pollution or sediment can threaten estuarine ecosystem function.

Overall, climate change is believed to represent a growing threat, and will challenge the resilience of salmonids and other species in coastal and inland areas of northern California.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but are not part of the 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 402.02).

BLM's decision area represents 2.6% of the total acres within the action area (BLM 2024). The miles of BLM-managed lands as a percentage of the total miles of designated critical habitat for each ESU/DPS are shown in Table 1. This percentage is highest for the SR winter-run Chinook salmon at 6.1%, and lowest for CCC coho salmon at 0%, because there are currently no BLM-managed lands in the action area in the range of CCC coho salmon.

Table 1. Miles of critical habitat within the action area and BLM-managed lands by ESU/DPS range. Source: BLM (2024).

ESU/DPS	Total miles within ESU/DPS Range	Miles within Action Area	Miles on BLM-managed lands	Percent of ESU/DPS miles on BLM-managed lands
SONCC coho salmon[1]	11027	6824	170	**1.5 %**
CCC coho salmon	2234	216	0	**0.0 %**
Sacramento River winter-run Chinook salmon	299	108	18	**6.1 %**
CV spring-run Chinook salmon	1158	643	32	**2.8 %**
CC Chinook salmon	1504	1190	35	**2.4 %**
NC steelhead	3029	2095	64	**2.1 %**
CCV steelhead	2316	1029	57	**2.5 %**
Southern DPS Green Sturgeon[2]	320	137	18	**5.7 %**

[1]SONCC coho distribution used as surrogate for unmapped critical habitat
[2]Includes river miles only

A large portion of BLM-managed lands that contain fish habitat are protected through special designations such as Wild and Scenic Rivers (i.e., Eel, Trinity, and Klamath rivers), Wilderness, Areas of Critical Environmental Concern, and Late Successional Reserves. In addition, all streams and water bodies must be managed in accordance with RMAs restrictions, and any project or program-level action that may affect listed species will be subject to individual ESA section 7 consultation with NMFS. The analysis and conclusions in this section considers the overall magnitude of potential effects to each species and their critical habitats, along with the proposed BMPs.

The Rangewide Status of the Species and Critical Habitat (Section 2.2) describes the life histories and status of the ESA-listed fish species managed by NMFS that are affected by the Proposed Action, as well as the status of designated critical habitat for these species. We present our effects analysis below. The management direction, potential management activities, and BMPs for each NCIP program area, as summarized in Section 1.3 (Proposed Federal Action), provide the plan-level constraints that allow us to analyze the anticipated effects as a result of the proposed action.

2.5.1. Effects to Species

Except for fish handling associated with effectiveness monitoring which may happen any time of the year, all instream NCIP implementation actions that may adversely affect ESA-listed salmonids and/or sDPS green sturgeon will occur between June 15 and November 1 (except the work windows in the Central Valley may be adjusted to reduce impacts to adult SR winter-run Chinook salmon and adult CV spring-run Chinook salmon). This period is designed to avoid the adult migratory periods of most coastal salmon and steelhead, but small numbers of adult salmonids of any ESU or DPS may linger in the action area during this period. In addition, adult CV spring-run Chinook salmon and adult summer NC steelhead hold in streams with sufficient cold water throughout the summer prior to spawning in the fall and winter. Juvenile salmonids are expected to be present throughout the action area during this period. Larval, juvenile, and adult sDPS green sturgeon are expected to be present in the mainstem Sacramento River during this time period. Therefore, NMFS expects the following life stages of each species may be present during instream activities to implement NCIP and potentially be exposed to effects of such activities: juvenile SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, and CCV steelhead; adult SR winter-run Chinook salmon, CV spring-run Chinook salmon, and summer NC steelhead; and larval, juvenile, and adult sDPS green sturgeon. NCIP implementation actions not occurring in the stream may occur outside of the instream work window. In addition, the effects of some NCIP actions may occur outside of the work window. For example, small amount of soil disturbed while establishing access to install an instream habitat structure may be carried into a stream by fall rains, causing temporary turbidity.

Appendix B of the NCIP BA (BLM 2024) represents a library of BMPs that BLM will draw from to minimize the effects of any given NCIP implementation project on listed salmonids, sDPS green sturgeon, and habitat for these species. The specific BMPs for each implementation project will be determined during future ESA consultations with NMFS and chosen to minimize the impacts of all relevant categories of effects to species described below.

2.5.1.1. Noise, Motion, and Vibration Disturbance

Noise, motion, and vibration disturbance resulting from activity in the channel may cause minor and temporary behavioral effects to listed species. NMFS expects any juvenile or adult salmonids or green sturgeon present in the action area during implementation activities to temporarily move to other available areas to avoid episodic areas of disturbance, resulting in minor, temporary changes in fish behavior (an hour or less). Any fish present are expected to detect areas of disturbance, actively avoid those portions of a project footprint where heavy equipment is operated, and move into undisturbed habitat nearby. Juvenile or adult salmonids and green sturgeon may be attracted to activity that stirs up sediment as it can disrupt benthic prey, but are expected to move quickly away whenever they detect an immediate threat. Because these avoidance behaviors will likely be limited to short time periods, we don’t anticipate any reductions in the fitness of individual salmonids or green sturgeon.

