FINAL

PROGRAM ENVIRONMENTAL IMPACT REPORT FOR THE HUMBOLDT BAY SEDIMENT MANAGEMENT PROGRAM

VOLUME 1

PREPARED FOR:

Humboldt Bay Harbor
Recreation and Conservation District
601 Startare Drive
Eureka, CA 95501
Phone: 707.443.0801

PREPARED BY:

ICF
1437 3rd St
Eureka, CA 95501
Contact: Sarah Baker
Phone: 213.312.1742
sarah.baker@icf.com

SCH #2018012052

May 2021

ICF. 2021. *Final Program Environmental Impact Report for the Humboldt Bay Sediment Management Program*. May. (ICF 00638.17.) Los Angeles, California. Prepared for Humboldt Bay Harbor District, Humboldt, California.

Executive Summary

This Final Program Environmental Impact Report (PEIR) assesses the potential environmental effects of implementing the Humboldt Bay Sediment Management Program (Proposed Program). The objective of this PEIR is to explore alternatives and provide an environmental analysis of dredging methods, sediment processing, and sediment placement at beneficial-use sites that would guide implementation of the Coastal Regional Sediment Management Plan for the Eureka Littoral Cell (CRSMP) and steer sediment management for Locally Maintained Sites (LMSs) toward achievement of CRSMP objectives. In recent years, dredged sediments have been almost exclusively transported to the Humboldt Open Ocean Disposal Site (HOODS) located approximately 3 nautical miles northwest of the Humboldt Bay entrance where the dredged material is deposited. Disposal at HOODS is not considered a beneficial use because it removes the sediments from the Eureka Littoral Cell (ELC). Located in Humboldt Bay, the Proposed Program consists of 25 sites where dredging may occur, three sites where sediment may be dewatered and temporarily stockpiled and 76 sites where sediment may be beneficially used.

This PEIR considers 4 alternatives: Alternative 1, Alternative 2, and Alternative 3, as well as a No-Project Alternative. Under Alternative 1, the method of sediment removal at LMSs would be suction dredging only, and Alternative 2 considers only using clamshell bucket dredging for sediment removal. Under Alternative 3, the method of dredging may be either suction or clamshell bucket dredging. However, dewatering and stockpiling of sediments at upland locations for future transport to a beneficial use site would not be conducted. Sediment would only be piped directly to beneficial-use sites, under this Alternative. The No-Project Alternative assumes that LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at the HOODS rather than used for beneficial projects around the bay. As further described below, Alternative 1 was selected as the environmentally superior alternative. The environmental effects of the Proposed Program are summarized in Table ES-1.

Table ES-1. Summary of the Project's Impacts, Mitigation Measures, and Impact Levels of Significance.

