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Humboldt Bay Power Plant
Intake and Discharge Canal Remediation Project
Biological Assessment

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Cover photos: Clockwise from top left: discharge canal west end; discharge canal east end; intake canal north end work area; discharge canal outfall structure and coastal trail.

Table of Contents

Tables

Figures

Abbreviations and Acronyms

Abbreviation/Acronym	Definition
ac	acres
BA	Biological Assessment
BMP	Best Management Practice
BO	Biological Opinion
C	Celsius
CC	California Coastal
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cm	centimeter
CFR	Code of Federal Regulations
CGP	California Construction General Permit
CH	Critical Habitat
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
CO_2e	Equivalent Carbon Dioxide
DPS	Distinct Population Segment
EEZ	Economic Exclusion Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
F	Fahrenheit
FR	Federal Register
ft	feet
ft^2	square feet
GHG	Greenhouse Gas
GWTS	Ground Water Treatment System
ha	hectares
HBPP	Humboldt Bay Power Plant
in	inch
kg	kilogram
km	kilometer
MSA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
MT	metric ton
m	meters
m^2	square meters
mi	mile
NC	Northern California
NMFS	National Marine Fisheries Service

Abbreviation/Acronym	Definition
NOAA	National Oceanic and Atmospheric Administration
PG&E	Pacific Gas and Electric Company
PCE	Primary Constituent Elements
SLR	Sea Level Rise
SONCC	Southern Oregon/Northern California Coast
SWPPP	Storm Water Pollution Prevention Plan
USACE	United States Army Corp of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1 INTRODUCTION

1.1 Purpose of the Biological Assessment

Pacific Gas and Electric Company (PG&E) is proposing to remove contaminated sediment from the intake and discharge canals located on the 58-hectare (ha) (143-acre [ac]) Humboldt Bay Power Plant (HBPP) property in King Salmon, CA and to prepare the canals for final site restoration after remediation (Proposed Action) (Figures 1–2). PG&E has determined that the HBPP intake and discharge canals are contaminated with low levels of radionuclides from past operations. The discharge canal is additionally contaminated with non-radiological contaminants that require remediation. PG&E is additionally seeking authorization for temporary use of the remediated discharge canal for storage of clean soils generated by HBPP decommissioning. Clean soils temporarily stored within the discharge canal will be removed at the conclusion of the project or may be used to establish final site restoration conditions. The scope of this Proposed Action is limited to remediation of both canals and interim use of the discharge canal before final restoration. (The anticipated restoration of the canals will be addressed in a Restoration and Redevelopment Plan for the HBPP Decommissioning Program, which will be subject to a separate permitting and, if necessary, consultation process.) The Project Area, as defined for this analysis, consists of the sediment removal areas within the intake and discharge canals, areas of ground disturbance around the canals and associated structures (e.g., intake structure, outfall structure, and cofferdam in Humboldt Bay to isolate the outfall structure [Figure 2]), and staging and laydown areas (Figure 3).

Portions of this Proposed Action have the potential to impact species listed under the federal Endangered Species Act (ESA). The ESA requires that any actions authorized, funded, or carried out by federal agencies are not likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. Performance of this project on PG&E property requires the U.S. Army Corps of Engineers' (USACE) authorization under Section 404 of the Clean Water Act and presents the federal nexus for the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) consultation under Section 7 of the ESA. Section 7 consultation with USFWS and NMFS requires the preparation of a Biological Assessment (BA) in order to obtain Biological Opinions (BO) and Incidental Take Statements for the project.

The purpose of this BA is to assess the potential effects of the Proposed Action on ESA-listed species and provide the best scientific and commercial data available for the Section 7 consultation with the USFWS and NMFS.

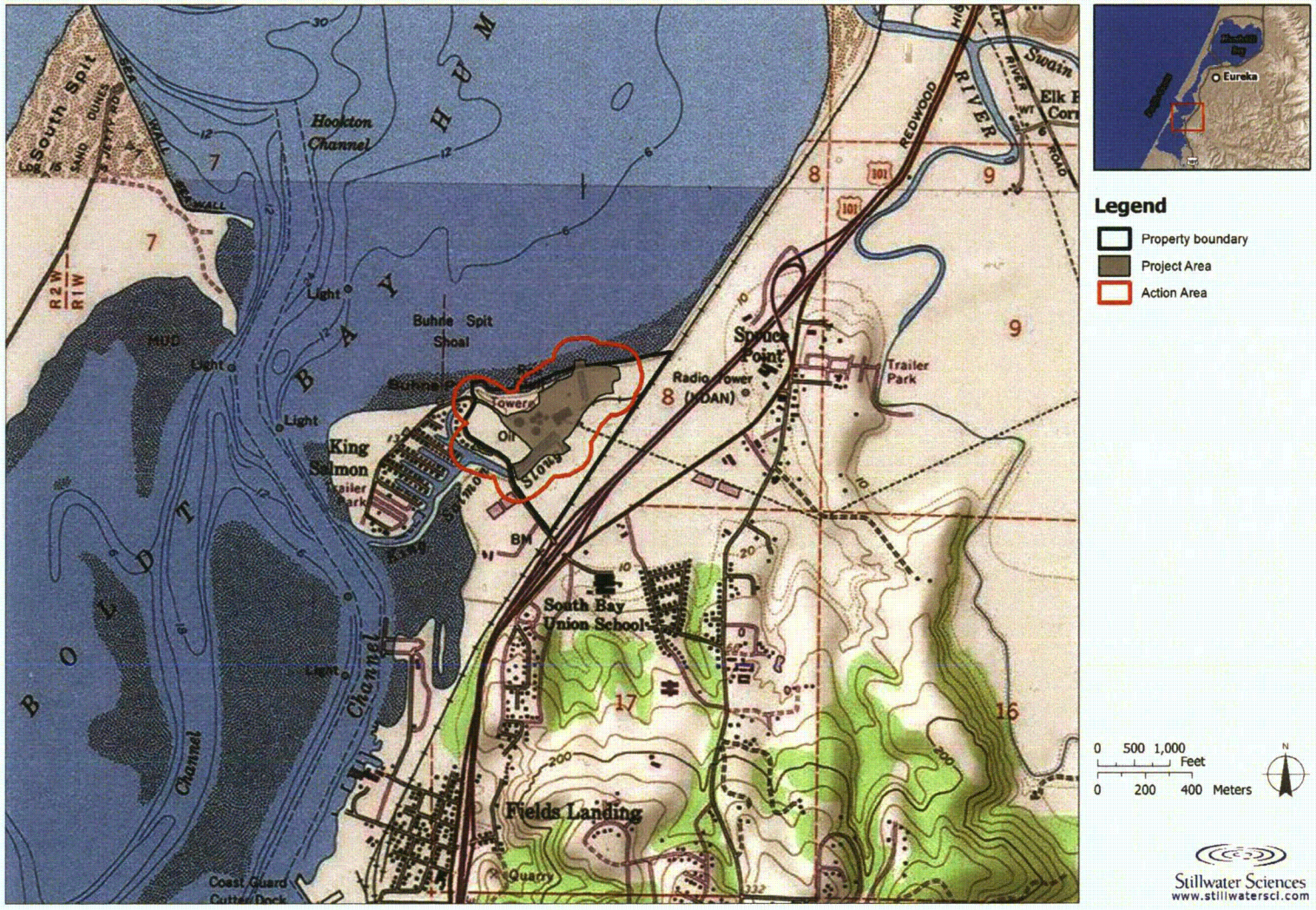

Figure 1. Project Area and Action Area.

Figure 2. Project Area and proposed sediment removal areas. Source: Canal Remediation Project Description (CH2M Hill 2013).

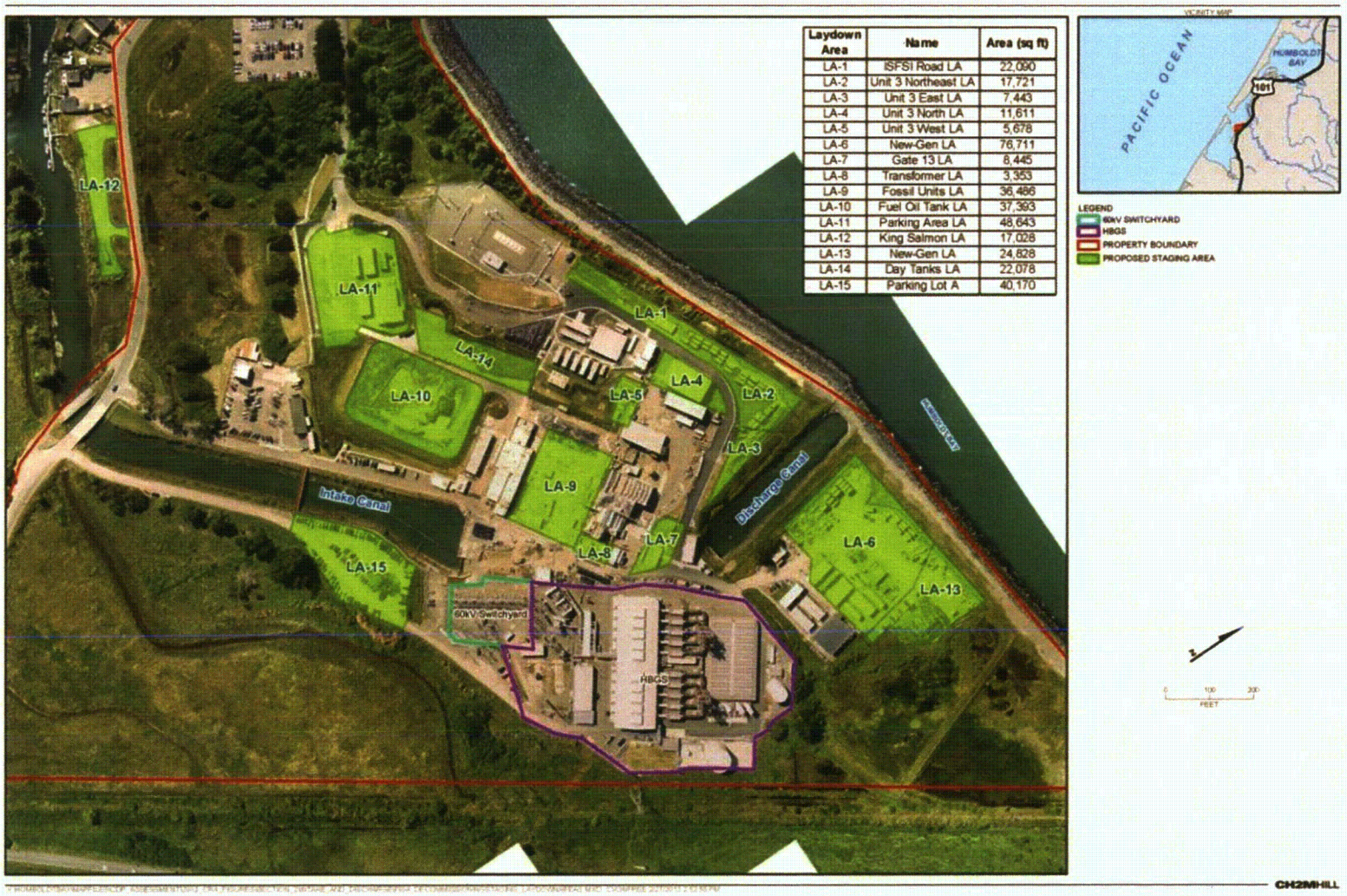

Figure 3. Proposed Action staging and laydown areas. Source: Canal Remediation Project Description (CH2M Hill 2013).

1.2 Listed Species and Critical Habitat

A desktop literature review was conducted for known occurrences of federally-listed species and designated or proposed critical habitat for plant, fish, and wildlife species within the following 8 U.S. Geological Survey (USGS) quadrangles that surround the project: Fields Landing (main), Cannibal Island, Eureka, Arcata South, McWhinney Creek, Ferndale, Fortuna, and Hydesville.

Information on federal ESA-listed species that may be affected by the Project was obtained from the following sources:

- The California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2013);
- The California Native Plant Society (CNPS) List of Rare and Endangered Plants (CNPS 2013);
- The USFWS online database of USFWS and NMFS critical habitat designations (USFWS 2013);
- Species profiles developed by NMFS (http://www.nmfs.noaa.gov/pr/species/) and the USFWS (http://www.fws.gov/arcata/); and
- Numerous scientific studies, assessment, and surveys.

Table 1 lists all the federally threatened and endangered species that are known to occur within the eight USGS Quadrangles described above. The potential effects on these species are discussed in Section 4.

Table 1. Federally threatened and endangered species known to occur within the eight USGS quadrangles surrounding the project area (USFWS 2013).