2.5.1.2. Disturbance of Riparian and Aquatic Habitat

NMFS expects any disturbance of riparian and aquatic habitat resulting from implementation of NCIP to cause only minor, temporary effects to individual fish, with one exception. The effects to species resulting from mobilization of sediment are discussed in Section 2.5.1.7 and are not included in the following discussion.

Some degree of disturbance to riparian and aquatic habitat is possible during implementation of individual NCIP implementation projects [i.e., when access to the habitat where fish are located is established, and during instream activities]. The following are program-specific examples of BMPs that may be implemented to avoid and minimize effects of disturbance of riparian and aquatic habitat on listed species to the maximum extent practicable from BLM (2024): Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Restoration Activities (RST-01 to RST-13), Road Stream Crossings (SC-01 to SC-20), Road Construction and Reconstruction (R-01 to R-42), Recreation Management (REC-01 to REC-35), Spill Prevention and Abatement (SP-01 to SP-08), Livestock (G-01 to G-12), and Minerals Development (M-01 to M-09). NMFS expects use of these and other appropriate BMPs from Appendix B of BLM (2024) will minimize the extent and severity of habitat disturbance to the extent that the effects of this disturbance on fish will be minor and temporary. NMFS expects fish will respond to this disturbance as described in Section 2.5.1.2 above.

When reaches are dewatered, or when channels are temporarily filled during grading activities, the benthic aquatic macroinvertebrate populations present in the affected areas will die. As these benthic organisms are part of the food web that provides prey to juvenile salmonids and larval, juvenile and adult green sturgeon, dewatering will reduce the amount of prey available and temporarily adversely affect the PBFs associated with prey resources. The extent of macroinvertebrate loss from any given project is expected to be small because the size of the dewatered area for any given project will be a small fraction of the total size of the stream systems they occur in, although the dewatered area may represent a larger portion of available summer rearing habitat in any given small stream or reach. Overall, juvenile salmonids and larval, juvenile, and adult green sturgeon are expected to have access to sufficient amounts of macroinvertebrate prey nearby. These effects will end once in-water work is over each year. Once flow is restored to a dewatered zone by the end of the construction season, or winter flows carve a new channel, macroinvertebrates from nearby populations are expected to recolonize affected areas within one to two months (Cushman 1985, Attrill and Thomas 1996, Harvey 1986).

2.5.1.3. Exposure to Toxic Chemicals

The following aspects of NCIP have the potential to detrimentally affect water quality: equipment refueling, fluid leakage, and maintenance activities within and near the stream channel; water in contact with wet cement; and application of herbicides, insecticides, and other toxicants, and other chemicals. The following are program-specific examples of BMPs that may be implemented to avoid and minimize effects of exposure to toxic chemicals on listed species to the maximum extent practicable from BLM (2024): Operations In or Near Aquatic Ecosystems (AQ-01 to AQ-27), Pesticide Application (P-1), and Spill Prevention and Abatement (SP-01 to SP-08). BMP REC-33 also provides guidance to connect drainage systems to existing stormwater conveyance systems or including bioretention/biofiltration systems or vegetated, permeable landscapes to convey runoff. In addition, standards and guidelines within RMAs specifically protect streams from toxic chemicals.

Effects of these activities on species are expected to be minor and temporary, because use of the applicable BMPs from Appendix B of BLM (2024) should effectively limit or eliminate entry of these chemicals into stream courses. Any fish that do detect toxic chemicals in their environment during the construction season are expected to avoid them by temporarily relocating either upstream or downstream into suitable habitat adjacent to the worksite. Salmonids are particularly vulnerable to herbicide impacts during the incubation stage. However, because no salmonid eggs or embryos would be present during the defined construction or herbicide use period, NMFS expects these life stages will not be exposed to toxic chemicals; any such chemicals that enter streams later (from residual amounts remaining after work is done) will be diluted and flushed from salmonid habitat by fall rains prior to when eggs are laid and embryos emerge.

2.5.1.4. Fish Observation, Capture, Handling, and/or Relocation

Stress, injury, or death from fish capture, handling, tagging, and/or relocation may occur when fish are relocated prior to dewatering events at project sites during the construction season. Fish may also be captured, and handled during pre and post project implementation effectiveness monitoring at select sites. The following methods may be used to capture fish prior to dewatering, or during effectiveness monitoring: seine, minnow trap, fyke net, and electrofishing with dip nets. Snorkel surveys may also be conducted to observe fish as part of effectiveness monitoring.