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
Impact AF-1: Would the Proposed Program Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as Shown on the Maps Prepared Pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to Non-agricultural Use?	No Impact		
Impact AF-2: Would the Proposed Program Conflict with Existing Zoning for Agricultural Use or a Williamson Act Contract?	Less than Significant		
Impact AF-3: Would the Proposed Program Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land (as Defined in PRC § 12220(g)), Timberland (as Defined by PRC § 4526), or Timberland-Zoned Timberland Production (as defined by Government Code § 51104(g))?	No Impact		
Impact AF-4: Would the Proposed Project Result in the Loss of Forest Land or Conversion of Forest Land to Non-forest Use?	No Impact		
Impact AF-5: Would the Proposed Program Involve Other Changes in the Existing Environment that, Due to their Location or Nature, Could Result in Conversion of Farmland, to Non-agricultural Use or Conversion of Forest Land to Non-forest Use?	Less than Significant		
Impact AQ-1: Would the Proposed Program Conflict with or Obstruct Implementation of the Applicable Air Quality Plan?	No Impact		
Impact AQ-2: Would the Proposed Program Result in a Cumulatively Considerable Net Increase of any Criteria Pollutant for which the Project Region Is a Nonattainment Area for an Applicable Federal or State Ambient Air Quality Standard?	Less than Significant		
Impact AQ-3: Would the Proposed Program Expose Sensitive Receptors to Substantial Pollutant Concentrations?	Less than Significant		
Impact AQ-4: Would the Proposed Program Result in Other Emissions (such as those Leading to Odors) Adversely Affecting a Substantial Number of People?	Significant	AQ-1: Implement Odor-Control Mechanisms and Odor Complaint Monitoring Program at	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		Material Processing Sites and During Sediment Transport	
Impact GHG-1: Would the Proposed Program Generate GHG Emissions, Either Directly or Indirectly, that may Have a Significant Impact on the Environment?	No Impact		
Impact GHG-2: Would the Proposed Program Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs?	No Impact		
Impact EN-1: Would the Proposed Program Have the Potential for Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources?	Less than Significant		
Impact EN-2: Would the Proposed Program Have Potential for Conflict with or Obstruction of a State or Local Plan for Renewable Energy or Energy Efficiency?	No Impact		
Impact CUL-1: Would the Proposed Program Have the Potential for Disturbance in Previously-dredged Underwater Areas of Humboldt Bay; Adversely Affect Known or Unknown Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?	Less than Significant		
Impact CUL-2: Would the Proposed Program Propose any Processing and Dewatering Actions in Terrestrial Areas around Humboldt Bay with Potential to Adversely Affect Known or Unknown Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?	Less than Significant		
Impact CUL-3: Would the Proposed Program Propose Placement of Treated Dredge Materials at Beneficial Use Areas around Humboldt Bay with Potential to Adversely Affect Known or Unknown	Significant	CUL-1: Detect and avoid archaeological sites during the program. CUL-2: Notification to	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?		Tribal Heritage Preservation Officers.	
Impact GEO-1: Would the Proposed Program Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving: Geo-1(a). Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42)? Geo-1(b). Strong seismic ground shaking? Geo-1(c). Seismic-related ground failure, including liquefaction? Geo-1(d). Landslides?	Significant	GEO-1: Protect material held in dewatering basins and stockpile areas at Redwood Marine Terminal II and Fields Landing Boatyard from the effects of seismically induced strong ground shaking and liquefaction.	Less than Significant
Impact GEO-2: Would the Proposed Program Result in Substantial Soil Erosion or the Loss of Topsoil?	Significant	GEO-2: Engineer transport pipelines to withstand the effects of seismically induced strong ground shaking and liquefaction. GEO-3: Gain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to control accelerated erosion at waterfront sites.	Less than Significant
Impact HAZ-1: Would the Proposed Program Create a Significant Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials?	Significant	HWR-2: Prepare and Implement Spill Prevention and Management Plan	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
Impact HAZ-2: Would the Proposed Program Create a Significant Hazard to the Public or the Environment through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment?	Significant	HWR-2: Prepare and Implement Spill Prevention and Management Plan	Less than Significant
Impact HAZ-3: Would the Proposed Program Emit Hazardous Emissions or Involve Handling Hazardous or Acutely Hazardous Materials, Substances, or Waste within 0.25 Mile of an Existing or Proposed School?	Less than Significant		
Impact HAZ-4: Would the Proposed Program Be located on a site that is Included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code Section 65962.5 and, as a Result, Create a Significant Hazard to the Public or the Environment?	No Impact		
Impact HAZ-5: Would the Proposed Program Be Located within an Airport Land Use Plan Area or, Where Such a Plan Has Not Been Adopted, Be Within 2 Miles of a Public Airport or Public Use Airport, and Result in a Safety Hazard or Excessive Noise for People Residing or Working in the Project Area?	No Impact		
Impact HAZ-6: Would the Proposed Program Impair Implementation of or Physically Interfere with an Adopted Emergency Response Plan or Emergency Evacuation Plan?	Less than Significant		
Impact HWR-1: Would the Proposed Project Violate any Water Quality Standards or Waste Discharge Requirements or Otherwise Substantially Degrade Surface or Groundwater Quality?	Significant	HWR-1: Minimize turbidity during maintenance dredging. HWR-2: Prepare and implement spill prevention and management plan. HWR-3: Prepare and implement dredge slurry and hazardous materials spill contingency plan. HWR-4: Implement erosion and sediment	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		control measures. HWR-5: Implement Best Management Practices (BMPs) during operation of dredged material processing sites. HWR-6: Implement measures at dredged material processing sites and beneficial-use sites to protect groundwater quality.	
Impact HWR-2: Would the Proposed Program Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge such that Sustainable Groundwater Management of the Basin is Impeded?	Less than Significant		
Impact HWR-3: Would the Potential Program Substantially Alter Existing Drainage Patterns Resulting in Substantial Erosion, Siltation, or Flooding, Exceed the Capacity of Existing or Planned Stormwater Drainage Systems, or Result in Substantial Polluted Runoff?	Significant	HWR-4: Implement erosion and sediment control measures. HWR-7: Design and implement dredged material beneficial use projects to avoid adverse alterations of onsite drainage.	Less than Significant
Impact HWR-4: Would the Proposed Program Risk Release of Pollutants Due to Project Inundation in Flood Hazard, Tsunami, or Seiche Zones.	Less than Significant		
Impact HWR-5: Would the Proposed Program Conflict with or Obstruct Implementation of a Water Quality Control Plan?	Significant	HWR-1: Minimize turbidity during maintenance dredging. HWR-2: Prepare and implement spill prevention and management plan. HWR-3: Prepare and implement dredge slurry and hazardous materials spill	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		contingency plan. HWR-4: Implement erosion and sediment control measures. HWR-5: Implement Best Management Practices (BMPs) during operation of dredged material processing sites. HWR-6: Implement measures at dredged material processing sites and beneficial-use sites to protect groundwater quality.	
Impact LUP-1: Would the Proposed Program Physically Divide an Established Community?	No Impact		
Impact LUP-2: Would the Proposed Program Cause a Significant Environmental Impact due to a Conflict with any Land Use Plan, Policy, or Regulation Adopted for the Purpose of Avoiding or Mitigating an Environmental Effect?	Less than Significant		
Impact NV-1: Would the Proposed Program Generate Substantial Temporary or Permanent Increase in Ambient Noise Levels in the Vicinity of the Project in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of other Agencies?	Less than Significant		
Impact NV-2: Would the Proposed Program Generate Excessive Groundborne Vibration or Groundborne Noise Levels?	Less than Significant		
Impact BIO-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS or NMFS.	Significant	HWR-1: Minimize turbidity during maintenance dredging. HWR-2: Prepare and implement spill prevention and management plan. HWR-3: Prepare and	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		implement dredge slurry and hazardous materials spill contingency plan. HWR-4: Implement erosion and sediment control measures. HWR-5: Implement Best Management Practices (BMPs) during operation of dredged material processing sites. BIO-1: Establish an environmental work window for all dredge operations. BIO-2: Minimize operating hydraulic dredge pumps when the intake is suspended above the seafloor. BIO-3: Avoid equipment staging and/or anchoring within eelgrass beds. BIO-4: Schedule sediment handling and processing activities to avoid bird nesting season to the extent possible. MM-BIO-5, Pre-activity nesting bird surveys and nest monitoring, BIO-5: Pre-activity nesting bird surveys and nest monitoring. BIO-6: Passive nesting bird deterrents.	