Scientific name	Common name	Federal status[1]
Erysimum menziesii ssp. *eurekense*	Humboldt Bay wallflower	E
Layia carnosa	beach layia	E
Lilium occidentale	western lily	E
Haliotis cracherodii	black abalone	E
Thaleichthys pacificus	eulachon (Southern distinct population segment [DPS])	T
Acipenser medirostris	green sturgeon (Southern DPS)	T
Eucyclogobius newberryi	tidewater goby	E
Oncorhynchus kisutch	coho salmon (SONCC evolutionarily significant unit [ESU])	T
Oncorhynchus tshawytscha	Chinook salmon (California coastal ESU)	T
Oncorhynchus mykiss	steelhead (Northern California DPS)	T
Caretta caretta	loggerhead turtle	T
Chelonia mydas (incl. agassizi)	green turtle	T
Dermochelys coriacea	leatherback turtle	E
Lepidochelys olivacea	olive (=Pacific) ridley sea turtle	T
Brachyramphus marmoratus	marbled murrelet	T
Charadrius alexandrinus nivosus	western snowy plover	T
Phoebastris albatrus	short-tailed albatross	E
Strix occidentalis caurina	northern spotted owl	T
Coccyzus americanus	California clapper rail	E
Eumetopias jubatus	Steller sea lion	T
Balaenoptera borealis	sei whale	E
Balaenoptera musculus	blue whale	E
Eubalaena japonica	North Pacific right whale	E
Balaenoptera physalus	fin whale	E
Megaptera novaengliae	humpback whale	E
Physeter macrocephalus	sperm whale	E
Orcinus orca	Southern resident killer whale	E

Key:
[1] Listing
E Endangered; Listed in the Federal Register as being in danger of extinction
T Threatened; Listed as likely to become endangered within the foreseeable future

1.3 Consultation History

This is a new action; therefore no consultation has taken place previously.

1.4 Compliance with the ESA

The ESA requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. To fulfill this requirement, the USACE, as the lead federal agency, must prepare a BA in accordance with 50 Code of Federal Regulations (CFR)§ 402 of the implementing regulations for ESA. If in the BA, the USACE determines the Proposed Action may affect a proposed or listed species, or destroy or modify designated or proposed critical habitat, then pursuant to Section 7(a)(2) of the ESA, the action agency must consult with the USFWS on terrestrial species and inland fish, and with NMFS on marine species and anadromous fish. This BA finds that the proposed action may affect listed species and will therefore be transmitted to the USFWS and NMFS requesting formal Section 7(a)(2) consultation. If USFWS and NMFS concur that the proposed action may affect proposed or listed species, or proposed or designated critical habitat, they will develop a BO for the project. The BO analyzes the effects of the proposed action to determine if they are likely to jeopardize listed species or destroy or adversely modify critical habitat.

1.5 Compliance with the MSA

The Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSA) (P.L. 94-256 or 10 U.S.C 1801 et seq.) require heightened consideration of habitat for commercial fish species in resource management decisions. EFH is defined in the MSA as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." NMFS interprets EFH to include aquatic areas and their associated physical, chemical, and biological properties used by fish that are necessary to support a sustainable fishery and the contribution of the managed species to a healthy ecosystem. The MSA and its implementing regulations (50 CFR § 600.92(j)) require that before a federal agency may authorize, fund, or carry out any action that may adversely affect EFH, it must consult with NMFS. The purpose of the consultation is to develop conservation recommendations that address reasonably foreseeable adverse effects on EFH. EFH for Pacific salmonids extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone [EEZ (200 miles [mi] or 370.4 kilometers [km] off shore)] offshore of Washington, Oregon, and California north of Point Conception (near Santa Barbara). EFH for Pacific coast groundfish includes all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California seaward to the boundary of the U.S. EEZ. EFH for coastal pelagic species includes all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the EEZ.

2 PROJECT DESCRIPTION

2.1 Action Area

For the purposes of this BA, the Action Area is defined as the Project Area and an additional 91 meters (m) (300 feet [ft]) surrounding the Project Area (Figure 1). The Project is located in the southwest corner of Section 8 of Township 4 North, Range 1 West of the Fields Landing, California USGS 7.5-minute topographic quadrangle. The Project is located in the community of King Salmon, south of Eureka in Humboldt County, along the east shore of Humboldt Bay just opposite of the bay's entrance, and west of Highway 101. The project is surrounded by Humboldt Bay to the west, agricultural land to the east, and King Salmon to the south. The entire project is located within or immediately adjacent to PG&E property.

2.2 The Proposed Action: Intake and Outfall Canal Remediation

The following sections describe the various components of the project. Project activities that have the potential to affect biological resources include intake and discharge canal dredging, removal of the outfall pipes, installation of cofferdams, dewatering of construction areas, and the rescue and relocation of threatened and endangered species.

2.2.1 Intake canal

The remediation contractor will install a structure or structures in the intake canal to control water during the remediation work. These may include bladder dams, bladder plugs, or other water control structures, located about 50 m (165 ft) southwest of the intake structure. The area isolated behind the water control structures is anticipated to be about 2,322 square meters (m^2) (25,000 square feet [ft^2], or 0.57 ac). The structures will prevent tidal flows from Humboldt Bay from entering the work area during excavation and other activities. Once the water control structures are in place, the contractor will pump water out of the affected area on the northeast side of the water control structure to prepare the remediation area. Water removed during the initial dewatering will be pumped over the water control structure into the part of the intake canal connected to Humboldt Bay. Water pumped from the work area during excavation activities will be routed through the Ground Water Treatment System (GWTS) if necessary to meet water quality objectives.

The remediation contractor will mechanically remove up to approximately 765 cubic meters (m^3) (1,000 cubic yards [yd^3]) of contaminated sediment from the intake canal between the water control structure and the intake structure. Although the intake canal includes the area from the King Salmon Avenue bridge to the intake structure, the sediment removal area will be much smaller than this and all of the contaminated sediment slated for removal is located in the northern corner of the canal, northeast of the pedestrian bridge and adjacent to the intake structure (Figure 4). In addition to sediment removal, the contractor will demolish and remove the intake structure. After sediment and structure removal, the intake canal will be returned to pre-project conditions (i.e. the sides of the intake canal will be conditioned to meet minimum safe sloping standards, surrounding areas will be reconditioned so that they drain toward the canal, the cofferdam will be removed, and the area will be reconnected to the unaffected portion of the intake canal). The end state for this permitting process will be reconnection to Humboldt Bay with full tidal exchange.

Figure 4. Intake canal work excavation area, located inside the floating boom. The intake structure is located at the far end of the canal.

2.2.2 Discharge canal

The remediation contractor will seal the outfall pipes to prevent tidal flows from Humboldt Bay from entering the 4,180 m² (1.03 ac) discharge canal during excavation and other activities. Access by listed species into the discharge canal is limited by its connection to Humboldt Bay through four culverts that are mostly filled with sand. The discharge canal is also significantly aggraded by sand and mud that has entered through the culverts since the power plant's cooling water discharge was halted in 2010. Water currently flowing into Humboldt Bay via the discharge canal (e.g., storm water drainage, GWTS outfall, etc.) will be re-routed; the water will continue to be discharged into the bay. Once the outfall pipes are sealed, the contractor will pump water out of the discharge canal and directly into Humboldt Bay during the initial dewatering operation. Water pumped during excavation activities will be directed through the GWTS system as necessary to meet water quality objectives.

The remediation contractor will mechanically remove up to approximately 6,116 cubic meters (8,000 cubic yards) of contaminated riprap and sediment, remove the outfall structure, and re-slope the sides of the canal to meet minimum safe sloping standards (Figure 5). Sediment will be characterized and either reused on site or disposed of at an appropriate licensed waste facility dependent on characterization results.

Figure 5. The discharge canal, looking toward the north end and outfall structure (left photo) and south view (right photo).

A section of the current coastal trail (Figure 6) that provides recreational access along the bay frontage will need to be temporarily closed to facilitate removal of the outfall structure. The contractor will install a cofferdam in Humboldt Bay to isolate the outfall structure work area from tidal and wave action, minimize construction-related effects on the bay, and provide a safe work environment. Prior to cofferdam installation, turbidity control structures (e.g., silt curtains) will be installed as needed in the bay outside of the cofferdam to keep turbidity within the levels required by the Water Quality Control Plan for the North Coast Region (i.e., less than 20% above background levels) (North Coast Regional Water Quality Control Board 2011). The contractor will then demolish and remove the concrete outfall structure and its four asbestos-bonded metal outfall pipes.

Following removal of the outfall structure, the coastal trail and levee along Humboldt Bay will be reconstructed to its pre-project condition. The sides of the discharge canal will be conditioned so that it can serve as an interim soil stockpile area. After the stored soil has been removed, the surrounding areas will be reconditioned. The end state for this permitting process will be an empty canal with no connection to Humboldt Bay.

Additionally, remediation of the discharge canal will require permanent relocation of the discharge piping from the GWTS. The current piping is routed to the discharge canal and will require rerouting over or under the coastal access trail directly to Humboldt Bay.

Figure 6. Discharge canal outfall structure. The Coastal Trail is located outside of the fence line along the top of the structure. Note the accumulated sediment filling the canal.

2.2.3 Access routes and laydown areas

Access to construction areas will use existing site access routes off King Salmon Avenue. No new access routes into the site are planned. Staging and laydown areas (Figure 3) have been designated for staging equipment and materials necessary for implementation of the Proposed Action.

Surface improvements to the staging areas, including placement of paving and any necessary best management practices (BMPs), will be performed to accommodate all-weather use during construction and facilitate surface water management as per the Storm Water Pollution Prevention Plan (SWPPP) for this project.

No impacts to listed species and designated critical habitat are expected from the laydown areas and this activity will not be discussed further in this BA.

2.2.4 Dredged sediment management

Contaminated sediment will be removed from the bottom of the canals and placed on settling pads or in containers located in one or more of the previously mentioned laydown areas for gravity dewatering. Any water resulting from the dewatering of contaminated sediment, including groundwater and storm water will be collected, characterized, and discharged or disposed of using appropriate methods consistent with characterization results. Excavated sediment taken

from the canals will be characterized and qualified for onsite reuse; however, it is expected that most, if not all, will be disposed of in an appropriate licensed waste facility.

An Erosion, Sediment, and Dust Control Plan will be completed, which will conform to the HBPP SWPPP and the California Construction General Permit (CGP). It will include BMPs for controlling storm water discharge per the CGP requirements and the HBPP SWPPP. It will also include final stabilization BMPs to be implemented for post-construction conditions.

No impacts to listed species and designated critical habitat are expected from management of dredged sediment and this activity will not be discussed further in this BA.

2.2.5 Project timing

Following site preparation activities, construction is planned to begin with installation of the water control structures in May 2014. The canal dredging, demolition of the intake and discharge structures, reconnection of the intake canal to Humboldt Bay, and preparation of the discharge canal for interim soil storage is expected to conclude in March 2015.

2.2.6 Conservation/protective measures

Conservation and protection measures have been designed to limit Project-related impacts on threatened and endangered species and proposed and designated critical habitat. The following protection measures would minimize the risk of impacts to listed fish species and habitat:

- A fish rescue and relocation plan will be developed and implemented in consultation with NMFS and the USFWS. The fish removal effort within the intake and discharge canals could include using seine nets during low tide to sweep the fish in a downstream direction to a point where cofferdam construction-related injuries would not occur. A blocknet would restrict reentry by fish into the proposed project's impact area until the cofferdam is constructed. Collection of remaining individual fish and crustacean species would occur by beach seining and hand during dewatering activities. The USFWS protocol-level sampling methodology would be used to capture tidewater gobies and other fish species. The tidewater goby protocol includes, but is not limited to, use of specific seine mesh size to minimize mortality, and specific reporting requirements. All captured individuals would be held in aerated buckets or live boxes prior to being relocated into the unaffected portion of the intake canal or other locations with suitable habitat. The final details of the fish rescue and relocation effort will be developed in coordination with project engineers, and consultation with NMFS, USFWS, and CDFW, and will consider the feasibility of safely performing the effort.
- A biological monitor or team will be present onsite during in-water work to minimize the risk of impacts to listed species. The team will be responsible for the rescue and relocation of any estuarine species that may be present in the work areas. It is expected that the team would no longer be required to be onsite once the rescue and relocation activities have been completed.
- The Ground Water Treatment System (GWTS) will be used for any water that does not meet water quality standards, and the HBPP SWPPP will be followed during the project.
- Turbidity control structures (e.g., silt curtains) will be installed as needed in the bay outside of the cofferdam to keep turbidity within the levels required by the Water Quality Control Plan for the North Coast Region (i.e., less than 20% above background levels) (North Coast Regional Water Quality Control Board 2011).

2.3 Interrelated and Interdependent Actions

"Interrelated actions" refers to those activities "that are part of a larger action and depend on the larger action for their justification," whereas "interdependent actions" refers to activities "that have no independent utility apart from the action under consideration" (50 CFR §402.02). For example, if the proposed action is a part of a regional or programmatic program, then the other actions that have been or will be implemented as a part of the program (i.e., the interrelated actions) should be summarized. Further, any additional actions necessary to achieve the purpose of the proposed action (i.e., interdependent actions) should be summarized. While interrelated and interdependent actions are not the focus of consultation, they are critical to identifying the action area and assessing cumulative effects.