All project sites that require dewatering will require relocation of any fish occurring there beforehand. A qualified biologist will capture and relocate fish to locations outside of the project work site prior to draining a reach to enable in-water work, to prevent crushing and desiccation. Fish in the area to be dewatered will be captured using the method most appropriate for particular field conditions, then quickly transferred to buckets of oxygenated water and promptly released in a suitable instream location nearby. Monitoring activities may also result in fish capture and handling, but fish would be released back at the original capture site.

Juvenile salmonids and juvenile green sturgeon are the life stage most likely to be exposed to fish relocation preceding dewatering. Because of their relative mobility, any adults present near construction zones are expected to avoid these zones prior to dewatering. Any adults that made their way into construction areas set for dewatering would be clearly visible to field personnel due to their large size and strong movements. These personnel would establish a means for adult fish to leave the construction area before dewatering efforts began.

Snorkel surveys may be used to observe listed fish without capturing or handling them. NMFS expects such surveys to have minor, temporary effects on observed salmonids. Observation without handling is the least disruptive method for determining a species' presence/absence and estimating their relative numbers. Young fish frightened by the turbulence and sound created by observers are likely to seek temporary refuge in deeper water or behind or under rocks or vegetation. In extreme cases, some individuals may leave a particular pool or habitat type and then return when observers leave the area. No injuries or deaths are expected to occur as a result of snorkel surveys.

Electrofishing may be used to remove fish from areas prior to dewatering activities during the construction season, to monitor salmonids in low water conditions where stream habitat is too complex for seining or minnow traps, or in places where those methods are not effective to inform the monitoring question. During electrofishing, an electrical current is passed through water containing fish (and the fish themselves) in order to stun them, which makes them easy to capture. This method can cause effects of varying severity - from disturbance of fish to immediate mortality. Salmonids can be injured or killed by spinal injuries that sometimes occur due to forced muscle contractions when the current passes through the body. Less power is required to immobilize smaller fish than larger fish (Dolan and Miranda 2003), resulting in lower injury rates for smaller fish [such as juvenile salmonids and green sturgeon] (e.g., Hollender and Carline 1994, Dalbey et al. 1996, Thompson et al. 1997). The percentage of fish that are injured or killed by electrofishing varies widely depending on the equipment used, the settings on the equipment, the expertise of the technician, and water temperature (Sharber and Carothers 1988, McMichael 1993, Dalbey et al. 1996, Dwyer and White 1997). Studies on the long-term effects of electrofishing indicate that even with spinal injuries, salmonids can survive long-term, although severely injured fish may have stunted growth (Dalbey et al. 1996, Ainslie et al. 1998).

All Program projects will follow the Guidelines for electrofishing waters containing salmonids listed under the Endangered Species Act (NMFS 2000), which describes the appropriate settings for electrofishing gear and a temperature limit above which no electrofishing should occur. When operated by experienced personnel following these guidelines, as expected under NCIP, shocked fish normally revive quickly.

Seining methods may be used to capture salmonids and green sturgeon in deeper water without significant habitat complexity (e.g., LWD). Minnow traps are typically used in very complex habitats where seining would likely not be successful due to small/large wood and significant aquatic vegetation. Fyke nets may be used in off-channel and slow water habitats when minnow traps and seining are found to not be effective. Dip nets are used to collect fish that are stunned by electrofishing. The capture of listed salmonids using these methods is likely to cause temporary stress to these fish during transfer from the seine, trap, or net to oxygenated water containing anesthetic. Injury may occur during transfer, but due to the high experience level of field staff, NMFS expects such injury to be a rare occurrence.

The capture of juvenile fish using these nets and traps, and the removal of fish from nets and traps for further data collection, may cause some stress. Individual protocols developed with NMFS during ESA consultation as projects are developed will reduce the potential for injury or death from fish trapping (e.g., limit on water temperature allowed for handling). Based on data from years of sampling at hundreds of locations under NMFS' 4(d) scientific research and monitoring program, NMFS expects the mortality rate resulting from fish capture and removal from traps and nets, and subsequent handling, to be 3% or less (WCRO-2020-03293).

Based on analyses of fish relocation data collected across the north coast, and Program coordination requirements, NMFS expects any injury or death of listed species due to fish capture and relocation will be minimal. A CDFW analysis of data from two years of fish relocation activities in Humboldt County showed that mortality rates associated with individual fish relocation sites were less than 3% and the mean mortality rates for all sites was less than 1% (Collins 2004). Further, a NMFS (2012b) review of all Fisheries Restoration Grant Program (FRGP) annual monitoring reports of dewatering and relocation activities for 99 projects across 8 years showed less than 1% of relocated steelhead perished.

Due to required consultation with NMFS prior to project implementation, when appropriate site-specific dewatering strategies will be developed, NMFS expects fish relocated during project implementation will not suffer from lower habitat quality or reduced growth potential after they are relocated. Specifically, during ESA consultation BLM and NMFS will establish that the biologist conducting the relocation will be fully qualified, and that the planned release site for any fish captured will have similar water temperatures as the capture location, contain ample habitat for released fish, and hold a low likelihood of fish reentering the work site or becoming impinged on any exclusion nets or screens.