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		BIO-7: Pre-construction sensitive species, habitat, and sensitive natural communities surveys. BIO-8: Beach pine avoidance at Samoa Lagoons. BIO-9: Offshore anchoring of the dredge slurry pipeline. BIO-14: Obtain State Incidental Take Permit and Fully Impact for Take of Longfin Smelt.	
Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS.	Significant	HWR-1: Minimize turbidity during maintenance dredging. HWR-2: Prepare and implement spill prevention and management plan. HWR-3: Prepare and implement dredge slurry and hazardous materials spill contingency plan. HWR-4: Implement erosion and sediment control measures. HWR-5: Implement Best Management Practices (BMPs) during operation of dredged material processing sites. BIO-3: Avoid equipment staging and/or anchoring within	Less than Significant

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
		eelgrass beds. BIO-7: Pre-construction sensitive species, habitat, and sensitive natural communities surveys BIO-9: Offshore anchoring of the dredge slurry pipeline BIO-10: Tide limitations for in-water work. BIO-11: Eelgrass mitigation. BIO-12: Wetland mitigation.	
Impact BIO-3: Would the Proposed Program Have a Substantial Adverse Effect on State or Federally Protected Wetlands (Including, but not Limited to, Marsh, Vernal Pool, Coastal, etc.) through Direct Removal, Filling, Hydrological Interruption, or Other Means?	Significant	BIO-11: Eelgrass mitigation. BIO-12: Wetland mitigation. BIO-13: Conduct wetland delineation.	Less than Significant
Impact BIO-4: Would the Proposed Program Interfere Substantially with the Movement of any Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors or Impede the Use of Native Wildlife Nursery Sites?	Significant	HWR-4: Implement erosion and sediment control measures.	Less than Significant
Impact BIO-5: Would the Proposed Program Conflict with any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance?	Significant	BIO-8, Beach pine avoidance at Samoa Lagoons	Less than Significant
Impact BIO-6: Would the Proposed Program Conflict with the Provisions of an Adopted HCP, Natural Community Conservation Planning (NCCP), or Other Approved Local, Regional, or State HCP?	No Impact		

Impact	Impact Significance Without Mitigation	Mitigation Measure(S)	Impact Significance with Mitigation
Impact TT-1: Would the Proposed Program Conflict with a Program, Plan, Ordinance or Policy Addressing the Circulation System, Including Transit, Roadway, Bicycle, and Pedestrian Facilities?	Significant	TRAN-1: Create Transportation Impact Plan.	Less than Significant
Impact TT-2: Would the Proposed Program Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3 Subdivision (b)?	Less than Significant		
Impact TT-3: Would the Proposed Program Substantially Increase Hazards due to a Geometric Design Feature (i.e., Sharp Curves Or Dangerous Intersections) or Incompatible Uses (i.e., Farm Equipment)?	No Impact		
Impact TT-4: Would the Proposed Program Result in Inadequate Emergency Access?	Significant	TRAN-1: Create Transportation Impact Plan.	Less than Significant

In accordance with the California Environmental Quality Act Section 15123(b)(2), the areas of known controversy are to be identified in an Environmental Impact Report (EIR). *Controversy* is generally defined as a difference of opinion or dispute. At this time, there are no known areas of controversy associated with this Program EIR.

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List of Acronyms

°C	degree Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	microgram per cubic m
AB	Assembly Bill
ACC	Advanced Clean Cars
AGP	Arcata General Plan
ALCP	Arcata Local Coastal Program
Basin	South Coast Air Basin
BMP	best management practices
BTU	British thermal unit
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/EPA	California Environmental Protection Agency
CalEEMod	California Emissions Estimator Model
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCP	Comprehensive Conservation Plan
CDFW	California Department of Fish and Game
CDP	Coastal Development Permit
CEC	California Energy Commission
CEMP	California Eelgrass Mitigation Policy
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CLUPS	Coastal Land Use Policies and Standards
CMPs	Comprehensive Management Plans
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
COP21	21st Session of the Conference of Parties
CPUC	California Public Utilities Commission

CRSMP	Coastal Regional Sediment Management Plan for the Eureka Littoral Cell
CSMW	California Coastal Sediment Management Workgroup
CSZ	Cascadia subduction zone
CWA	Clean Water Act
cy	cubic yards
dBA	A-weighted decibels
DO	dissolved oxygen
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EDF	Environmental Defense Fund
EFH	Essential Fish Habitat
EGP	City of Eureka 2040 General Plan
EIR	Environmental Impact Report
ELC	Eureka Littoral Cell
EO	Executive Order
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESA	Environmentally Superior Alternative
ESHA	environmentally sensitive habitat area
ESP	energy service provider
ESU	evolutionary significant unit
FMMP	Farmland Mapping and Monitoring Program
FPA	Forest Practice Act
FSZ	Farmland Security Zone
ft	foot
GHG	greenhouse gas
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
GWP	global warming potential
Harbor District	Humboldt Bay Harbor, Recreation and Conservation District
Harbor District UDDS	Humboldt Bay Harbor Recreation and Conservation District Upland Dredge Disposal Site
HBAP	Humboldt Bay Area Plan
HBI	Humboldt Bay Initiative
HBMP	Humboldt Bay Management Plan
HBPP	Humboldt Bay Power Plant
HCAOG	Humboldt County Association of Governments
HCGP	Humboldt County General Plan
HCP	Habitat Conservation Plan
HOODS	Humboldt Open Ocean Disposal Site
HU	Hydrologic Unit
IPCC	Intergovernmental Panel on Climate Change