As stated in Section 1.2, PG&E is currently in the process of full decommissioning and license termination for its current and former power generation facilities at the 58-hectare (143-acre) HBPP site. The canal remediation project is a part of (interrelated to) the larger decommissioning project. Therefore, the HBPP decommissioning project is interrelated with the Proposed Action.

3 APPROACH TO THE ANALYSIS

The analytical approaches used to assess effects of the Proposed Action on ESA-listed species and critical habitat are described in this section.

3.1 Effects on Individuals or Populations

To determine the effects of an action, the listed resources potentially exposed to impacts (endangered and threatened species and designated critical habitat) need to be identified, then the potential stressors associated with the action and the nature of that exposure (effects) needs to be determined. The next step requires an examination of the scientific and commercial data available to determine whether and how those listed resources are likely to respond given their exposure. The final step of the analysis is making a determination of risk that the project effects pose to listed resources.

A "no effect" determination is the appropriate conclusion when the action agency determines that the Proposed Action will not affect listed species or critical habitat (USFWS and NMFS 1998). A "may affect, not likely to adversely affect" determination is the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects on the species. Insignificant effects relate to the size of the impact and should never reach the scale where take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

A "may affect, likely to adversely affect" determination is the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial (USFWS and NMFS 1998). In the event that the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If the adverse effect can be detected in any way or if it can be meaningfully articulated in a discussion of the results, then it is not insignificant, it is likely to adversely affect. A "may affect, likely to adversely affect" determination requires formal section 7 consultation.

The BA also assesses impacts of the Proposed Action on a "short-term" and "long-term" basis. PG&E considers effects in the short-term (less than 2 years) and the long-term (more than 2 years), but either short- or long-term impacts may affect listed species. For the purposes of this BA, impacts would be "likely to adversely affect" if they would result in the following:

Short-term:

- Disturb any life history stage of a species such that it causes a disruption of breeding, feeding or sheltering in the short-term.
- Take any individuals of any life history stage in the short-term.
- Decrease the quality of any Primary Constituent Element (PCE) of critical habitat for any life history stage of a listed in the short-term.

Long-term:

- Decrease the quality and quantity of any PCE of critical habitat for ESA-listed fish or wildlife species over a large proportion of the available habitat available in the long-term.
- Continue or worsen conditions that are currently causing an ESA-listed species to decline in the long-term.

3.1.1 Habitat disturbance effects

Assessing the potential effects of habitat disturbance on ESA-listed species required identifying the spatial and temporal distribution of each life stage in the Action Area relative to expected areas of sediment removal. For each focal species and life stage, potential effects were determined by evaluating the magnitude and duration of the disturbance on both spatial distribution (proportion of the population expected to be present during period of effect) and life-history timing (life stages expected to be in the Action Area).

3.2 Effects on Critical Habitat

The following describes the BA's analytic methodology to assess the Proposed Action's effects on designated critical habitat for southern DPS green sturgeon, coho and Chinook salmon, and steelhead. Although critical habitat has been designated or proposed for many of the other listed species identified in Table 1, it does not occur in the Action Area.

3.2.1 Southern DPS green sturgeon

Within the range of the Southern DPS green sturgeon, the estuarine residency period of the species can be separated into five PCEs or essential habitat types. These include food resources (shrimp, clams, oligochaetes, and benthic fishes), water flow, water quality, water depth, and sediment quality (contaminants) (NMFS 2009). The effects of the Proposed Action's intake canal activities on designated critical habitat for southern DPS green sturgeon are limited to sediment removal activities' effects on food resources and sediment quality.

3.2.2 Southern Oregon/Northern California Coast coho salmon

Within the range of the Southern Oregon/Northern California Coast (SONCC) coho salmon Evolutionarily Significant Unit (ESU), the life cycle of the species can be separated into five PCE or essential habitat types: (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. Areas 1 and 5 are often located in small headwater streams and side channels, while areas 2 and 4 include these tributaries as well as mainstem reaches and estuarine zones. Growth and development to adulthood (area 3) occurs primarily in near-and off-shore marine waters, although final maturation takes place in freshwater tributaries when the adults return to spawn. 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 (NMFS 1999). The PCEs of coho salmon critical habitat associated with this project relate to juvenile summer and winter rearing areas. The essential features that may be affected by the Proposed Action's sediment removal activities include water quality, cover/shelter, and food.

3.2.3 California Coastal Chinook salmon

The PCE of California coastal (CC) Chinook salmon critical habitat within the Action Area is limited to the estuarine area with: (1) water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (2) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (NMFS 2005). The essential features that may be affected by the Proposed Action's sediment removal activities include natural cover in the form of aquatic vegetation and juvenile forage.

3.2.4 Northern California DPS steelhead

Similar to CC Chinook salmon, the PCE of Northern California (NC) DPS steelhead critical habitat within the Action Area is limited to the estuarine area with: (1) water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (2) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (NMFS 2005). The essential features that may be affected by the Proposed Action's sediment removal activities include natural cover in the form of aquatic vegetation and juvenile forage.

4 ENVIRONMENTAL BASELINE

The following description of baseline environmental conditions in the Action Area is drawn primarily from previously developed PG&E documents, site visits, and habitat and species assessments that were developed specifically for the HBPP area.

4.1 Physical Environment

The HBPP is located on approximately 29 ha (70 ac) of a larger 58 ha (143 ac) property owned by PG&E (Figure 1). The site is situated along the eastern shore of Humboldt Bay on Buhne Point. Buhne Point is directly across from the opening between the South Spit and Samoa Peninsula that separates the Pacific Ocean from Humboldt Bay. The community of King Salmon, established in the late 1940s, is immediately adjacent to the western boundary of the PG&E property.

4.1.1 Watershed setting

Humboldt Bay is the second largest estuary in California and provides a rich diversity of natural habitats, including tidal marshes, sloughs, and man-made channels, as well as intertidal flats, eelgrass beds, and deepwater estuarine habitats. The Humboldt Bay watershed encompasses approximately 583 square kilometers (225 square miles) containing Douglas-fir and redwood forests (primarily private landownership and commercial timber production east of Highway 101), pastured grasslands, wetlands, and rivers and creeks (tributaries to the Bay).

4.1.2 Climate and hydrology

The climate in the Eureka area is heavily influenced by its proximity to the Pacific Ocean, with a mean annual temperature of 12°C (53°F) (with extremes ranging from -6 to 31°C [21 to 87° F]); mean annual yearly precipitation of 1 meter (m) (39 inches [in]), and partial or full cloud cover two-thirds of the year on average (Western Regional Climate Center 2013). The predominant wind directions are from the north, and the average wind speed is 11 kilometers (km) (7 miles [mi]) per hour (Western Regional Climate Center 2013).

4.1.3 Vegetation cover

The primary vegetation communities in the general project vicinity include grassland (including landscaped areas, pastures, and fallow fields), coastal dunes, mud flats, eelgrass beds, coyote brush scrub, North Coast forest, North Coast riparian forest, salt marsh, brackish or freshwater marsh, seasonal wetlands, and drainages. Habitats also include the open water and areas along the shoreline of Humboldt Bay. Small seasonal wetlands, drainage ditches, and California Coastal Commission (CCC) wetland habitats are also present. The intake and discharge canals, which formerly supplied and discharged cooling water for the power plant, contain tidally-influenced open water and mudflat habitat.

Eelgrass is present in both the intake and discharge canals. Eelgrass in the intake canal is patchily distributed and located at the margins of the channel. There is a total of 783 m^2 (8,430 ft^2, or 0.19 ac) of eelgrass in the entire intake canal from the King Salmon Avenue bridge to the intake structure; 67 m^2 (721 ft^2, or 0.02 ac) of which is located between the proposed location for the water control structure and the intake structure and has the potential to be impacted. Eelgrass

density in the intake canal was estimated to be medium to high where present (Stillwater Sciences 2013). The discharge canal contains 76 m^2 (815 ft^2, or 0.02 ac) of medium–high density eelgrass patches located in the southern third of the canal in the deeper water near the discharge structure (Stillwater Sciences 2013).

4.1.4 Land use

The general project vicinity is dominated by open agricultural lands interspersed with industrial, commercial, and residential uses. The town of King Salmon is a highly water-dependent community with a relatively large harbor for small recreational and commercial vessels. The HBPP site is used primarily for power generation and is fenced and access-restricted. Areas of the property outside the secure area, and adjacent land, experiences coastal recreation uses.

Over the past century, nearly 90 percent of the salt marsh (3,278 ha [8,100 acres]) around Humboldt Bay was diked and drained for agricultural uses or walled off from tidal inundation by the construction of the Northwest Pacific Railroad (Pickart 2006). Due to compaction and subsidence of former tidelands that are behind dikes, much of this land is lower in elevation than the Bay and high tides (Laird et al. 2013).

4.1.5 Climate change

Humboldt Bay area is and will continue to be affected by climate change, especially sea level rise (SLR). North of Cape Mendocino, the rate of sea level rise over the next 100 years is expected to range from 10 to 143 cm (0.3 to 4.69 ft) (CO-CAT 2013). However, there may be areas where tectonic uplift or subsidence may result in locally lesser or greater amounts of SLR, respectively. For example, the tide gage at the Humboldt Bay north jetty has recorded an average sea-level rise of +4.73 +/- 1.58 mm/yr, equivalent to 1.55 ft/100 years. This is considerably higher than the global average and indicates significant subsidence in this location (CO-CAT 2013). Sixty-five miles north at Crescent City, the tide gage record extends back to 1933 and shows, over the period of record, a local drop in sea level of -0.65 +/-0.36 mm/yr, equivalent to -0.21 ft/100 years (CO-CAT 2013). The drop in sea level is explained by a rising coastline near Crescent City due to flexure of the North American tectonic plate above the subducting Juan de Fuca plate (CO-CAT 2013).

4.2 Status of the Species

4.2.1 Species considered and excluded from further consideration (No effect only)

The following species have the potential to occur in the Action Area. However, based on habitat associations, proximity to proposed activities, and/or protective measures, these species have been determined to not be affected by the project and will be excluded from further analysis in this BA (Tables 2 and 3).

Table 2. Federally-listed plant species considered and excluded from further analysis.

Species name	Federal status[1]	Habitat associations (blooming period)	Source	Likelihood of occurrence (none, low, moderate, high)
Plants				
Humboldt Bay wallflower	E	Coastal dunes; 0–10 m (0–33 ft) (March–October)	CNDDB; CNPS	**None**: No habitat present.
beach layia	E	Coastal dunes, Coastal scrub (sandy); 0–60 m (0–197 ft) (March–July)	CNDDB; CNPS	**None**: No habitat present.
western lily	E	Marshes and swamps, bogs and fens, coastal scrub, and coastal prairie; edges of sphagnum bogs and forest openings along margins of ephemeral ponds and stream channels; 2–185 m (6.5–607 ft) (June–July)	CNDDB; CNPS	**None**: No habitat present.

[1] E—Federally Endangered, T—Federally Threatened

Table 3. Federally-listed animal species considered and excluded from further analysis.

Species name	Federal status[1]	Distribution	Habitat associations	Likelihood of occurrence (none, low, moderate, high)
Invertebrates				
black abalone	E/CH	Point Arena in northern California to Bahia Tortugas and Isla Guadalupe, Mexico	Intertidal and shallow subtidal rocks, in areas of moderate to heavy surf action	**None**: Outside of current distribution. Critical habitat does not extend North of Sonoma County.
Fish				
eulachon [Southern Distinct Population Segment (DPS)]	T/CH	Alaska to Mad River, Humboldt County	A small anadromous fish that uses the estuaries and lowest portions of the rivers to spawn. Most of their life is spent in the ocean.	**None**: Outside of current distribution. Critical habitat does not extend into Humboldt Bay.
Reptiles				
loggerhead turtle	T	Warm waters of the Pacific coast, primarily from the Channel Islands south; does not nest in California.	Uses the open ocean near-shore zone; nests on high energy, relatively narrow, steep coarse-grained beaches.	**None**: Habitat not suitable.
green turtle	T	Warm waters of the Pacific coast, primarily from San Diego south. Uncommon along the California coast; does not nest in California.	Uses convergence zones in the open ocean and benthic feeding grounds in coastal areas; nests on sandy ocean beaches	**None**: Habitat not suitable.
leatherback turtle	E	Temperate and cool waters of the Pacific coast; most sightings in California are from boats out at sea; have been observed in open ocean near San Diego, Santa Barbara, Ventura, San Mateo, and Santa Cruz counties; does not nest in California	Pelagic, though also forages near coastal waters	**None**: Habitat not suitable.