Based on data from years of sampling at hundreds of locations under NMFS' 4(d) scientific research and monitoring program, NMFS expects the injury and mortality rate resulting from fish capture (for all methods) and handling to be 3% or less (WCRO-2020-03293).

2.5.1.5. Crushing

If in-water work occurs without dewatering a work area, any salmonids or green sturgeon present are at risk of being killed by crushing injury from boots or heavy equipment. NMFS expects these salmonids to avoid sources of potential injury or death, but their ability to do so decreases if the amount of water in the work area is small, or if there is a large volume of equipment and people in a small watered area that is not sufficiently connected to other aquatic zones to allow fish to escape.

2.5.1.6. Desiccation

Any individual fish that elude capture prior to dewatering will become stranded in dewatered work areas, where they are expected to die from desiccation.

2.5.1.7. Turbidity and Sediment Mobilization

All project types involving ground disturbance in or adjacent to streams have the potential to increase turbidity and suspended sediment levels within the project work site and for a short distance downstream. Activity in the channel, such as wading in the river to catch fish for effectiveness monitoring, installing large wood structures, grading, or use of heavy equipment will mobilize fine sediment already present in the stream and result in turbidity. In addition, a small amount of sediment from the banks may be incidentally introduced into the channel at any Project site.

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

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

Studies of sediment effects during culvert construction determined that increased sediment accumulation within the streambed was measurable (relative to control levels within) at a range of 358 to 1,442 meters downstream of the culvert (Lachance et al. 2008). Turbidity is therefore expected to extend as far as 1,500 feet downstream of work areas. Turbidity should decline rapidly once the source of disturbance stops; the volume of water in these areas is expected to stay the same or decline during the construction season, which ends before the rainy season begins. Without disturbance from increased flow, sediment suspended in the water column is expected to rapidly settle onto the stream substrate. Each project will be required to control erosion, cover exposed dirt piles, and revegetate disturbed soils, which NMFS expects will reduce the sediment entering the stream to a great degree. Most of any newly introduced sediment that settles on the stream substrate is expected to exit the system during winter storms with scouring flows.

The following are program-specific examples of BMPs that may be implemented to avoid and minimize effects of turbidity and sediment mobilization on listed species to the maximum extent practicable: Stream Crossings for Roads (SC-1), Road Construction and Reconstruction (R-01 to R-24), Surface Drainage including Cross Drains on Road Activities (R-25 to R-42), and Recreation Management (REC-01 to REC-R-35). The specific BMPs applied to each implementation project determined during future ESA consultations will reduce the extent, severity, and duration of turbidity and reduce suspended sediment levels enough that the most severe effect would be a short-term reduction in feeding. NMFS does not expect these temporary effects to feeding to decrease the individual fitness of any listed fish.

2.5.1.8. Bioengineered Bank Stabilization

While bioengineered bank stabilization methods carried out during NCIP implementation will benefit degraded salmonid habitat by manually improving riparian and streambank habitat, the achieved habitat quality and persistence may fall short of what could be achieved naturally through dynamic channel processes if unhampered by the bank stabilization. Because of the perpetual nature of most bank stabilization structures, any impacts experienced by species with typically short life-spans (3 years for coho salmon, typically 3-4 for Chinook salmon and steelhead) will likely manifest as a continued depression in juvenile carrying capacity at the site level. While bio-engineering represents an improvement over rock or concrete solutions when it comes to physical habitat quality at the aquatic/streambank interface, both techniques preclude natural fluvial and geomorphic processes important to creating and maintaining habitat over the long term (i.e., decades and centuries). This improvement may not fully counter-balance the ongoing impact on habitat function and carrying capacity caused by extending channelization at that site into the foreseeable future, but instead compensates for it to a fair degree at the site level.

2.5.2. Effects to Designated Critical Habitat

2.5.2.1. Effects of Riparian and Aquatic Habitat Disturbance

Effects of riparian vegetation disturbance on designated critical habitat are expected to be minor and temporary. In most cases, entire trees or shrubs in riparian areas that are part of a project footprint will be left in place and their branches or vegetation cut back to establish access. Where entire riparian plants must be removed (e.g., removal of a shrub to create access to place a large wood structure), NMFS expects the loss of riparian vegetation from any given project to be small, and limited to mostly shrubs and an occasional tree. Consistent with the BMPs in Appendix B of BLM (2024) that BLM and NMFS will draw from when BLM is developing projects to implement NCIP, as well as the BMPs summarized in Section 1.3.4.4, as much understory brush and as many trees as possible will be retained, to preserve shade and natural bank stabilization benefits. The plant species most likely to be cut back or removed (willows and other shrubs) will generally reestablish quickly (usually within two to three seasons). As removal of riparian vegetation will not normally remove aquatic habitat elements, any effects to fish are also expected to be minor and limited to temporary changes in shade (shade recovery within two years) and food availability (at former levels by the next spring or summer) until replanted vegetation is established.