LCFS	low carbon fuel standard
LCPs	Local Coastal Plans
LMS	Locally Maintained Sites
LOS	level of service
LRHP	Local Register of Historic Places
LTOs	Licensed Timber Operators
m	meter
MARAD	U.S. Department of Transportation Maritime Administration
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MHHW	mean higher high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
mpg	miles per gallon
MSA	Magnuson-Stevens Fishery Conservation and Management Act
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCAB	North Coast Air Basin
NCCP	Natural Community Conservation Plan
NCP	National Contingency Plan
NCUAQMD	North Coast Unified Air Quality Management District
NDC	Nationally Determined Contributions
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administrative
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOC	Notice of Completion
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Natural Resources Conservation Service
NSR	New Source Review
OES	Office of Emergency Services
OPR	Office of Planning and Research
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PEIR	Program Environmental Impact Report
PGA	peak ground acceleration
PM	particulate matter
PM_{10}	fine particles with an aerodynamic diameter of 10 micrometers
$PM_{2.5}$	fine particulate matter with an aerodynamic diameter of 2.5 micrometers or fewer

ppb	parts per billion
ppm	part per million
PPV	peak particle velocity
Proposed Program	Humboldt Bay Sediment Management Program
QSD	Qualified SWPPP Developer
RCRA	Resource Conservation and Recovery Act of 1976
ROG	reactive organic gases
RPF	Registered Professional Forester
RPS	Renewables Portfolio Standard
RSS	resuspended sediment
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SAP	Sampling and Analysis Plan
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SIP	State Implementation Plan
SLCP	Short-Lived Climate Pollutant
SLR	sea level rise
SMR	salt marsh restoration
SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SSC	suspended sediment concentrations
SWPPP	Storm Water Pollution Prevention Plan
TACs	Toxic Air Contaminants
TCR	tribal cultural resources
THP	Timber Harvesting Plan
TMDL	total maximum daily load
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPZ	Timberland Production Zone
TVS	total volatile solids
UFWS	U.S. Fish and Wildlife Service
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEP	U.S. Environmental Protection Agency
USEPA	U.S. Environmental Protection Agency
USGS	U. S. Geological Survey
UST	underground storage tank
VMT	vehicle miles traveled
VTS	Vessel Traffic Control Service
WDR	Waste Discharge Requirements

Chapter 1
Introduction

This document is the Final Program Environmental Impact Report (PEIR) analyzing the environmental effects of the Humboldt Bay Harbor, Recreation, and Conservation District's (Harbor District) proposed Humboldt Bay Sediment Management Program (Proposed Program). This Final PEIR includes changes from the Draft PEIR that are a result of public comments on the Draft PEIR. Changes affecting the meaning and intent of the PEIR are shown in "underline/strikethrough" format. Minor edits were also made to the document to make the language clearer.

The Proposed Program is a long-term strategy for beneficially using dredged sediments from locally maintained dredging sites outside the federal navigation channels. This PEIR assesses the environmental impacts of the Proposed Program.

This Final PEIR was prepared in compliance with the California Environmental Quality Act (CEQA) to provide an objective analysis to be used by the lead agency (Harbor District), as well as other agencies and the public, in their considerations regarding the implementation, rejection, or modification of the Proposed Program. The PEIR itself does not determine whether the Proposed Program would be implemented; it serves only as an informational document in the local planning and decision-making process. The Harbor District's Board of Directors will use the information it contains, together with comments submitted by other agencies and the public during the PEIR review period, to evaluate if and how Program elements should proceed. Because future regulatory documents would utilize or tier off information in the PEIR, the PEIR would also increase efficiency and predictability of future sediment management permitting. Other local agencies and entities with harbor dredging needs would use information in this PEIR in deciding how best to beneficially use sediments taken from the various private channels, docks, and marinas in the bay. The California Department of Fish and Wildlife (CDFW), California Coastal Commission (CCC), North Coast Regional Water Quality Control Board (RWQCB) and other agencies may use the PEIR analyses to assess whether to grant the permits necessary for the various Program elements to proceed.

1.1 Background

Humboldt Bay is a multi-basin, tidally driven coastal lagoon (Costa & Glatzel 2002), located in northwestern California which has been governed under the jurisdiction of the Harbor District since 1973. The Eureka Littoral Cell (ELC) lies along the coast of northern California from Trinidad Head to False Cape in Humboldt County. The littoral cell encompasses approximately 40 miles of coastline and includes seven watersheds, a coastal dune field, the Eel Submarine Canyon and Humboldt Bay. The Eel, Mad and Little Rivers discharge directly to the Pacific Ocean and are the major contributors of sediment to the ELC (Barnhardt et al. 1992). However, the remaining four watersheds (Freshwater, Jacoby, Elk, and Salmon) drain into Humboldt Bay, which is the second largest natural bay in California and the only deep-water port between San Francisco, California, and Coos Bay, Oregon.

In Humboldt Bay, the primary mechanism for sediment management is dredging. The United States Army Corps of Engineers (USACE) maintains responsibility for all federal navigation channels within the bay and performs annual dredging of the Bar and Entrance Channel and periodic dredging of

other federally maintained channels. Smaller channels, docks, and marinas (referred to as *Locally Maintained Sites* [LMS]) are the responsibility of a range of local government agencies and private entities. This Draft PEIR analyzes sediment management of LMSs. Sediment management of federal navigation channels is considered in the cumulative impact analysis.