Species name	Federal status[1]	Distribution	Habitat associations	Likelihood of occurrence (none, low, moderate, high)
olive ridley sea turtle	T	Warm waters of the Pacific coast, primarily from southern California south; does not nest in California	Well out to sea in pelagic zone as well as coastal areas, including bays and estuaries; nests on sandy ocean beaches	**None**: Habitat not suitable.
Birds				
short-tailed albatross	E	Pacific Ocean (nests in Japan)	Feeds in north Pacific	**None**: Habitat not suitable.
northern spotted owl	T/CH	Northwestern California south to Marin County, and southeast to the Pit River area of Shasta County	Usually found in mature and old-growth coniferous forest with dense multi-layered structure	**None**: Habitat not suitable. Critical habitat located more than 25 km (16 mi) from the proposed project area.
California clapper rail	E	Predominantly in the marshes of the San Francisco estuary: South San Francisco Bay, North San Francisco Bay, San Pablo Bay, and sporadically throughout the Suisun Marsh area east to Browns Island	Salt and brackish water marshes, typically dominated by pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*)	**None**: Outside of current distribution and no habitat present. Last observed around Humboldt Bay in 1932 (CDFW 2013).
Mammals				
Steller (northern) sea-lion	T/CH	Coastal waters of California	Colder waters; haul outs and rookeries usually consist of beaches, ledges, or rocky reefs	**None**: Habitat not suitable. Critical habitat located about 25 mi south of the Action Area at Sugarloaf Island, Cape Mendocino.
sei whale	E	Pacific Ocean	Deep ocean waters far from the coastline	**None**: Habitat not suitable.
blue whale	E	Pacific Ocean	Deep ocean offshore waters; also can be found in coastal waters	**None**: Habitat not suitable.

Species name	Federal status[1]	Distribution	Habitat associations	Likelihood of occurrence (none, low, moderate, high)
North Pacific right whale	E	Pacific Ocean	Deep ocean waters	**None**: Habitat not suitable.
fin whale	E	Pacific Ocean	Deep ocean waters	**None**: Habitat not suitable.
humpback whale	E	Pacific Ocean	Deep ocean waters	**None**: Habitat not suitable.
sperm whale	E	Pacific Ocean	Deep ocean waters	**None**: Habitat not suitable.
killer whale (Southern Resident DPS)	E/CH	Pacific Ocean	Coastal waters and bays	**None**: Habitat not suitable. Low likelihood of foraging and migratory habitat within Humboldt Bay based on a single documented occurrence in the harbor entrance. Critical habitat in Washington; potential project impacts on fisheries (prey base) would not affect populations of salmonids within critical habitat.

[1] E—Federally Endangered, T—Federally Threatened, CH—Critical Habitat designated

4.2.2 Species subject to further analysis

The following species will be included for further analysis of the effect of the Proposed Action due to their occurrence in the Action Area, proximity to the activities, or potential to be affected by the project (Table 4). These species include southern Distinct Population Segment (DPS) green sturgeon, tidewater goby, Southern Oregon/Northern California Coastal (SONCC) coho salmon, California Coastal (CC) Chinook salmon, Northern California (NC) DPS steelhead, marbled murrelet, and snowy plover. Species life history summaries are provided below.

Table 4. Federally-listed species that may be in the Action Area and affected by the Proposed Action.

Common name	Federal status[1]	Distribution	Habitat associations	Potential presence in Action Area
Fish				
green sturgeon (southern DPS)	T/CH	San Francisco, San Pablo, Suisun, and Humboldt bays; Sacramento-San Joaquin Delta, Sacramento and Klamath rivers	Large mainstem rivers with cool water and cobble, clean sand, or bedrock for spawning. Estuarine waters (river mouths or embayments) for summer and fall foraging.	**Moderate**: Known to occur in the North Humboldt Bay (area of the bay north of the harbor entrance). Sub-adults and adults may forage in the intake canal, but are unlikely to be present in the discharge canal due to the connection to Humboldt Bay being through four mostly filled culverts. Critical habitat, which includes all tidally-influenced areas of Humboldt Bay (including tributaries) up to the elevation of mean higher high water, is present.

Common name	Federal status[1]	Distribution	Habitat associations	Potential presence in Action Area
tidewater goby	E/CH	Tillas Slough (mouth of the Smith River, Del Norte County) to Agua Hedionda Lagoon (northern San Diego County)	Coastal lagoons and the uppermost zone of brackish large estuaries; prefer sandy substrate for spawning, but can be found on silt and rocky mud substrates; can occur in water up to 4 m (15 ft) in lagoons and within a wide range of salinity (0–42 ppt)	**Moderate**: Suitable habitat is present in the discharge canal, which consists of an isolated pool during low tide and sand and mud substrate. Individuals are less likely to be present in the intake canal since this species prefers habitat with muted tidal action, which does not occur in the intake canal. Individuals were documented in 2006 in the vicinity of Swain Slough and Elk River, about 1.5 mi from the project area (CDFW 2013). Surveys conducted in 2007 within Buhne Slough, near the project area, did not identify presence (Stillwater Sciences 2007). Designated critical habitat is located in slough habitat about 1.6 km (1 mi) north and about 3 km (2 mi) south of the proposed project area.
SONCC coho salmon	T/CH	Punta Gorda north to the Oregon border	Spawn in coastal streams and large mainstem rivers (i.e., Klamath/Trinity Rivers) in riffles and pool tails-outs and rear in pools > 1 m deep with overhead cover with high levels oxygen and temperatures of 10–15°C (50–59°F). Estuaries and sloughs utilized by smolts prior to ocean entry.	**High**: Foraging and rearing habitat for juveniles and adults is present in the intake canal. Habitat is less suitable in the discharge canal. Critical habitat includes all accessible waters of estuarine areas.

Common name	Federal status[1]	Distribution	Habitat associations	Potential presence in Action Area
CC Chinook salmon	T/CH	Russian River (Sonoma County) north to Redwood Creek (Humboldt County)	Coastal streams; spawns in gravel riffles. Estuaries and sloughs utilized by Chinook smolts prior to ocean entry.	**High**: Foraging and rearing habitat for juveniles and adults is present in the intake canal. Habitat is less suitable in the discharge canal. Humboldt Bay has been designated as critical habitat up to the extent of inundation at the highest high tide.
NC steelhead	T/CH	Russian River north to Redwood Creek (Humboldt County)	Inhabits small coastal streams to large mainstem rivers with gravel-bottomed, fast-flowing habitat for spawning. However, habitat criteria for different life stages (spawning, fry rearing, juvenile rearing) are can vary significantly.	**High**: Foraging and rearing habitat for juveniles is present in the intake canal. Habitat is less suitable in the discharge canal. Humboldt Bay has been designated as critical habitat up to the extent of inundation at the highest high tide.
Birds				
marbled murrelet	T/CH	Nesting marbled murrelets in California mostly concentrated on coastal waters near Del Norte and Humboldt counties, and in lesser numbers near San Mateo and Santa Cruz counties; winter throughout nesting range, and in small numbers in southern California.	Most time spent on the ocean; nests inland in old-growth conifers with suitable platforms, especially redwoods near coastal areas.	**Low**: No suitable foraging or nesting habitat within the general area of the proposed project area; however, a flight migration corridor is present in the area based on occurrences documenting multiple individuals flying out of the bay to the ocean (eBird 2007). Critical habitat located more than 6 mi from the proposed project area.

Common name	Federal status[1]	Distribution	Habitat associations	Potential presence in Action Area
Western snowy plover	T (Pacific coastal population) /CH	Nests in locations along the California coast, including the Eel River in Humboldt County; nests in the interior of the state in the Central Valley, Klamath Basin, Modoc Plateau, and Great Basin, Mojave, and Colorado deserts; winters primarily along coast	Barren to sparsely vegetated beaches, barrier beaches, salt-evaporation pond levees, and shores of alkali lakes; also nests on gravel bars in rivers with wide floodplains; needs sandy, gravelly, or friable soils for nesting.	**Low**: No nesting or foraging habitat is present in the proposed project area; however, nesting may occur on nearby sandy beaches. Critical habitat is located about 1 mi west of the proposed project area on the South Spit (land south of the harbor entrance) (CDFW 2013).

[1] E—Federally Endangered, T—Federally Threatened, CH— Critical Habitat designated

4.2.2.1 Southern DPS green sturgeon

NMFS published a final rule listing the southern DPS of green sturgeon as threatened in 2006 (NMFS 2006). There are two Distinct Population Segments (DPSs) defined for green sturgeon—a southern DPS that spawns in the Sacramento River and a northern DPS with spawning populations in the Klamath and Rogue rivers (NMFS 2008a). The southern DPS includes all spawning populations of green sturgeon south of the Eel River in California, of which only the Sacramento River currently contains a spawning population. The southern DPS of green sturgeon has been listed as threatened under the ESA (NMFS 2006), whereas the northern DPS is a Species of Concern. McLain (2006) noted that southern DPS green sturgeon were first determined to occur in Oregon and Washington waters in the late 1950s when tagged San Pablo Bay green sturgeon were recovered in the Columbia River estuary (CDFG 2002a).
Critical habitat for the southern DPS of green sturgeon was designated in 2009 (NMFS 2009). Humboldt Bay and surrounding sloughs and watercourses up to the highest high tide line are within designated critical habitat. The Action Area and Project Area are within designated critical habitat for this species.

Green sturgeon are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Early life-history stages reside in fresh water, with adults returning to freshwater to spawn when they are more than 15 years of age and more than 1.2 m (4 ft) in size. Spawning is believed to occur every 2–5 years (Moyle 2002). Adults typically migrate into fresh water beginning in late February; spawning occurs in March–July, with peak activity in April–June (Moyle et al. 1995) (Table 7). Females produce 60,000–140,000 eggs (Moyle et al. 1992). Juvenile green sturgeon spend 1–4 years in fresh and estuarine waters before dispersal to saltwater (Beamesderfer and Webb 2002). They disperse widely in the ocean after their out-migration from freshwater (Moyle et al. 1992).

Green sturgeon is a widely distributed marine-oriented species found in nearshore waters from Baja California to Canada (NMFS 2008), but its estuarine/marine distribution and the seasonality of estuarine use range-wide are largely unknown. Southern DPS green sturgeon are known to congregate in coastal waters and estuaries, including non-natal estuaries, such as the Rogue River. Beamis and Kynard (1997) suggested that green sturgeon move into estuaries of non-natal rivers to feed. Information from fisheries-dependent sampling suggests that green sturgeon only occupy large estuaries during the summer and early fall in the northwestern U.S. Green sturgeon are known to enter Washington estuaries during summer (Moser and Lindley 2007). Commercial catches of green sturgeon peak in October in the Columbia River estuary, and records from other estuarine fisheries (Willapa Bay and Grays Harbor, Washington) support the idea that sturgeon are only present in these estuaries from June until October (Moser and Lindley 2007). Green sturgeon tagged in San Pablo Bay were detected in Humboldt Bay in 2006 (Lindley et al. 2011).

No good data exist on current population sizes exist and trend data are lacking (NMFS 2013). Based on tagging data and visual observations, Woodbury (2010, as cited in NMFS 2010) estimated a total of 1,500 spawners. Assuming that spawners represent 10% of the population, the number of individuals in the southern DPS would be about 15,000, or somewhat smaller than the estimate for the northern DPS population. However, Lindley et al. (2011) suggested that, based on their tagging data, southern DPS green sturgeon may be more abundant or the northern DPS green sturgeon may be less abundant than supposed by Adams et al. (2007).

Green sturgeon are known to occur in the North Humboldt Bay (area of the bay north of the harbor entrance). Sub-adults and adults may forage in the intake canal, but are unlikely to be

present in the discharge canal because the only access to the discharge canal from the bay is through four mostly filled culverts.

4.2.2.2 Tidewater goby

Tidewater goby was federally listed as endangered in 1994 (USFWS 1994). Critical habitat was designated in 2000 and revised in 2008 (USFWS 2008a). Critical habitat is designated in all of the tributaries surrounding Humboldt Bay, but does not include Humboldt Bay itself (USFWS 2008).

Tidewater goby are a small, short-lived, estuarine/lagoon-adapted species that may infrequently disperse via marine habitat but with no dependency on marine habitat for its life cycle (Swift et al. 1989, Lafferty et al. 1999a). Unlike other California gobies, the tidewater goby is able to complete its entire life cycle in fresh or brackish water (Irwin and Soltz 1984, Swift et al. 1989). Tidewater gobies are thought to reproduce year-round, although spawning peaks are known to occur (Moyle 2002). Reproduction and spawning typically occurs during spring and summer in slack shallow waters of seasonally disconnected or tidally muted lagoons, estuaries, and sloughs. The female deposits eggs into the burrow, which the male guards until larvae emerge in 9–10 days (Swift et al. 1989).