NMFS also expects aquatic habitat disturbance to be minor, episodic, and temporary - generally limited to compression of substrate, aquatic plants, and benthic prey from trampling and heavy equipment operation, and disturbance of benthic prey during pile driving activities. Any affected aquatic vegetation and benthic prey are expected to repopulate quickly (within a season).

2.5.2.2. Toxic Chemicals

Effects of toxic chemicals on designated critical habitat are expected to be minor and temporary because the BMPs BLM will choose, in coordination with NMFS, when designing projects (including those described in Section 2.5.1.3) should effectively limit or eliminate entry of these chemicals into stream courses. In addition, designated critical habitat would only be temporarily affected by any trace amount of chemicals that enter the water, because contaminants will be swiftly diluted and rapidly flushed from the system, either immediately or after fall rains arrive.

2.5.2.3. Turbidity, Sediment Mobilization, and Deposition of Sediment on Aquatic Substrate

Turbidity, sediment mobilization, and deposition of fine sediment on aquatic substrate may affect water quality and the food resources available for development, which are two physical and biological features (PBFs) of designated critical habitat for coho salmon, Chinook salmon, steelhead, and green sturgeon. When sediment settles out the water column, it may obscure benthic (bottom dwelling) aquatic invertebrates, which may reduce salmonid feeding efficiency. However, the amount of sediment entering waterways from projects implemented under NCIP is expected to be small, given the BMPs and project requirements described in Section 2.5.1.7. This small amount is not expected to kill or harm benthic aquatic macroinvertebrate prey items or to alter their behavior. Effects to water quality and prey items are expected to be minor and temporary, lasting from an hour to perhaps a day at a time at any given project site. Many of the projects planned for implementation such as forest fuel reduction and thinning treatments are expected to reduce harmful levels of fine sediment deposition in waterways throughout the action area.

2.5.2.4. Dewatering

Benthic aquatic macroinvertebrate populations will die when their habitat is dewatered. As these benthic organisms are part of the food web that provides prey to juvenile salmonids and larval and juvenile green sturgeon, dewatering will reduce the amount of prey available and temporarily adversely affect the PBF associated with prey resources. The extent of macroinvertebrate loss from any given project may be small because the size of the dewatered area is a small fraction of the total size of the stream systems they occur in, although the dewatered area may represent a larger portion of available summer rearing habitat in any given small stream or reach. These effects will end once in-water work is over each year. Once flow is restored to a dewatered zone, macroinvertebrates from nearby populations typically recolonize it within one to two months (Cushman 1985, Attrill and Thomas 1996, Harvey 1986).

2.5.2.5. Temporary Loss of Channel Habitat and Prey Resources

Floodplain reconnection projects that involve channel fill for hydraulic reconnection (such as when re-grading floodplains, which involves skimming earth off higher areas and moving it into lower areas) will result in a temporary loss of habitat in the portion of the channel that is filled. Once fall rains arrive, the stream will establish a new stream channel nearby, so upstream and downstream migratory access should not be impaired. A similar physical volume of habitat as occurred in the original channel should form quickly in the new channel as fall rains scour new pools. Aquatic vegetation and benthic prey are expected to colonize the area quickly (within a season).

2.5.2.6. Preclusion of Natural Channel Form and Function

The Program includes use of bioengineering techniques. These techniques are intended to resist lateral erosion while improving riparian and aquatic habitat. Habitat improvements include increased stream shade, increased production of invertebrates, providing for future recruitment of large woody material to streams, and trapping and binding fine sediment to reestablish riparian areas. Bioengineering techniques typically use a minimal amount of hard materials (e.g., rock), and are not intended to include traditional hard engineering techniques.

Bank stabilization, including that achieved through bio-engineering techniques, impacts the physical habitat in two general ways – by changing a dynamic, unrestrained stream that constantly evolves via hydrologic and geomorphic processes into a fixed, simplified channel, and by altering the physical land/water interface (i.e., streambank) that provides shelter, food, and other ecosystem benefits to young fish. Unlike lining the entire streambank with rock riprap that results in a streambank interface lacking suitable juvenile fish habitat, the proposed bioengineering methods will instead use natural material (e.g., live plantings, logs and root wads, boulders) to craft a streambank that will resist lateral erosion while providing complex rearing, feeding and sheltering habitat that is equivalent or better than the streambank habitat already present. Replacement of poorly vegetated, eroding stream banks with bio-engineered stabilization and riparian planting will improve existing habitat at project sites, improving the growth and survival of salmonids and green sturgeon.

Of greater concern than streambank habitat impacts is the long-term preclusion of natural fluvial and geomorphic processes resulting from bio-engineering when added to existing streambank stabilization in the action area. In most low gradient streams, the channel will naturally "meander", eroding laterally to dissipate its hydraulic energy while creating a sinuous longitudinal course. Meandering streams also create and maintain both the hydraulic and physical components of instream habitat used by fish and other aquatic species.