The primary components of the dredging process include the removal, transport, and placement of sediment. Each portion of this process must be carefully considered for compatibility during the design and implementation of dredging projects to ensure a successful project.

Sediment removal, the process commonly referred to as dredging, is typically accomplished by excavation with mechanical or hydraulic equipment. Removal of recently deposited sediments is classified as maintenance dredging, whereas removal of native sediments is considered new construction. Once excavated, sediment must be transported to either a disposal or beneficial use site, and this stage often requires additional equipment such as barges, scows, and/or pipelines and booster pumps. The final placement of dredged sediments can occur in open water, nearshore or upland locations. Choosing the appropriate removal method, transport method, and placement location involves a variety of factors including environmental acceptability, technical feasibility, and economic feasibility.

In August 2017, the Coastal Regional Sediment Management Plan for the Eureka Littoral Cell (CRSMP) was prepared by the California Coastal Sediment Management Workgroup (CSMW) (2017). The CSRMP describes the following objectives for beneficial uses of dredged sediments, primarily sandy materials, from Humboldt Bay.

1. Reduce shoreline erosion and coastal storm damage.
2. Provide for environmental restoration and protection.
3. Increase natural sediment supply to the coast.
4. Restore and preserve beaches.

Similarly, the *Beneficial Reuse of Dredged Materials for Tidal Marsh Restoration and Sea Level Rise Adaptation in Humboldt Bay* (SHN Consulting Engineers & Geologists 2015) describes the following specific beneficial uses of fine sediments dredged from small marinas and docks in Humboldt Bay.

- Maintaining littoral zone beaches
- Providing protection from tsunamis
- Providing protection from sea-level rise and severe storms
- Restoring or creating habitat
- Restoring natural shoreline
- Creating recreational areas
- Providing land for a multi-use trail connecting Arcata and Eureka
- Protecting existing structures behind levees
- Removing invasive species through burial

There are many opportunities to meet these objectives using dredged sediments from the bay. However, there is no existing comprehensive plan for dredging LMSs, nor comprehensive analysis of the environmental impacts of the various dredging process alternatives.

1.2 Relationship with Other Projects

The CSMW is a collaborative entity, comprised of federal, state, and local agencies and non-governmental organizations, committed to the overarching goal of cataloging and addressing California's coastal sediment management needs. The CSMW aims to improve coastal zone and coastal watershed management and the reuse of dredged sediments has been identified as a key factor in the development of strategies to restore and maintain California's coastal beaches and watersheds (CSMW 2017). The CSMW identified the need for distinct, region-specific coastal sediment reuse plans as better able to adapt to the varying challenges and circumstances along the California coast. To date, nine CRSMPs, including for the Eureka Littoral Cell, have been completed and adopted by the sponsors and stakeholders.

Implementation of the recently enumerated goals and vision of the CRSMP (CSMW 2017) explicitly states that it should be consistent with regional initiatives and management plans that have been prepared by several local stakeholder groups, including the following.

- The ***Humboldt Bay Management Plan*** *(HBMP)*, completed in 2007, is intended to improve the management of Humboldt Bay to achieve harbor, recreation, and conservation objectives.
- The ***Humboldt Bay National Wildlife Refuge Comprehensive Conservation Plan*** *(CCP),* completed in 2009. Its goal is to conserve, manage, and, where appropriate, restore coastal habitats for a great diversity of fish, wildlife, and plant resources.
- The ***Humboldt Bay Initiative*** *(HBI)* is an ongoing effort that seeks to create a coordinated resource-management framework linking the needs of people, habitats, and species by increasing scientific understanding of the ecosystem. The Initiative has brought together local stakeholders to envision the desired future of Humboldt Bay ecosystems and communities, to understand current conditions in the ecosystem, and to implement ecosystem-based projects.
- A feasibility study, ***Beneficial Reuse of Dredged Materials for Tidal Marsh Restoration and Sea Level Rise Adaptation in Humboldt Bay, California***, was prepared for the Harbor District in July of 2015 (SHN Consulting Engineers & Geologists 2015). This report evaluates beneficial reuse of dredged materials in the context of physical, environmental, and economic constraints and opportunities for tidal wetland restoration at three pilot study sites. It also presents a conceptual design for implementation of two tidal wetland restoration sites using dredged sediments. This study creates a framework for future projects to restore tidal marshes in Humboldt Bay using dredged bay sediments.
- SHN Engineers and Geologists prepared ***Summary of Dredge Material Disposal on the Samoa Beach Surf Zone and Alternative Disposal Analysis*** (2017), a review summary of dredge material disposal on the Samoa beach surf zone and an alternative disposal analysis. The report updates a previously detailed analysis of dredging methods and disposal options completed in 2005 and includes a comparison of the challenges, permit requirements, degree of difficulty for permitting and implementation, and overall estimated costs for dredging and permitting of nine alternative sediment disposal options.
- Previously documented dredged sediment characterization studies for Humboldt Bay small marinas and docks can be found in the following: ***City of Eureka and Humboldt Bay Harbor, Recreation and Conservation District Sediment Sampling Analysis*** (Pacific Affiliates 2005); ***Report of Findings – Sediment Sampling and Analysis, Fisherman's Channel and King***

Salmon Residential Canals (GHD 2013); and ***Sediment Sampling and Analysis: Results Summary Tables, City of Eureka Maintenance Dredging Project*** (Pacific Affiliates 2018).