The tidewater goby is endemic to California and inhabits brackish water habitats from San Diego County in the south to the mouth of the Smith River, Del Norte County in the north (Swift et al. 1989). The preferred juvenile/adult habitat is also slack, shallow water in seasonally disconnected or tidally muted lagoons, estuaries, and sloughs. Tidewater goby appear to prefer shallow depths (<1 m [3.3 ft]) near emergent vegetation, possibly to avoid predation by wading birds and piscivorous fish (Moyle 2002). Reported shallow minimum depths of occurrence may be associated with depth thresholds for wading bird predators such as herons; in general, avian predation efficiency decreases with depths >20 centimeters (cm) (8 in) (Gawlik 2002). Juvenile and adult tidewater gobies were reported to prefer water temperatures of 12–24°C (54–75°F) within a range of 5.8–25°C (42–77°F) (Tetra Tech Inc. 2000).

Substrate preference is for sand, mud, gravel, and silt. The diet consists mostly of small crustaceans (i.e., mysid shrimp, ostracods, amphipods), aquatic insects (i.e., chironomid and other dipteran larvae), and molluscs, which are gleaned from bottom substrates (Irwin and Soltz 1984).

Swift et al. (1989) recorded its presence at 64 localities in 1984, only 11 of them north of San Francisco Bay. Existing tidewater goby populations are relatively small and isolated (Moyle et al. 1989). The distribution of the tidewater goby around Humboldt Bay includes tributaries to Arcata Bay (Arcata Marsh, Mad River Slough, Freshwater Slough, Jacoby Creek, Wood Creek, Liscom Slough, McDaniel Slough, and Gannon Slough) and tributaries to Humboldt Bay (Elk River and Salmon Creek). Tidewater gobies have also been captured in Martin Slough, a tributary to lower Elk River (CDFG 2008). Surveys conducted in 2007 within Buhne Slough, within the Action Area, did not document presence (Stillwater Sciences 2007).

4.2.2.3 Southern Oregon Northern California Coast coho salmon

Southern Oregon/Northern California Coast (SONCC) coho salmon was listed under the ESA as threatened in 1997 (NMFS 1997) and critical habitat was designated in 1999 to encompass reaches of all rivers between the Mattole River in California and the Elk River in Oregon, inclusive (NMFS 1999a).

Coho salmon adults typically begin to migrate upstream from October through late December. Spawning occurs mainly from November through January, with fry emerging from the gravel in the spring, approximately 3 to 4 months after spawning. Coho salmon tend to spawn in small streams that flow directly into the ocean, or tributaries and headwater creeks of larger rivers (Moyle 2002, Sandercock 1991). Preferred gravel sizes range from 0.5 to 4.0 in. Adults die within 10–14 days following spawning and embryos hatch after 8–12 weeks of incubation and emerge from the gravel several weeks later. Juveniles may spend 1 to 2 years rearing in freshwater (Bell and Duffy 2007), or emigrate to an estuary shortly after emerging from spawning gravels (Tschaplinski 1988). Highest densities are usually associated with pools ≥1 m (3.3 ft) in depth, with plenty of overhead cover, undercut banks, logs, and other woody debris and water temperatures not exceeding 22–25°C (72–77°F) for extended periods of time (Moyle et al. 1995). Preferred water temperatures are in the 7–16°C (45–62°F) range (Hassler 1987). Coho salmon juveniles are also known to redistribute into non-natal rearing streams, lakes, or ponds, often following rainstorms, where they continue to rear (Peterson 1982). Emigration from streams to the estuary and ocean generally takes place from February through June, peaking in April and May. Downstream migration to the ocean starts around March when the coho are about one year old. The migration peaks around mid-May and continues until mid-June. Coho spend two years at sea before migrating back to their natal streams to spawn.

All SONCC coho salmon stocks between Punta Gorda (in southern California) and Cape Blanco (in Oregon) are depressed relative to past abundance (Weitkamp et al. 1995, Good et al. 2005). In the latest status review by NMFS, Ly and Ruddy (2011) concluded that many coho salmon populations in this ESU are low in abundance, may well be below their depensation thresholds, and that their risk of extinction may also be increasing. Ly and Ruddy (2011) also concluded that the best available updated information on the biological status of this ESU and the threats facing this ESU indicate that it continues to remain threatened and there is cause for concern.

Although not documented, coho salmon likely inhabit the Action Area as they move from freshwater rearing streams to Humboldt Bay and the coastal ocean, or as they move back to their natal streams to spawn.

4.2.2.4 California Coastal Chinook salmon

California Coastal (CC) Chinook salmon was listed under the ESA as threatened in 1999 (NMFS 1999b). Critical habitat was designated for CC Chinook salmon in 2005, encompassing reaches of all rivers and tributaries south of the Klamath River (exclusive), and north of the Russian River (inclusive), not including those reaches excluded from critical habitat (NMFS 2005). Humboldt Bay has been designated as critical habitat up to the extent of inundation at the highest high tide.

Chinook salmon exhibit two main life-history strategies: ocean-type fish and river-type fish (Healey 1991). Ocean-type fish typically are fall- or winter-run fish that enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few weeks of freshwater entry; their offspring emigrate shortly after emergence from the redd (Healey 1991). River-type fish are typically spring- or summer-run fish that have a protracted adult freshwater residency, sometimes spawning several months after entering freshwater. Progeny of river-type fish frequently spend one or more years in freshwater before emigrating.

Chinook salmon in the California Coastal ESU exhibit life history characteristics of the fall-run ecotype. Adult fall-run Chinook throughout their range generally enter estuaries from July to September, remaining in these areas until they become nearly sexually mature before moving

upstream as flows increase in the fall. In California, most adult fall-run Chinook enter streams from August through November, with peak arrival usually occurring in October and November (Leet et al. 1992), and spawn from early October through December (Table 4). Egg incubation generally lasts between 40–90 days at water temperatures of 42.8–53.6°F (6–12°C) (Vernier 1969, Bams 1970, Heming 1982, all as cited in Bjornn and Reiser 1991), and the alevins remain in the gravel for 2 to 3 weeks before emerging from the gravel. Fall Chinook salmon fry usually begin outmigration in February or March and continue into late July.

Fall Chinook are currently the most abundant and widespread of salmon stocks in California (Mills et al. 1997). However, fall Chinook salmon abundance has fluctuated widely over recent decades, with some populations often reaching critically low levels. Trends in abundance of Chinook salmon in the California Coastal ESU were reported by the NMFS as being highly variable, with the strongest negative trends generally occurring in southern-most populations (NMFS 1999b). More recently, relatively good water years combined with excellent ocean conditions have resulted in very robust adult runs in the Klamath and Eel rivers. Adult escapement for the last three years at the Van Arsdale Dam fish ladder on the Eel River have been the largest since records began in 1933 (Potter Valley Irrigation District 2013).

Although not documented, Chinook salmon likely inhabit the Action Area as they move from freshwater rearing streams to Humboldt Bay and the coastal ocean, or as they move back to their natal streams to spawn.

4.2.2.5 Northern California Steelhead

The Northern California (NC) DPS steelhead were listed under the ESA as threatened 2000 (NMFS 2000). Critical habitat was designated in 2005, encompassing reaches of all rivers and tributaries between Redwood Creek (Humboldt County) and the Gualala River in Mendocino County, not including those reaches excluded from critical habitat (NMFS 2005).

Steelhead can utilize smaller tributaries with steeper gradients than other anadromous salmonids, and can be found in the upper reaches of most large tributaries (unless barriers preclude their upstream migration).

Adult winter steelhead generally begin their spawning migration in October with the peak in December through February (Table 2). Steelhead spawning occurs in mainstems, tributaries, and intermittent streams (Everest 1973, Barnhart 1986). Reiser and Bjornn (1979) found that steelhead prefer spawning gravels ranging in size from 1.3 to 11.7 mm (0.5 to 4.6 in). The survival of embryos is reduced when fines of less than 6 mm (0.25 in) compose 20–25 percent of the substrate. The number of days required for steelhead eggs to hatch is inversely proportional to water temperature and varies from about 19 days at 16°C (60°F) to about 80 days at 6°C (42°F). Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986).

Upon emerging from the gravel, fry rear in edgewater 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 velocity refuge and as a means of avoiding predation (Shirvell 1990, 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 variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, they become inactive and hide in any available cover, including woody debris and the interstitial spaces between cobbles and bounders.

Although not documented, steelhead likely inhabit the Action Area as they move from freshwater rearing areas to Humboldt Bay and the coastal ocean, or as they move back to their natal streams to spawn.

4.2.2.6 Marbled murrelet

The marbled murrelet was listed as threatened under the ESA in 1992. Critical habitat was designated in 1996 (USFWS 1996), and a recovery plan was produced in 1997 (USFWS 1997). A proposed rule to revise (reduce) critical habitat was published in 2006 (USFWS 2006a), with a subsequent revision in 2008 (USFWS 2008b). In 2009, the USFWS announced the reopening of the public comment period (USFWS 2009) for the 2008 proposed revised designation of critical habitat for the marbled murrelet. The final rule designating critical habitat was published in 2011 (USFWS 2011). Although several areas in Humboldt County were designated as critical habitat in 1996 (USFWS 1996), none of this habitat under either the 1996 or 2011 Final Rules is located within the Action Area.

Marbled murrelets are small seabirds that range along the Pacific Coast of North America, and breed from central California (Santa Cruz County) north to southern Alaska and west to the Aleutian Archipelago (Nelson 1997; Gaston and Jones 1998; Burger 2002, as cited in Piatt et al. 2007; USFWS 1997; Ralph et al. 1995). They winter throughout this breeding range and also occur in small numbers offshore of southern California (USFWS 1997). In California, suitable marbled murrelet nesting habitat currently exists in two disjunct areas separated by about 480 km (300 mi): along the North Coast in Del Norte and Humboldt counties, and along the central coast in San Mateo and Santa Cruz counties (Cooperrider et al. 2000).

Marbled murrelets feed closer to shore than other members of the alcid family, usually within 3.2 km (2 mi) of shore, and may also be found in bays, lagoons, and coves (USFWS 1996, Nelson 1997). They often preferentially forage either near kelp beds or at the mouths of streams. During the summer, most marbled murrelets on the west coast are found within 5 km (3 mi) of shore in water less than 60 m (197 ft) deep (Nelson 1997; Day et al. 2003, as cited in Piatt et al. 2007).

Although marbled murrelets feed and rest on the water, they nest in stands of old-growth coniferous forest located within 81 km (50 mi) of the coast (Miller et al. 1995). Marbled murrelets do not build a traditional nest, but lay a single egg on a large flattened branch or natural platform hidden in the upper canopy of the tree. The breeding season extends from late March through early September. Nesting begins between early April and early July.

Threats to marbled murrelet populations are numerous. The principal threat to these birds is the loss and fragmentation of nesting habitat due to timber harvesting (Miller et al. 1995). Other factors include increases in predation, oil spills, gill netting, fluctuations in food supply due to natural climatic cycles such as the Pacific Decadal Oscillation, changes in sediment delivery from streams due to logging practices, windthrow of trees, natural fires, and additional human disturbances (Marshall 1988, Miller et al. 1995).

Although nesting may occur in redwood forests inland from the coast, there is no suitable breeding habitat for marbled murrelets in the Action Area. However, marbled murrelets may use the waters offshore for foraging, and may fly over the area during their daily movements between nesting and foraging areas.

4.2.2.7 Western snowy plover

The western snowy plover was federally listed as threatened in 1993 due to loss of nesting habitat and declines in breeding populations (USFWS 1993). A recovery plan was published in 2007 (USFWS 2007). Critical habitat has been designated and was updated in 2005 in California, Oregon, and Washington (USFWS 2005); critical habitat units located in Humboldt County include CA 2 (Big Lagoon), CA 3B (Mad River), CA 4A (Humboldt Bay South Spit), and CA 4D (Eel River gravel bars).

This small shorebird historically ranged from southern Washington south to the southern tip of Baja California, Mexico. Snowy plovers can still be found throughout their range, although available habitat is much more fragmented (Bruce et al. 1994). There has been a significant decline in the number of western snowy plover breeding locations used in California, especially in the southern portion of the state (USFWS 2007). Within the plover's range, there are only ten extant nesting locations, representing a 65 percent decline in active breeding areas. The western snowy plover is a year-round resident of California that migrates through the coastal zone of California and breeds on selected sandy beaches.

Nesting populations of western snowy plovers at coastal locations consist of both year-round residents and migrants (Warriner et al. 1986, as cited in USFWS 2007). Migrants begin arriving at breeding areas as early as January, peak in early March to late April (Page et al. 1995, as cited in USFWS 2007), and continue to arrive through June (Stenzel et al. 1994, as cited in USFWS 2007). The nesting season extends from as early as the first week of March through late September (Page et al. 1995, as cited in USFWS 2007; USFWS 2007), and nestlings hatch from early April through mid-August (Powell et al. 1997, as cited in USFWS 2007). Snowy plover chicks fledge approximately 1 month after hatching (Ehrlich et al. 1988; Powell et al. 1997, as cited in USFWS 2007).