While the bioengineered bank stabilization methods carried out under NCIP will benefit degraded aquatic habitat to some degree by manually improving riparian and streambank habitat, the achieved habitat quality and persistence is expected to fall short of what could be achieved naturally through dynamic channel processes if unhampered by the bank stabilization. Because of the perpetual nature of most bank stabilization structures, any impacts experienced by critical habitat will be long-term. However, as noted above, the proposed bio-engineering approach is expected to improve habitat conditions relative to what currently exists within those portions of the action area where these practices are implemented. This improvement may not fully counter-balance the ongoing impact on habitat function and carrying capacity caused by extending channelization at that site into the foreseeable future, but instead compensates for it to a fair degree at the site level. Remaining adverse effects to critical habitat will be minimal and limited to small site specific areas.

2.5.3. Benefits to Species and their Critical Habitats

Degraded habitat was a major factor in the ESA listings of coho salmon, Chinook salmon, steelhead, and sDPS green sturgeon throughout the action area, and it remains a major limitation on recovery of these species (NMFS 2024a, 2024b, 2023, 2021, 2018, 2016b, 2016c, 2016d, 2016f, 2016g). Many projects carried out under NCIP will be designed to restore, enhance, or protect habitat, including habitat for ESA-listed salmonids and green sturgeon. Habitat improvements support rebuilding of fish populations over time, because they enable improved growth and reproduction of individual fishes. In addition to creating new habitat or restoring existing habitat, some projects will also restart natural processes that create and maintain this habitat into the future. For example, placing a large habitat structure in a river provides fish with cover and habitat from the structure itself. In addition, when winter flows interact with the structure, they will scour pools from the existing sediment nearby, and scour from flows each winter will maintain the pools over time. Water conservation projects are particularly critical, as they can relatively rapidly change the amount of water in the river, saving fish from death by desiccation as well as supporting their growth and development. Ongoing implementation of habitat restoration projects throughout the action area has been and continues to be a major driver in regional recovery of these species (NMFS 2024a, 2024b, 2023, 2021, 2018, 2016b, 2016c, 2016d, 2016f, 2016g). NCIP's wide geographic scope results in projects occurring each year in many watersheds important to species recovery, spreading the benefits of this restoration beyond a single watershed.

2.6. Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation [50 CFR 402.02]. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

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

Non-federal activities that are reasonably certain to occur within the action area include those described in the environmental baseline and likely to continue into the future: agricultural practices, water withdrawals/diversions, state or privately sponsored and funded habitat restoration activities on non-Federal lands and without Federal permit needs or funding, road work, timber harvest, and residential growth. Depending on how, where, and when these activities are carried out, they have the potential to harm or kill individuals of, and degrade critical habitat for, SONCC coho salmon, CCC coho salmon, CC chinook salmon, SR winter-run Chinook salmon, CCV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon. NMFS assumes these activities, and similar resultant effects [as described in the Status of the Species (Section 2.2) and Environmental Baseline (Section 2.4) sections within this document] on listed salmonids and sDPS green sturgeon will continue over time.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in assessing the risk that the proposed action poses to species and critical habitat. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

As described in sections above, the abundance of SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon has substantially declined from historic numbers. Nearly all populations of SONCC coho salmon are at a high risk of extinction, but SONCC coho salmon are still found in all major river basins within the ESU. The overall risk of extinction for the CCC coho salmon ESU is high due to low abundance, range constriction (especially in the south portion of the range), fragmentation, and loss of genetic diversity. CC Chinook salmon have a fragmented population structure, and the geographic distribution within the ESU has been reduced, particularly in southern and spring-run populations.

The overall viability of the SR winter-run Chinook salmon ESU has declined further since 2015, and the extinction risk remains high. The extinction risk of all independent populations of CV spring-run Chinook salmon has increased since 2015. Long-term population trends suggest that many populations of NC steelhead have a negative growth rate. All populations of CCV steelhead for which data are available are at high risk of extinction. The viability of sDPS green sturgeon has not changed; there is only one spawning location, and many threats have not been addressed. The most recent five-year reviews reaffirmed the endangered status of CCC coho salmon (NMFS 2023) and SR winter-run Chinook salmon (NMFS 2024a) and the threatened status of SONCC coho salmon (NMFS 2016b), CC Chinook salmon (NMFS 2016d), CV spring-run Chinook salmon (NMFS 2016f), NC steelhead (NMFS 2024), CCV steelhead (NMFS 2016g), and sDPS green sturgeon (NMFS 2021).

Habitat degradation has been a major factor in the decline of these species, and poor habitat conditions continue to limit their recovery potential. In addition to ongoing concerns such as fine sediment and poor water quality resulting from legacy land management practices, persistent drought conditions across most of the action area between 2015 and 2022 decreased water quantity and resulted in juvenile mortality as well as suppression of fish growth. During this same period, marine heat waves reduced marine habitat quality for salmonids by increasing temperature and changing salmonid prey quantity and quality. Thiamine deficiency complex likely contributed to additional reductions in spawning success of several salmonid stocks.