- Sea-level rise vulnerability has been assessed by a multi-phased regional collaboration; the **Humboldt Bay Sea Level Rise Adaptation Planning Project**, funded by the California State Coastal Conservancy. The inventory of shoreline vulnerability can be found in the ***Humboldt Bay Shoreline Inventory, Mapping and Sea Level Rise Vulnerability Assessment*** (Laird 2013). Following this, the Coastal Ecosystems Institute of Northern California commissioned a study: ***Humboldt Bay: Sea Level Rise, Hydrodynamic Modeling and Vulnerability Assessment*** (Anderson 2015) in which threats posed from five sea-level rise scenarios (from 2012 elevation to +2.0 meters [m]) are compared across the entirety of Humboldt Bay shorelines. In addition, Humboldt County received funding from the Caltrans Adaptation Planning Grant program to support the preparation of a sea level rise (SLR) adaptation plan for the Eureka Slough hydrologic sub-unit of Humboldt Bay. This project is currently underway and is expected to be completed by the end of the 2020.

1.3 Lead, Responsible, and Trustee Agencies for this PEIR

The Harbor District is the lead agency for CEQA compliance for the Proposed Program. The following public agencies have been identified as responsible agencies (i.e., additional public agencies that have discretionary approval authority over the Proposed Program, per State CEQA Guidelines § 15381) and/or trustee agencies (i.e., those that have jurisdiction by law over natural resources affected by a project and held in trust for the people of California, per State CEQA Guidelines § 15386).

- CDFW (responsible and trustee)
- North Coast RWQCB (responsible)
- CCC (responsible)
- County of Humboldt (responsible)
- City of Arcata (responsible)
- City of Eureka (responsible)

Although agencies of the federal government are not defined as public agencies under CEQA (per State CEQA Guidelines § 15379), the following additional federal agencies do have discretionary approval power over the Proposed Program.

- USACE
- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (UFWS)
- USEPA

As local government and private entities plan and permit sediment management activities in Humboldt Bay they may rely on this PEIR as a source of information for beneficial uses of dredged sediments. Additionally, CEQA documents prepared for sediment management activities may tier off

of this PEIR. Entities listed in Table 1.3-1 may use this PEIR as partial or complete CEQA documentation for their role as responsible and trustee agencies.

Table 1.3-1. Agencies Expected to Use this PEIR in their Decision-Making Processes and the Related Environmental Laws, Approvals, Permits, and/or Consultations

Agency	Law(s)	Type of Approval, Permit or Consultation
U.S. Army Corps of Engineers (USACE)	• Clean Water Act (CWA) Section 404, Rivers and Harbors Act Section 10	• Likely a Regional General Permit
	• National Environmental Policy Act	• Likely an Environmental Assessment
North Coast Regional Water Quality Control Board (RWQCB)	• CWA Section 401	• Section 401 Water Quality Certification
Humboldt Bay Harbor, Recreation and Conservation District (Harbor District)	• State of California Harbor and Navigation Code	• Harbor District Permit
City of Eureka	• City of Eureka Code	• Conditional Use Permit
County of Humboldt	• County of Humboldt Code	• Conditional Use Permit
California Coastal Commission (CCC)	• CA Coastal Act	• Coastal Development Permit
National Marine Fisheries Service (NMFS)	• Magnuson Stephens Fishery Conservation and Management Act, Endangered Species Act, Marine Mammal Protection Act	• Primarily through consultation with USACE
U.S. Fish and Wildlife Service (USFS)	• Endangered Species Act	• Primarily through consultation with USACE
California Department of Fish and Wildlife (CDFW)	• California Endangered Species Act and California Fish and Game Code Section 1802	• Primarily through consultation with the California Coastal Commission and Harbor District

1.4 Public and Agency Involvement in the Program EIR Process

1.4.1 Scoping Comment Period

Scoping refers to the public outreach process used under CEQA to determine the coverage and content of an Environmental Impact Report (EIR). Scoping is initiated when the lead agency issues a formal Notice of Preparation (NOP) announcing the beginning of the EIR process. The District submitted the NOP for the Project to the State Clearinghouse on January 26, 2018. As required by CEQA Guidelines Section 15082, the NOP provided information on the background, goals, and objectives of the Project; announced preparation of and requested public and agency comment on the Program EIR and provided information on the public scoping meetings to be held in support of the PEIR.

One public scoping meeting was held February 15, 2018, at 3:00 p.m. at the Harbor District's offices on Woodley Island, Eureka.

In addition, the District formed a Sediment Advisory Committee composed of volunteer members from local government, shipping interests, environmental groups, and interested public to provide stakeholder input on project development and document drafts throughout the process of PEIR development. The Advisory Committee held an initial meeting on June 6, 2018, at which an overview of the existing status of dredging efforts and sediment management strategies was presented in the context of current environmental laws and regulations. This background information was used to inform and guide a discussion leading to a framework for the project description for the PEIR. A follow-up meeting on January 10, 2020, discussed the Project Description for the Proposed Program and solicited additional insight from Advisory Committee members on elements that should be included in the Proposed Program and the environmental analysis.

1.4.2 Public and Agency Concerns and Areas of Known Controversy

Public, interest group, and agency comments on the Project during the scoping period were received from Humboldt Baykeeper, CDFW, and County of Humboldt. A summary is provided here.

Comments received from **Humboldt Baykeeper** included the following topics.

- Effects of Project elements on the natural environment and human health due to potential presence of dioxins, furans, and/or other contaminants in Bay sediments
- Disruption of coastal access
- Range of alternatives to be analyzed, including potential pilot projects that may be necessary

Comments received from **CDFW** and **County of Humboldt** concerned the following.