Western snowy plovers use beaches in Humboldt County for foraging during migration and for nesting. Nests are shallow scrapes or depressions constructed at elevations above the high-tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries where sandy, gravelly, or friable soils are available as nesting substrate. In recent years, nesting has occurred at the following locations in Humboldt County: Gold Bluffs Beach, Big Lagoon, Clam Beach, South Spit, Eel River Wildlife Area, Centerville Beach, and gravel bars on the lower Eel River (USFWS 2013b). Snowy plovers may utilize the shoreline of Humboldt Bay within the Action Area.

The Action Area does not overlap with snowy plover critical habitat. Critical habitat subunit CA 4A (Humboldt Bay South Spit) is located about one mile west of the HBPP.

5 EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES AND CRITICAL HABITAT

The activities associated with the Proposed Action that may affect listed species and designated critical habitat consist of:

- Installation of a cofferdam /water structure in the intake canal
- Dewatering of the intake canal
- Rescue and relocation of listed species that might be present in the intake canal (conservation measure)
- Excavation of approximately 765 cubic meters (1,000 cubic yards) of contaminated sediment and an unknown amount of uncontaminated sediment from the intake canal
- Plugging outfall structure culverts to halt tidal exchange into the discharge canal
- Dewatering of the discharge canal
- Rescue and relocation of listed species that might be present in the discharge canal (conservation measure)
- Excavation of approximately 6,116 cubic meters (8,000 cubic yards) of contaminated riprap and sediment from the discharge canal
- Demolition of the intake and discharge structures
- Recontouring the intake canal to original topography and bathymetry
- Installation of a cofferdam in the bay that surrounds the outfall structure
- Rescue and relocation of listed species that might be present inside the discharge canal outfall structure cofferdam area (conservation measure)
- Removal of a portion of the coastal trail and entire outfall structure
- Reconstruction of the affected portion of the coastal trail
- Removal of the cofferdams in the intake canal and Humboldt Bay

The effects of the Proposed Action on terrestrial and estuarine species are expected to be primarily due to noise disturbance that will occur during cofferdam installation, dewatering of excavation areas, and rescue and relocation efforts. Effects of the project on designated critical habitat within the Action Area will be due to the short- and long-term loss of habitat and eelgrass in the intake and discharge canals.

5.1 Effects of the Proposed Action

5.1.1 Fish

A number of listed fish species have the potential to be in the intake canal and would potentially experience impacts during proposed project activities. These species include green sturgeon (Southern DPS), tidewater goby, southern Oregon/northern California coho salmon, California coastal Chinook salmon, and northern California steelhead. All species except tidewater goby have a higher likelihood to be present in the intake canal than in the discharge canal due to the intake canal's direct connectivity with the bay and deeper water habitat. Access by these species into the discharge canal is limited by its connection to Humboldt Bay through four culverts that are mostly filled with sand. The discharge canal is also significantly aggraded by sand and mud

that has entered through the culverts since the power plant's cooling water discharge was halted in 2010.

Potential impacts on these species could include injury or mortality of individuals due to installation of cofferdams, dewatering, and sediment removal activities. In addition, short-term degradation of water quality could result from construction activities. Degraded water quality may result from increased turbidity from disturbance of sediment or from spills or leakage from machinery during near or in-water construction activities. This may result in localized disturbance of juvenile and adults, potentially resulting in stress, disruption of essential behaviors, or physiological impairment.

5.1.1.1 Southern DPS green sturgeon

Southern DPS green sturgeon inhabit estuaries along the west coast during the summer and fall months (Moser and Lindley 2007). Water control devices to isolate the work areas from Humboldt Bay are scheduled to be installed in May 2014. Installation of these devices would occur prior to southern DPS green sturgeon sub-adults and adults entering the Action Area (around June or July) and effectively exclude this species from the project area. Juvenile southern DPS green sturgeon rear in their natal streams and would not inhabit Humboldt Bay. **Therefore, the Proposed Action will have no effect on individuals of this species in either the short- or long-term.**

Critical habitat

The intake and discharge canals are part of the designated critical habitat for this species. The effects of the Proposed Action's intake canal activities on designated critical habitat for southern DPS green sturgeon are limited to sediment removal activities' effects on the PCEs of food resources and sediment quality.

The canals contain very low-quality critical habitat due to the high level of disturbance associated with being within an industrial area, contamination with radionuclides from the decommissioned nuclear power plant, shallow water in both canals, need to access the discharge canal through partially filled culverts, and location away from the heavier used areas in the shipping channel and northern Humboldt Bay (Arcata Bay).

The Proposed Action will result in the temporary loss of food resources critical habitat within the intake canal due to isolation of the work area behind a water exclusion structure and excavation of contaminated sediment. The intake canal will be returned to its original bathymetry following excavation activities and benthic organisms and small fish are expected to return over time. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for southern DPS green sturgeon within the intake canal for the short-term.**

The Proposed Action will result in the permanent loss of food resources within the discharge canal. This is due to the permanent removal of the outfall structure, which provides access for green sturgeon to enter the discharge canal. The discharge canal will be permanently disconnected from Humboldt Bay following completion of operations. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for southern DPS green sturgeon within the discharge canal for the short- and long-term.**

Removal of contaminated sediment from the intake canal will result in a beneficial effect on the PCE of sediment quality. The removal of radionuclides and recontouring with uncontaminated sediment will provide a clean substrate for recolonization of green sturgeon's food resources.

Therefore, the Proposed Action will have a beneficial effect on sediment quality and food resources in the intake canal in the long-term.

Conservation measures

No conservation measures are applicable for this species.

5.1.1.2 Tidewater Goby

There is a moderate potential for adult and juvenile tidewater gobies to inhabit the discharge canal and lesser potential in the intake canal. If any gobies are present in the canals, it is expected that their number would be relatively low due to the low quality of the habitat in the intake and discharge canals and isolation from the populations in the Elk River and Salmon Creek watersheds. In addition, tidewater goby were not captured during a focused survey in Buhne Slough (Stillwater Sciences 2007), which is within the Action Area.

Tidewater gobies could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individual tidewater gobies. A fish rescue and relocation plan will be implemented prior to completion of cofferdams and initiation of excavation activities. The rescue and relocation plan will reduce impacts on individual of this species if they are present in the canals. However, the risk of impacts cannot be eliminated. **Therefore, the Proposed Action may affect and is likely to adversely affect tidewater gobies.**

Critical habitat

There is no designated critical habitat for tidewater gobies in the Action Area. **Therefore, the Proposed Action will have no effect on designated critical habitat.**

Conservation measures

The only conservation measure that could affect tidewater gobies is implementation of the rescue and relocation plan. This plan will require using seine nets during low tide to sweep the fish in a downstream direction, beach seining, hand capture, holding, and relocation of any tidewater gobies that may be present within the intake and discharge canal work areas. Some individual fish may be injured during capture, holding, transport, and relocation activities. However, it is expected that 100% mortality would occur within the work areas without implementation of the rescue and relocation plan. In the short-term, implementation of this conservation measure may result in capture- and handling-related injury or mortality to tidewater gobies. In the long-term, implementing this measure will result in a better outcome than not having a rescue and relocation effort at all. However, there is still the risk of short-term injury or mortality associated with this conservation measure. **Therefore, implementation of this conservation measure may affect and is likely to adversely affect tidewater gobies.**

5.1.1.3 Southern Oregon Northern California Coast Coho salmon

There is a high potential for coho salmon smolts to be present within the intake canal during implementation of the Proposed Action; however, it is expected that their numbers would be low given the low quality of habitat present. Potential for this species to be present in the discharge canal is relatively low due to the aggraded condition and because the only access to the discharge canal from the bay is through culverts that are mostly filled with sand. These fish would be foraging in the canals and utilizing the eelgrass as cover prior to ocean entry. Adult coho would not be present in the Project Area, but would be periodically present within the Action Area beyond the discharge canal outfall structure in Humboldt Bay.

Coho salmon could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individuals.

A cofferdam will be constructed in Humboldt Bay to isolate the outfall structure work area from tidal and wave action and minimize the discharge of sediment into the bay. Depending on construction methods selected per final design, the noise generated during construction has the potential to result in impacts to juvenile or adult coho salmon that may be close to the work area.

A fish rescue and relocation effort will be implemented prior to, and following completion of, installation of the cofferdams and initiation of excavation activities. The rescue and relocation effort will reduce impacts on individual of this species if they are present in the canals or inside the outfall structure cofferdam. Noise minimization measures, which may be developed in consultation with the regulatory agencies, may also reduce potential impacts on coho salmon. However, the risk of impacts on coho salmon cannot be eliminated. **Therefore, the Proposed Action may affect and is likely to adversely affect coho salmon.**

Critical habitat

The PCEs of coho salmon critical habitat associated with this project relate to juvenile summer and winter rearing areas. The essential features that may be affected by the Proposed Action's sediment removal activities include water quality, cover/shelter, and food.

The Proposed Action includes activities that could degrade the essential feature of water quality. Degraded water quality could result from increased turbidity from disturbance of sediment, hydrocarbon (e.g., gasoline, diesel, lube oil, hydraulic fluid, etc.) releases from heavy equipment, or sediment delivery from stockpile areas. Implementation of the following measures, which are included in the Proposed Action, will minimize the risk of impacts on individuals, if present nearby. These conservation measures include (1) installation of water control structures (e.g., cofferdams and silt curtains) to isolate and control potentially contaminated water and sediment within the work area, (2) directing any project-generated water that doesn't meet water quality standards into the Ground Water Treatment System (GWTS), (3) conformance to the HBPP Storm Water Pollution Prevention Plan (SWPPP), (4) conducting all heavy equipment maintenance and refueling in designated locations away from the work areas, (5) ensuring that all heavy equipment that works within the wetted portion of the canals will be free of fluid leaks, and (6) immediate clean-up of any hydraulic leaks or spills.

The Proposed Action will result in the temporary loss of cover/shelter and food resources within the intake canal due to the loss of eelgrass within the excavation footprint. In addition, the sequestration of the work area behind a water exclusion structure will result in the temporary loss of access to cover/shelter and food resources during the period of isolation. The intake canal will be returned to its original bathymetry following excavation activities and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in the intake canal.

The Proposed Action will result in the permanent loss of cover/shelter and food resources within the discharge canal. This is due to the permanent removal of the outfall structure, which provides some limited access for coho salmon to enter the discharge canal. The discharge canal will be permanently disconnected from Humboldt Bay following completion of operations. The Proposed Action will result in a permanent loss of low-quality critical habitat in the discharge canal.

The Proposed Action will result in the temporary loss of cover/shelter and food resources within the outfall structure's cofferdam area for the period that the work area is isolated from Humboldt Bay. The coastal trail will be returned to its original configuration following removal of the outfall structure and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in Humboldt Bay.

Implementation of the above-mentioned conservation measures will be sufficient to protect the water quality PCE of SONCC coho salmon critical habitat. The Proposed Action will result in the temporary loss of cover/shelter and food resources PCE of critical habitat in the intake canal. The Proposed Action will result in the permanent loss of cover/shelter and food resources PCE of critical habitat in the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for SONCC coho salmon.**

Conservation measures

The only conservation measure that could affect coho salmon is implementation of the rescue and relocation plan. This plan will require using seine nets during low tide to sweep the fish in a downstream direction, beach seining, hand capture, holding, and relocation of any coho salmon that may be present within the intake and discharge canal work areas. Some individual fish may be injured during capture, holding, transport, and relocation activities. However, it is expected that 100% mortality would occur within the work areas without implementation of the rescue and relocation plan. In the short-term, implementation of this conservation measure may result in capture- and handling-related injury or mortality to coho salmon. In the long-term, implementing this measure will result in a better outcome than not having a rescue and relocation effort at all. However, there is still the risk of short-term injury or mortality associated with this conservation measure. **Therefore, implementation of this conservation measure may affect and is likely to adversely affect SONCC coho salmon.**

5.1.1.4 California Coastal Chinook salmon

There is a high potential for Chinook salmon smolts to be present within the intake canal during implementation of the Proposed Action; however, it is expected that their numbers would be low given the low quality of habitat present. Potential for this species to be present in the discharge canal is relatively low due to the aggraded condition and because the only access to the discharge canal from the bay is through culverts that are mostly filled with sand. These fish would be foraging in the canals and utilizing the eelgrass as cover prior to ocean entry. Adult Chinook would not be present in the Project Area, but would be periodically present within the Action Area beyond the discharge canal outfall structure in Humboldt Bay.

Chinook salmon could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individuals.

A cofferdam will be constructed in Humboldt Bay to isolate the outfall structure work area from tidal and wave action and minimize the discharge of sediment into the bay. Depending on the final design selected for the cofferdam, noise generated during installation of Humboldt Bay has the potential to result in the injury or mortality of juvenile or adult Chinook salmon that may be close to the work area.