Actions to restore habitat make up the vast majority of needed actions identified in each species' recovery plan. As described in the status of the species and cumulative effects sections, NMFS expects that ongoing Federal and non-Federal actions to support human activities will continue. Some of these activities are expected to incidentally harm these species or adversely affect their designated critical habitat (e.g., agricultural practices, water withdrawals/diversions, road work, and timber harvest). Habitat restoration activities sponsored by state, federal, and private entities, as well as regulatory changes, are expected to benefit to these species and their habitat.

NCIP will continue into the future, and benefits from restoration actions carried out under NCIP or other authorities will continue to accrue. For example, increased access to good spawning habitat that results from a barrier remediation project that restores access to good spawning habitat will benefit spawners every year into the future. The vast majority of juvenile fish, as well as other fish exposed to habitat changes as a result of NCIP activities, (e.g., temporary elevated turbidity, etc.) will avoid detrimental effects, aside from potential temporary behavioral impacts to feeding behavior. As noted earlier, these behavioral impacts will likely be negligible, given their short duration and sub-injurious nature. NMFS also anticipates small losses of ESA-listed juvenile salmonids resulting from channelization of portions of streams using bioengineering techniques. Because these sites are very small relative to the stream area available to rearing juveniles throughout the action area, NMFS expects overall reductions in juvenile fish numbers due to bioengineered stream channelization to be minimal.

A large portion of BLM-managed lands that overlap fish habitat are protected through special designations such as Wild and Scenic Rivers (i.e., Eel, Trinity, and Klamath rivers), Wilderness, Areas of Critical Environmental Concern, and Late Successional Reserves (see maps in Appendix A). These special designations prohibit certain activities from occurring on these lands, prescribe limits on how certain other activities can be carried out, or both. Both prohibitions and limitations on activities are expected to reduce the detrimental impacts of BLM activities on ESA-listed salmonids and green sturgeon in the action area.

Activities within the riparian zone of streams and rivers have the potential to briefly degrade habitat for ESA-listed salmonids and green sturgeon, and cause direct harm to individual fish, more than those further from the stream. BLM's activities within the RMA of all streams and water bodies within the NCIP action area will be specifically designed to maintain and restore habitat and species, as shown by the goals and objectives and management direction for RMAs (Section 1.3.1). Further, no activities may be carried out within RMAs that would retard or prevent attainment of the ACS identified in the Northwest Forest Plan, including activities to carry out other NCIP programs.

Any action carried out under NCIP that may affect a listed species or its designated critical habitat will be subject to individual section 7 ESA consultation with NMFS during project development. During each consultation, NMFS and BLM will identify the BMPs BLM will implement to reduce or minimize any detrimental effects of that action on SONCC coho salmon, CCC coho salmon, CC chinook salmon, SR winter-run Chinook salmon, CCV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon and their designated critical habitats. The analysis and conclusions in this section consider the small overall magnitude of potential effects to each species and their critical habitats, along with the proposed protective measures.

Given that the parcels BLM manages are small and fragmented, overlapping at most 6% of the designated critical habitat for any of NMFS ESA-listed species (Table 1), any detrimental effects to species or their habitats from activities carried out under NCIP will affect a small amount of any species' range.

NMFS does not expect juvenile mortality resulting from NCIP activities to impact future adult returns for SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, CCV steelhead, or sDPS green sturgeon. Juvenile salmonids and green sturgeon rearing within the action area will tend to occur in areas with the best habitat, while NCIPs restoration activities will focus on areas with poor habitat; therefore, many juvenile salmonids occurring throughout the action area would not be subjected to potential injury or death from construction activities associated with the Program's projects, because they won't be present where these activities are occurring. In NMFS' judgment, the juvenile fishes throughout the action area that are not affected by NCIP activities are likely to result in enough future spawning adult fish to outweigh any losses resulting from relocation efforts within the action area.

Minor or temporary adverse effects to critical habitat are expected during construction of projects. Some projects may prevent lateral channel migration to some degree, which can limit the degree of habitat improvement possible on a site-specific basis. However, the use of native riparian plants during bioengineering associated with structure placed to inhibit or stop such channel migration will create essential components of critical habitat where they do not currently exist, or enhance critical habitat where it is already functional. Overall, NMFS expects NCIP will improve critical habitat by improving and enhancing a number of PBFs for all listed salmonids and green sturgeon. NMFS expects this habitat improvement will improve the probability of spawning and rearing success of subsequent generations, and so improve the distribution and abundance of SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon across the action area over time.