- Potential impacts on species protected under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA), or listed under the California Rare Plant Ranking System
- Potential impacts on native eelgrass
- Comprehensive discussion regarding measures to avoid, minimize, and mitigate impacts on fish, wildlife, and wetland resources
- The need for consistency with local land use plans and policies

Comments on the Draft EIR were received from the CDFW concerning biological effects of the project and the Blue Lake Rancheria concerning cultural resource impacts. The comments and responses to comments are included in FEIR Volume 2.

1.4.3 Public and Agency Review of Draft PEIR

CEQA requires that the lead agency notify agencies and the public that a Draft PEIR is complete and available for review. The official notification, referred to as a Notice of Completion (NOC), is sent to the State Clearinghouse; CEQA also requires that the lead agency provide written notice of the draft document's availability to the County Clerk's office for posting, and to any other parties who have requested it. The NOC must also be published in a general-circulation newspaper, posted on and off

the project site, or mailed to residents of properties adjacent to the project site. Issuance of the NOC initiates a public review period during which the lead agency receives and collates public and agency comments on the Proposed Program and the document.

The Harbor District circulated the Draft PEIR for a 30-day public review and comment period starting on **November 12, 2020** and concluding on **December 11, 2020**. One public hearing to solicit comments on the Draft PEIR was held at 6 p.m. on **December 2, 2020**. In light of Governor Newsom's State of Emergency declaration regarding the COVID-19 outbreak and in accordance with Executive Order N-29-20 and the Guidance for Gatherings issued by the California Department of Public Health the public hearing was held virtually, via Zoom.

1.5 PEIR Organization and Topics Covered

In addition to this introduction, this Draft PEIR contains chapters that describe the Proposed Program; discuss the Proposed Program's likely impacts on the project area's environmental resources; and evaluate the Proposed Program's potential to contribute to cumulative (longer-term and/or regional) impacts and to induce growth. It also includes a list of key staff involved in preparing the document. This Draft PEIR is organized in the following manner:

- Chapter 1: Introduction
- Chapter 2: Project Description
- Chapter 3: Environmental Setting and Effects of the Alternatives
    - Section 3.1: Agriculture and Forestry Resources
    - Section 3.2: Air Quality
    - Section 3.3: Greenhouse Gas Emissions
    - Section 3.4: Energy
    - Section 3.5: Cultural Resources
    - Section 3.6: Geology and Soils
    - Section 3.7: Hazardous Materials and Public Health
    - Section 3.8 Hydrology and Water Resources
    - Section 3.9: Land Use and Planning
    - Section 3.10: Noise and Vibration
    - Section 3.11: Biological Resources
    - Section 3.12: Transportation
    - Section 3.13: Topics not Covered in Detail in this PEIR
- Chapter 4: Cumulative Impacts
- Chapter 5: References
- Chapter 6: Persons Consulted and List of Preparers

Chapter 2
Project Description

This chapter describes the Project, including information on the Project purpose and need, Project components, and required permits and approvals.

2.1 Project Purpose and Need

Currently, individual plans are developed prior to each sediment management event and there is often uncertainty regarding the environmental impacts of dredging, dredged material transport, dredged material processing and beneficial use alternatives. In recent years, dredged material has been recognized by USEPA and USACE as a manageable and beneficial resource suitable for multiple applications around the country (USEPA and USACE 2007), and by the California State Coastal Conservancy as a resource to assist in the restoration of tidal wetlands in Humboldt Bay. This decision is in part based on similar projects that have been implemented in the Sonoma Baylands and Hamilton Army Airfield Wetlands projects located along San Pablo Bay, in Marin County, California. In other regions, dredged sediments have been used beneficially for beach and dune replenishment, wetland restoration, erosion control, to create safer waterfront access, and to enhance recreational opportunities.

The objective of this PEIR is to explore alternatives and provide an environmental analysis of dredging methods, sediment processing, and sediment placement at beneficial-use sites that would guide implementation of the CRSMP and steer sediment management for LMSs toward achievement of CRSMP objectives.

2.2 Project Location and Setting

The Project is located in Humboldt Bay (Figure 2.2-1) and consists of 25 sites where dredging may occur, three sites where sediment may be dewatered and temporarily stockpiled and 76 sites where sediment may be beneficially used. These sites and project activities are further described in the following project description and the accompanying *Humboldt Bay Potential Beneficial Uses of Dredged Sediment Report* (Appendix A).

Figure 2.2-1. Project Location, Humboldt Bay, California

2.2.1 Dredging Sites

This Draft PEIR evaluates 20 dredging sites in north Humboldt Bay (North Bay) (Figure 2.2-2 and Figure 2.2-3) and five in south Humboldt Bay (South Bay) (Figure 2.2-4). Table 2.2-1 corresponds with Figure 2.2-2 and Figure 2.2-3 and provides relevant information regarding each dredging site.