A fish rescue and relocation effort will be implemented prior to, and following completion of, installation of the cofferdams and initiation of excavation activities. The rescue and relocation effort will reduce impacts on individual of this species if they are present in the canals or inside

the outfall structure cofferdam. Noise minimization measures, which may be developed in consultation with the regulatory agencies, may also reduce potential impacts on Chinook salmon. However, the risk of impacts on Chinook salmon cannot be eliminated. **Therefore, the Proposed Action may affect and is likely to adversely affect CC Chinook salmon.**

Critical habitat

The PCE of Chinook salmon critical habitat within the Action Area is limited to the estuarine area with: (1) water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (2) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (NMFS 2005). The essential features that may be affected by the Proposed Action's sediment removal activities include water quality, natural cover in the form of aquatic vegetation, large rocks and boulders (rock slope protection), and juvenile forage.

The Proposed Action includes activities that could degrade the PCE of water quality. Degraded water quality could result from increased turbidity from disturbance of sediment, hydrocarbon (e.g., gasoline, diesel, lube oil, hydraulic fluid, etc.) releases from heavy equipment, or sediment delivery from stockpile areas. Implementation of the following measures, which are included in the Proposed Action, will minimize the risk of impacts on individuals, if present nearby. These conservation measures include (1) installation of water control structures (e.g., cofferdams and silt curtains) to isolate and control potentially contaminated water and sediment within the work area, (2) directing any project-generated water that doesn't meet water quality standards into the GWTS, (3) conformance to HBPP SWPPP, (4) conducting all heavy equipment maintenance and refueling in designated locations away from the work areas, (5) ensuring that all heavy equipment that works within the wetted portion of the canals will be free of fluid leaks, and (6) immediate clean-up of any hydraulic leaks or spills.

The Proposed Action will result in the temporary loss of natural cover (submerged vegetation) and juvenile forage within the intake canal due the loss of eelgrass within the excavation footprint. In addition, the sequestration of the work area behind a water exclusion structure will result in the temporary loss of access to cover/shelter and food resources during the period of isolation. The intake canal will be returned to its original function following excavation activities and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in the intake canal.

The Proposed Action will result in the permanent loss of natural cover (submerged vegetation) and juvenile forage within the discharge canal. This is due to the permanent removal of the outfall structure, which provides some limited access for Chinook salmon to enter the discharge canal. The discharge canal will be permanently disconnected from Humboldt Bay following completion of operations. The Proposed Action will result in a permanent loss of low-quality critical habitat in the discharge canal.

The Proposed Action will result in the temporary loss of large rock and boulder cover (rock slope protection) and juvenile forage within the outfall structure's cofferdam area for the period that the work area is isolated from Humboldt Bay. The coastal trail will be returned to its original configuration following removal of the outfall structure and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in Humboldt Bay.

Implementation of the above mentioned conservation measures will be sufficient to protect the water quality PCE of Chinook salmon critical habitat. The Proposed Action will result in the temporary loss of cover and forage PCE of critical habitat in the intake canal. The Proposed Action will result in the permanent loss of cover and forage PCE of critical habitat in the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for CC Chinook salmon.**

Conservation measures

The only conservation measure that could affect Chinook salmon is implementation of the rescue and relocation plan. This plan will require using seine nets during low tide to sweep the fish in a downstream direction, beach seining, hand capture, holding, and relocation of any Chinook salmon that may be present within the intake and discharge canal work areas. Some individual fish may be injured during capture, holding, transport, and relocation activities. However, it is expected that 100% mortality would occur within the work areas without implementation of the rescue and relocation plan. In the short-term, implementation of this conservation measure may result in capture- and handling-related injury or mortality to Chinook salmon. In the long-term, implementing this measure will result in a better outcome than not having a rescue and relocation effort at all. However, there is still the risk of short-term injury or mortality associated with this conservation measure. **Therefore, implementation of this conservation measure may affect and is likely to adversely affect CC Chinook salmon.**

5.1.1.5 Northern California Steelhead

There is a high potential for steelhead smolts to be present within the intake canal during implementation of the Proposed Action; however, it is expected that their numbers would be low given the low quality of habitat present. Potential for this species to be present in the discharge canal is relatively low due to the aggraded condition and because the only access to the discharge canal from the bay is through culverts that are mostly filled with sand. These fish would be foraging in the canals and utilizing the eelgrass as cover prior to ocean entry. Adult steelhead would not be present in the Project Area, but would be periodically present within the Action Area beyond the discharge canal outfall structure in Humboldt Bay.

Steelhead could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individuals.

A cofferdam will be constructed in Humboldt Bay to isolate the outfall structure work area from tidal and wave action and minimize the discharge of sediment into the bay. The noise generated during installation of the cofferdam in Humboldt Bay has the potential to result in the injury or mortality of juvenile or adult steelhead that may be close to the work area.

A fish rescue and relocation effort will be implemented prior to, and following completion of, installation of the cofferdams and initiation of excavation activities. The rescue and relocation effort will reduce impacts on individual of this species if they are present in the canals or inside the outfall structure cofferdam. Noise minimization measures, which may be developed in consultation with the regulatory agencies, may also reduce potential impacts on steelhead. However, the risk of impacts on steelhead cannot be eliminated. **Therefore, the Proposed Action may affect and is likely to adversely affect NC steelhead.**

Critical habitat

The PCE of steelhead critical habitat within the Action Area is limited to the estuarine area with: (1) water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (2) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (NMFS 2005). The essential features that may be affected by the Proposed Action's sediment removal activities include water quality, cover in the form of aquatic vegetation, large rocks and boulders (rock slope protection), and juvenile forage.

The Proposed Action includes activities that could degrade the PCE of water quality. Degraded water quality could result from increased turbidity from disturbance of sediment, hydrocarbon (e.g., gasoline, diesel, lube oil, hydraulic fluid, etc.) releases from heavy equipment, or sediment delivery from stockpile areas. Implementation of the following measures, which are included in the Proposed Action, will minimize the risk of impacts on individuals, if present nearby. These conservation measures include (1) installation of water control structures (e.g., cofferdams and silt curtains) to isolate and control potentially contaminated water and sediment within the work area, (2) directing any project-generated water that doesn't meet water quality standards into the GWTS, (3) conformance to HBPP SWPPP, (4) conducting all heavy equipment maintenance and refueling in designated locations away from the work areas, (5) ensuring that all heavy equipment that works within the wetted portion of the canals will be free of fluid leaks, and (6) immediate clean-up of any hydraulic leaks or spills.

The Proposed Action will result in the temporary loss of natural cover (submerged vegetation) and juvenile forage within the intake canal due the loss of eelgrass within the excavation footprint. In addition, the sequestration of the work area behind a water exclusion structure will result in the temporary loss of access to cover/shelter and food resources during the period of isolation. The intake canal will be returned to its original bathymetry following excavation activities and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in the intake canal.

The Proposed Action will result in the permanent loss of natural cover (submerged vegetation) and juvenile forage within the discharge canal. This is due to the permanent removal of the outfall structure, which provides some limited access for steelhead to enter the discharge canal. The discharge canal will be permanently disconnected from Humboldt Bay following completion of operations. The Proposed Action will result in a permanent loss of low-quality critical habitat in the discharge canal.

The Proposed Action will result in the temporary loss of large rock and boulder cover (rock slope protection) and juvenile forage within the outfall structure's cofferdam area for the period that the work area is isolated from Humboldt Bay. The coastal trail will be returned to its original configuration following removal of the outfall structure and benthic organisms and small fish are expected to return over time. The Proposed Action will result in a short-term loss of critical habitat in Humboldt Bay.

Implementation of the above-mentioned conservation measures will be sufficient to protect the water quality PCE of steelhead critical habitat. The Proposed Action will result in the temporary loss of cover and forage PCE of critical habitat in the intake canal. The Proposed Action will result in the permanent loss of cover and forage PCE of critical habitat in the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for NC steelhead.**

Conservation measures

The only conservation measure that could affect steelhead is implementation of the rescue and relocation plan. This plan will require using seine nets during low tide to sweep the fish in a downstream direction, beach seining, hand capture, holding, and relocation of any steelhead that may be present within the intake and discharge canal work areas. Some individual fish may be injured during capture, holding, transport, and relocation activities. However, it is expected that 100% mortality would occur within the work areas without implementation of the rescue and relocation plan. In the short-term, implementation of this conservation measure may result in capture- and handling-related injury or mortality to steelhead. In the long-term, implementation of this measure will result in a better outcome than not having a rescue and relocation effort at all. However, there is still the risk of short-term injury or mortality associated with this conservation measure. **Therefore, implementation of this conservation measure may affect and is likely to adversely affect NC steelhead.**

5.1.2 Birds

5.1.2.1 Marbled murrelet

There is no suitable habitat for marbled murrelets within the Action Area. Marbled murrelets, however, may fly over the Action Area at twilight and just before dawn as they migrate from their nest location to forage in the open ocean and back. The Proposed Action does not include night-time work and any lighting that could possibly be installed will be directed downward and away from off-site areas. The HBPP is an industrial site and is already well-lit. Any marbled murrelets that fly over the site are already conditioned to the existing lighting. **Therefore, the Proposed Action may affect, but is unlikely to adversely affect marbled murrelets.**

Critical habitat

Designated critical habitat for marbled murrelet is located 9.7 km (6 mi) inland from the Project Area. **Therefore, the Proposed Action will have no effect on designated critical habitat for this species.**

Conservation measures

No conservation measures are applicable for this species.

5.1.2.2 Western snowy plover

Western snowy plovers are not likely to be present in the Project Area, but they may be present along the shoreline of Humboldt Bay inside the Action Area. The Proposed Action includes activities that could degrade water quality in the Bay, which could in turn impact western snowy plover. Degraded water quality could result from increased turbidity from disturbance of sediment, hydrocarbon (e.g., gasoline, diesel, lube oil, hydraulic fluid, etc.) releases from heavy equipment, or sediment delivery from stockpile areas. This may result in disturbance of essential behaviors or physiological impairment. Implementation of the following measures, which are included in the Proposed Action, will minimize the risk of impacts on individuals, if present nearby. These include (1) installation of water control structures (e.g., cofferdams) to isolate and control potentially contaminated water and sediment within the work area, (2) directing any project-generated water that doesn't meet water quality standards into the GWTS, (3) conformance to HBPP SWPPP, (4) conducting all heavy equipment maintenance and refueling in designated locations away from the work areas, (5) ensuring that all heavy equipment that works within the wetted portion of the canals will be free of fluid leaks, and (6) immediate clean-up of

any hydraulic leaks or spills. **Therefore, the Proposed Action may affect, but is unlikely to adversely affect western snowy plovers in the short- and long-term.**

Critical habitat

Designated critical habitat for western snowy plovers is located about 1.6 km (1 mi) west of the proposed Project Area on the South Spit (land south of the harbor entrance) (CDFW 2013). **Therefore, the Proposed Action will have no effect on designated critical habitat for this species.**

Conservation measures

No conservation measures are applicable for this species.

5.2 Interrelated and Interdependent Actions

The larger HBPP decommissioning project is interrelated to the Proposed Action. With the exception of the Proposed Action, the decommissioning activities are occurring entirely within a heavy industrial site in compliance with all applicable terms and conditions to protect terrestrial, aquatic, and estuarine resources. This larger decommissioning project has already been subject to extensive regulatory review and was determined to have no effect on ESA-listed species. Therefore, the interrelated decommissioning project will have no effect on individual ESA-listed species or their critical habitat.

5.3 Climate Change

By its very nature, climate change is a cumulative phenomenon, and it is not possible to link a single project to specific climatological changes. The Proposed Action would result in temporary greenhouse gas (GHG) emissions from project-related activities.

Currently, there are no adopted numerical thresholds of significance in California that are specifically applicable to the Proposed Action. The South Coast Air Quality Management District (SCAQMD) and the Bay Area Air Quality Management District have adopted numerical California Environmental Quality Act (CEQA) thresholds of significance for industrial stationary source GHG emissions; both districts use a threshold of 10,000 metric tons (MT) of equivalent carbon dioxide (CO_2e) per year (Bay Area Air Quality Management District 2011, SCAQMD 2008). Only the SCAQMD's threshold addresses construction emissions. It takes 3.785 liters (1 gallon) of diesel fuel to produce approximately 10.2 kilograms (kg) (22.38 pounds) of CO_2e. It would take about 3,709,300 liters (980,000 gallons) of diesel to produce 10,000 MT of CO_2e. Although there are not any current project-related GHG emission calculations associated with the Proposed Action, it is extremely unlikely that they would exceed 10,000 MT of CO_2e per year. The entire Proposed Action would likely use less than 1/100 of the threshold amount.

The Humboldt Bay Shoreline Inventory, Mapping and Sea Level Rise Vulnerability Assessment (Laird et al. 2013) looked at levee and shoreline conditions and elevations around the entire perimeter of Humboldt Bay. The assessment found that the levees surrounding the HBPP were high enough to withstand a SLR of greater than 61 cm (2 ft) (Laird et al. 2013). Other than the temporary removal and reconstruction of the coastal trail levee to facilitate the outfall structure removal, there would be no change in levee elevations within the Action Area.