Inland portions of the action area could be subject to higher average summer air temperatures and lower total precipitation levels due to climate change. Although the total precipitation levels may decrease, the average rainfall intensity has increased and is expected to continue to increase in the future. Higher inland air temperatures would likely warm associated stream temperatures. Reductions in the amount of precipitation would reduce stream flow levels and estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment load. Much of the action area is in the coastal fog belt which is likely to ameliorate many climate impacts for the foreseeable future relative to inland areas. Because many NCIP activities will restore habitat-forming processes (through restoration activities or following ACS objectives in riparian zones), NMFS expects it will help improve the resilience of species and habitats to climate change across the action area.

Overall, the Program is unlikely to appreciably reduce the likelihood of survival and recovery of SONCC coho salmon, CCC coho salmon, CC Chinook salmon, SR winter-run Chinook salmon, CV spring-run Chinook salmon, NC steelhead, CCV steelhead, and sDPS green sturgeon; further, the Program is unlikely to appreciably diminish the value of designated critical habitat to the conservation of these species.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon, CCC coho salmon, CC chinook salmon, SR winter-run Chinook salmon, CCV spring-run Chinook salmon, NC steelhead, CCV steelhead, or sDPS green sturgeon 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). "Harass" is further defined by guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02).

Consistent with the final rule for framework programmatic actions (80 FR 26832) and regulations at 50 CFR 402.14(i)(7), NMFS has determined that no incidental take will occur under the framework of the NCIP. Incidental take may result from future actions implemented under the framework of the NCIP, but this incidental take will be estimated under future individual consultations.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, "conservation recommendations" are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS has no conservation recommendations to suggest.

2.11. Reinitiation of Consultation

This concludes formal consultation for NCIP.

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

In the context of this opinion, there is no incidental take anticipated and the reinitiation trigger set out in § 402.16(a)(1) is not applicable.

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 on the EFH assessment provided by BLM (BLM 2024) and descriptions of EFH for Pacific Coast salmon contained in Appendix A to the Pacific Coast Salmon Fishery Management Plan (FMP) (PFMC 2014). All streams and water bodies must be managed in accordance with RMAs restrictions, and any project or program-level action that may adversely affect EFH will be subject to individual EFH consultation with NMFS. The analysis and conclusions in this section considers the overall magnitude of potential effects to EFH at the program level, along with the proposed BMPs.

3.1. EFH Affected by the Proposed Action

The proposed action occurs within EFH for the federally managed salmon within the Pacific Coast Salmon FMP (PFMC 2014) and within, or in the vicinity of, complex channel and floodplain habitat, thermal refugia, and spawning habitat, which are designated as habitat areas of particular concern (HAPCs) for coho salmon and Chinook salmon within the Pacific Coast Salmon FMP. HAPCs are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPCs are not afforded any additional regulatory protection under MSA; however, federal projects with potential adverse impacts to HAPCs will be more carefully scrutinized during the consultation process.

3.2. Adverse Effects on EFH

NMFS determined the proposed action would adversely affect salmon EFH as follows. These effects are very similar to the effects of NCIP on coho salmon and Chinook salmon critical habitat described in Section 2.5.

Construction activities including dewatering and in-water work, and associated water quality degradation, will cause temporary adverse effects to Pacific Coast Salmon EFH. Specifically, instream construction activities to implement NCIP programs may disrupt, harm, or kill aquatic macroinvertebrate prey items for coho salmon and Chinook salmon when stream reaches are dewatered and prey items desiccate, EFH is subjected to heavy equipment work and prey items suffer crushing injury, and channels are filled during grading activities and prey items are smothered. In addition, water quality will be adversely affected by sedimentation and turbidity resulting from construction activities occurring within streams or in riparian zones. These construction activities will also adversely affect the salmon HAPCs for complex channel and floodplain habitat and spawning habitat by temporarily disrupting these habitats and limiting access to them.

Although bioengineering work associated with stabilizing channels is an improvement over rock slope protection, stabilized areas will continue to suffer from channelization and habitat simplification. Therefore, EFH will suffer some long-term loss of habitat value as described above in the biological opinion's effects section (2.5). The complex channel and floodplain habitat HAPC will also be affected by channel stabilization.

Projects implemented under NCIP that will adversely affect EFH will undergo individual EFH consultation with NMFS. During these consultations, BLM and NMFS will identify the appropriate BMPs for BLM to follow to minimize the effects of any given project on EFH, drawing from the extensive list in Appendix B of BLM (2024). During these consultations, NMFS may also identify specific EFH conservation recommendations for projects implemented under NCIP.

Overall, nearly all adverse effects of NCIP on EFH are expected to be temporary, and NCIP will improve and enhance the quantity and quality of EFH in the action area. NMFS has no EFH conservation recommendations to provide at this time. This concludes the EFH consultation on BLM's NCIP.

3.3. Supplemental Consultation

BLM must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH (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 BLM. Other interested users could include permit or license applicants, citizens of affected areas, others interested in the conservation of the affected ESUs/DPSs. Individual copies of this opinion were provided to BLM. 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 part 600.

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

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

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

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