The Proposed Action will produce significantly less CO_2e than air quality threshold amounts and not result in any change to levee elevations that could increase the potential for flooding due to

SLR. **Therefore, the Proposed Action may affect, but is unlikely to adversely affect climate change.**

6 CUMULATIVE EFFECTS

This section describes the cumulative effects of the Proposed Action. A cumulative effects analysis needs to consider the "future state, tribal, local or private actions that are reasonably certain to occur in the Action Area" (USFWS and NMFS 1998). Any federal actions (including hatcheries, National Forest timber harvest, water projects, instream restoration activities) that require future consultations are not considered cumulative (NMFS 2010) and are not included in this analysis. Non-federal actions (e.g., timber harvest on private land) or those with an uncertain timeframe are speculative and are not included in this analysis. If the Proposed Action has been determined to result in no effect on, or is not likely to adversely affect a species, then future projects would not contribute to any cumulative effects and are thus not discussed in this section.

6.1 Projects Considered and Effects Analysis

There are no other projects identified in the Action Area that meets the cumulative effects criteria defined above. The only other projects that will occur in the Action Area include future actions by PG&E. These future actions will be subject to future consultations and therefore do not meet the above criteria.

6.2 Cumulative Effects Conclusion

The Proposed Action, when combined with future actions, is not likely to cause a cumulatively considerable contribution to the overall effects on the analysis species discussed above or their designated critical habitat.

7 CONCLUSION

7.1 Fish

7.1.1 Southern DPS green sturgeon

Southern DPS green sturgeon inhabit estuaries along the west coast during the summer and fall months (Moser and Lindley 2007). Water control devices to isolate the work areas from Humboldt Bay are scheduled to be installed in April 2014. Installation of these devices would occur prior to southern DPS green sturgeon sub-adults and adults entering the Action Area and effectively exclude this species from project activities. Juvenile southern DPS green sturgeon rear in their natal streams and would not inhabit Humboldt Bay. **Therefore, the Proposed Action will have no effect on individuals of this species.**

The Proposed Action will result in the temporary loss of food resources critical habitat within the intake canal due to isolation of the work area behind a water exclusion structure and excavation of contaminated sediment. The intake canal will be returned to its original bathymetry following excavation activities and benthic organisms and small fish are expected to return overtime. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for southern DPS green sturgeon within the intake canal.**

The Proposed Action will result in the permanent loss of food resources within the discharge canal. This is due to the permanent removal of the outfall structure, which provides access for green sturgeon to enter the discharge canal. The discharge canal will be permanently disconnected from Humboldt Bay following completion of operations. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for southern DPS green sturgeon within the discharge canal.**

Removal of contaminated sediment from the intake canal will result in a beneficial effect on the PCE of sediment quality. The removal of radionuclides and recontouring with uncontaminated sediment will provide a clean substrate for recolonization of green sturgeon's food resources. **Therefore, the Proposed Action will have a beneficial effect on sediment quality and food resources in the intake canal.**

7.1.2 Tidewater goby

Tidewater gobies could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individual tidewater gobies. **Therefore, the Proposed Action may affect and is likely to adversely affect tidewater gobies.**

There is no designated critical habitat for tidewater gobies in the Action Area. **Therefore, the Proposed Action will have no effect on designated critical habitat.**

7.1.3 Southern Oregon/Northern California Coast coho salmon

Coho salmon could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these

activities have the potential to result in injury or mortality to individuals. **Therefore, the Proposed Action may affect and is likely to adversely affect SONCC coho salmon.**

The Proposed Action will result in a short-term loss of critical habitat in the intake canal and the permanent loss of cover/shelter and food resources PCE of critical habitat in the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for SONCC coho salmon.**

7.1.4 California Coastal Chinook salmon

Chinook salmon could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individuals. **Therefore, the Proposed Action may affect and is likely to adversely affect CC Chinook salmon.**

The Proposed Action will result in the temporary loss of natural cover (submerged vegetation) and juvenile forage within the intake canal due the loss of eelgrass within the excavation footprint. The Proposed Action will result in the permanent loss of natural cover (submerged vegetation) and juvenile forage within the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for CC Chinook salmon.**

7.1.5 Northern California Steelhead

Steelhead could be affected by installation of water control structures (cofferdams), dewatering of the intake and discharge canal work areas, and excavation of sediment. All of these activities have the potential to result in injury or mortality to individuals. **Therefore, the Proposed Action may affect and is likely to adversely affect NC steelhead.**

The Proposed Action will result in the temporary loss of natural cover (submerged vegetation) and juvenile forage within the intake canal due the loss of eelgrass within the excavation footprint. The Proposed Action will result in the permanent loss of natural cover (submerged vegetation) and juvenile forage within the discharge canal. **Therefore, the Proposed Action is likely to adversely affect designated critical habitat for steelhead.**

7.2 Birds

7.2.1 Marbled murrelet

There is no suitable habitat for marbled murrelets within the Action Area. Marbled murrelets, however, may fly over the Action Area at twilight and just before dawn as they migrate from their nest location to forage in the open ocean and back. The Proposed Action does not include night-time work and any lighting that could possibly be installed will be directed downward and away from off-site areas. The HBPP is an industrial site and is already well-lit. Any marbled murrelets that fly over the site are already conditioned to the existing lighting. **Therefore, the Proposed Action may affect, but is unlikely to adversely affect marbled murrelets.**

Designated critical habitat for marbled murrelet is located 9.7 km (6 mi) inland from the Project Area. **Therefore, the Proposed Action will have no effect on designated critical habitat for this species.**

7.2.2 Western snowy plover

Western snowy plovers are not likely to be present in the Project Area, but they may be present on beaches inside the Action Area. The Proposed Action includes activities that could degrade water quality along the shoreline of Humboldt Bay, which could in turn impact western snowy plover. **Therefore, the Proposed Action may affect, but is unlikely to adversely affect western snowy plovers.**

Designated critical habitat for western snowy plovers is located about 1.6 km (1 mi) west of the proposed Project Area on the South Spit (land south of the harbor entrance) (CDFW 2013). **Therefore, the Proposed Action will have no effect on designated critical habitat for this species.**

8 ESSENTIAL FISH HABITAT ASSESSMENT

8.1 Essential Fish Habitat Background

Essential Fish Habitat (EFH) is designated for commercially fished species under the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSA) (Public Law 104-297). Congress defined essential fish habitat for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSA requires federal fishery management plans, developed by National Oceanic and Atmospheric Administration's (NOAA) NMFS and the Pacific Southwest Fisheries Management Council, to describe the habitat essential to the fish being managed and to describe threats to that habitat from both fishing and non-fishing activities. Pursuant to section 305(b) of the MSA (16 U.S.C. 1855[b]), federal agencies are required to consult with NMFS on actions that may adversely affect EFH for species managed under the fishery management plans.

The objective of this EFH assessment is to determine whether or not the Proposed Action may adversely affect designated EFH for relevant commercially, federally managed fisheries species within the proposed action area. EFH has been designated for 3 salmon species, 83 groundfish species, and 5 coastal pelagic species. Descriptions of EFH within the Action Area are provided below.

8.1.1 Chinook salmon and coho salmon

Coho salmon and Chinook salmon are managed under the MSA. EFH for coho and Chinook salmon is described in Amendment 14 to the Pacific Coast Salmon Fishery Management Plan (50 CFR § 660.412). Non-freshwater EFH for Pacific salmonids extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the EEZ (370.4 km [200 mi]) offshore of Washington, Oregon, and California north of Point Conception. Salmon EFH includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding naturally impassible barriers (i.e. natural waterfalls in existence for several hundred years), but includes aquatic areas above all artificial barriers except specifically named impassible dams.

8.1.2 Groundfish

NMFS defined EFH to include those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 [10]). EFH for Pacific Coast groundfish includes all waters and substrate within areas with a depth less than or equal to 3,500 m (11,483 ft) shoreward to the mean higher high water level or the upriver extent of saltwater intrusion (defined as upstream and landward to where ocean-derived salts measure less than 0.5 parts per thousand during the period of average annual low flow).

8.1.3 Coastal pelagic species

EFH for coastal pelagic species, including finfish (northern anchovy, Pacific sardine, Pacific mackerel, and jack mackerel) and market squid occurs from the shorelines of California, Oregon, and Washington westward to the EEZ (5–322 km [3–200 mi] offshore) and above the thermocline where sea surface temperatures range from 10 to 26°C (50 to 78°F). During colder winters, the

northern extent of EFH for coastal pelagic species may be as far south as Cape Mendocino, and during warm summers it may extend into Alaska's Aleutian Islands. In each of these seasonal examples Humboldt Bay would be included as EFH for these species.

8.2 Proposed Action

Please refer to Section 2 of the associated Biological Assessment for a description of the Proposed Action.

8.3 Essential Habitat Requirements for Chinook and Coho Salmon

8.3.1 Coho and Chinook salmon

See Section 4.2.2 of the Biological Assessment for a description of coho and Chinook salmon life history and habitat requirements.

8.4 Effects of the Action

The EFH implementing regulations, 50 CFR § 600.810(a), define the term "adverse effect" as:

> "any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations 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 and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions."

8.4.1 Chinook and coho salmon

EFH for Chinook salmon and coho salmon in the Action Area includes nearshore and tidal submerged environments within state territorial waters that are necessary for the feeding or growth to maturity for juvenile coho salmon and Chinook salmon. The potential effects of the Proposed Action on Pacific salmon EFH would be similar to those described for designated critical habitat.

The Proposed Action includes activities that could degrade water quality and result in the temporary loss of low-quality natural cover (submerged vegetation) and juvenile forage within the intake canal due the damage to eelgrass within the excavation footprint. However, the intake canal will be recontoured to its pre-project bathymetry. In addition, the removal of sediment contaminated with radionuclides from the intake canal will be beneficial for Pacific salmon EFH.

The discharge canal will experience a permanent loss of approximately 3,157 m^2 (0.78 ac) of low-quality foraging area for juvenile salmonids. Humboldt Bay is approximately 62 km^2 (15,360 ac) in surface area. The loss of 3,157 m^2 (0.78 ac) of low-quality habitat out of 62 km^2 (15,360 ac) equals 0.0051% of the total available habitat. The removal of sediment contaminated with radionuclides from the discharge canal will be beneficial for Pacific salmon EFH.

Therefore, the Proposed Action will result in a very small loss of cover and foraging habitat, which will minimally adversely affect Pacific salmon EFH.

8.4.2 Groundfish

EFH for groundfish in the Action Area includes nearshore and tidal submerged environments within state territorial waters that are necessary for their spawning, feeding, or growth to maturity. The potential effects of the Proposed Action on groundfish EFH would be similar to those described for Pacific salmon.

The Proposed Action includes activities that could degrade water quality and result in the temporary loss of low-quality natural cover (submerged vegetation) and juvenile forage within the intake canal due the damage to eelgrass within the excavation footprint. However, the intake canal will be recontoured to its pre-project bathymetry. In addition, the removal of sediment contaminated with radionuclides from the intake canal will be beneficial for groundfish EFH.

The discharge canal will experience a permanent loss of approximately ,3,157 m^2 (0.78 ac) of low-quality foraging area for juvenile groundfish. Humboldt Bay is approximately 62 km^2 (15,360 ac) in surface area. The loss 3,157 m^2 (0.78 ac) of low-quality habitat out of 62 km^2 (15,360 ac) equals 0.0051% of the total available habitat. The removal of sediment contaminated with radionuclides from the discharge canal will be beneficial for groundfish EFH.

Therefore, the Proposed Action will result in a very small loss of spawning and foraging habitat, which will minimally adversely affect groundfish EFH.

8.4.3 Coastal pelagic species

EFH for coastal pelagic fish in the Action Area includes nearshore and tidal submerged environments within state territorial waters that are necessary for their spawning, feeding, or growth to maturity. The potential effects of the Proposed Action on coastal pelagic fish EFH would be similar to those described for Pacific salmon and groundfish.

The Proposed Action includes activities that could degrade water quality and result in the temporary loss of potential low-quality natural cover (submerged vegetation), spawning, and juvenile forage habitat within the intake canal due the damage to eelgrass within the excavation footprint. However, the intake canal will be recontoured to its pre-project bathymetry. In addition, the removal of sediment contaminated with radionuclides from the intake canal will be beneficial for coastal pelagic fish EFH.

The discharge canal will experience a permanent loss of approximately 3,157 m^2 (0.78 ac) of potential low-quality spawning and foraging area for juvenile coastal pelagic fish. Humboldt Bay is approximately 62 km^2 (15,360 ac) in surface area. The loss of 3,157 m^2 (0.78 ac) of low-quality habitat out of 62 km^2 (15,360 ac) equals 0.0051% of the total available habitat. The removal of sediment contaminated with radionuclides from the discharge canal will be beneficial for coastal pelagic fish EFH.

Therefore, the Proposed Action will result in a very small loss of spawning and foraging habitat for coastal pelagic fish, which will minimally adversely affect coastal pelagic fish EFH.

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