Table 2.2-1. Dredging Sites Analyzed in this PEIR

Dredge Site ID	Site Name	Amount Dredged (yd^3) in Average Dredge Cycle	Design Depth (ft) Mean Lower Low Water (MLLW)	Average Dredge Cycle (years)
North Bay				
NB-1	Redwood Terminal Berth 1	16,393	35	Unknown
NB-2	Redwood Terminal Berth 2	40,194	35	Unknown
NB-3	Green Diamond Chip Export	2,500	35	Unknown
NB-4	Fairhaven Terminal	Unknown	35	Unknown
NB-5	Woodley Island Marina	123,048	14/10	10
NB-6	Samoa Bridge Launch Ramp	187	5	7
NB-7	Bonnie Gool Guest Dock	1,519	14	7
NB-8	Adorni Dock	1,105	6	7
NB-9	J Street Dock	928	12.5	7
NB-10	I Street Dock	3,616	14	7
NB-11	F street Dock	1,242	10	7
NB-12	Fisherman's Terminal	5,433	14	7
NB-13	Coast Seafoods Dock	5,000	6	7
NB-14	Eureka Cold Storage Dock	Unknown	Unknown	Unknown
NB-15	Commercial Street Dock	837	14	7
NB-16	Eureka Small Boat Basin	62,555	8	7
NB-17	Dock B	11,350	14	Unknown
NB-18	Schneider Dock	634	35	15
NB-19	Eureka Forest Products (SPI)	14,783	35	25
NB-20	Chevron Terminal	3,486	20	7
South Bay				
SB-1	Johnny's Marina, King Salmon	Unknown	Unknown	Unknown
SB-2	Fisherman's Channel, King Salmon	4,200	6/8	10
SB-3	Humboldt Bay Forest Products	Unknown	Unknown	Unknown
SB-4	Jimmy Smith Boat Launch	50	12	Annually
SB-5	Field's Landing Travel Lift Dock	2,000	14	7

*Values are estimates based on discussions with local experts and professional opinion.

Figure 2.2-2. Locally Maintained Dredging Sites in North Humboldt Bay Analyzed in this PEIR (Figure 1/2)

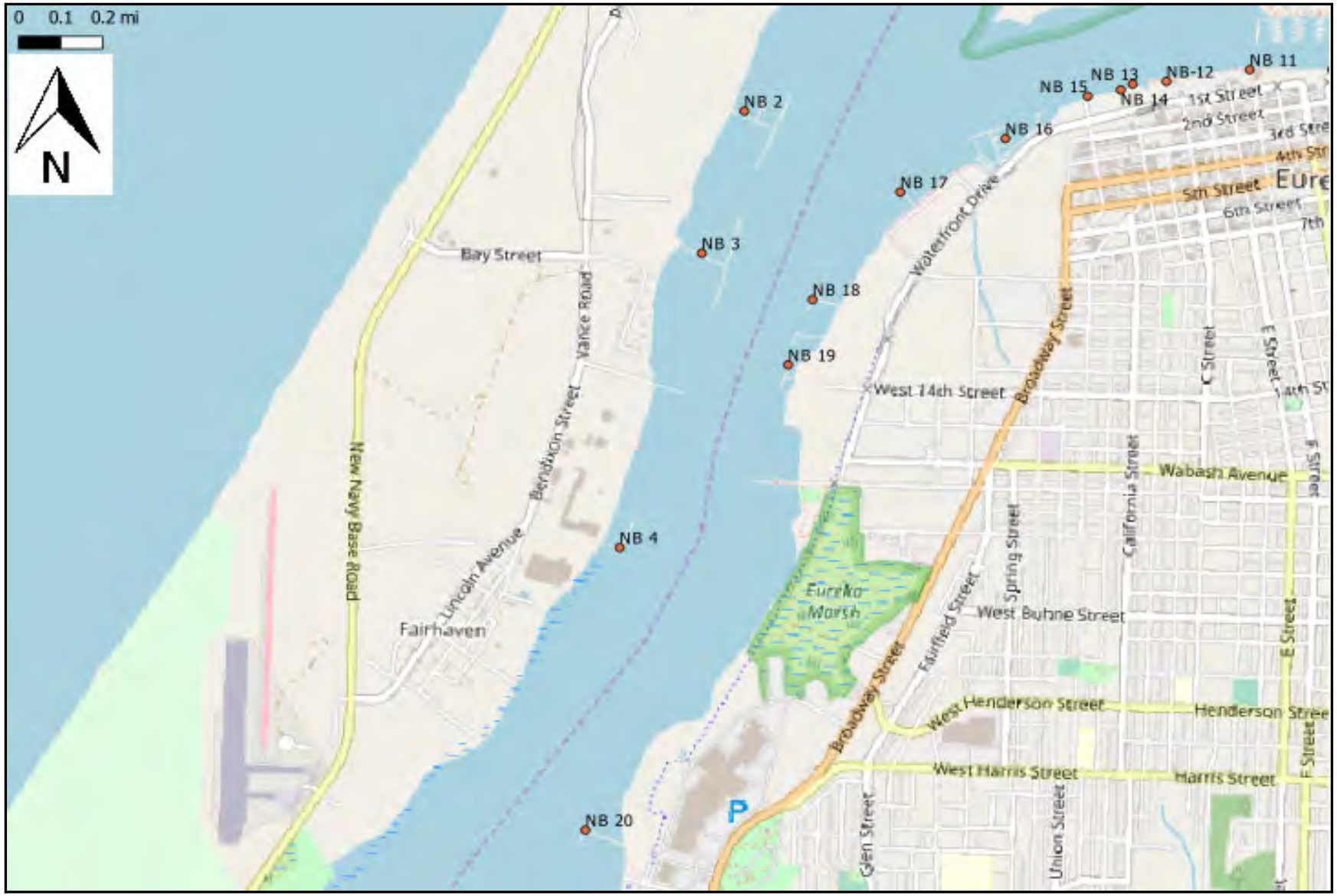


Figure 2.2-3. Locally Maintained Dredging Sites in North Humboldt Bay Analyzed in this PEIR (Figure 2/2)

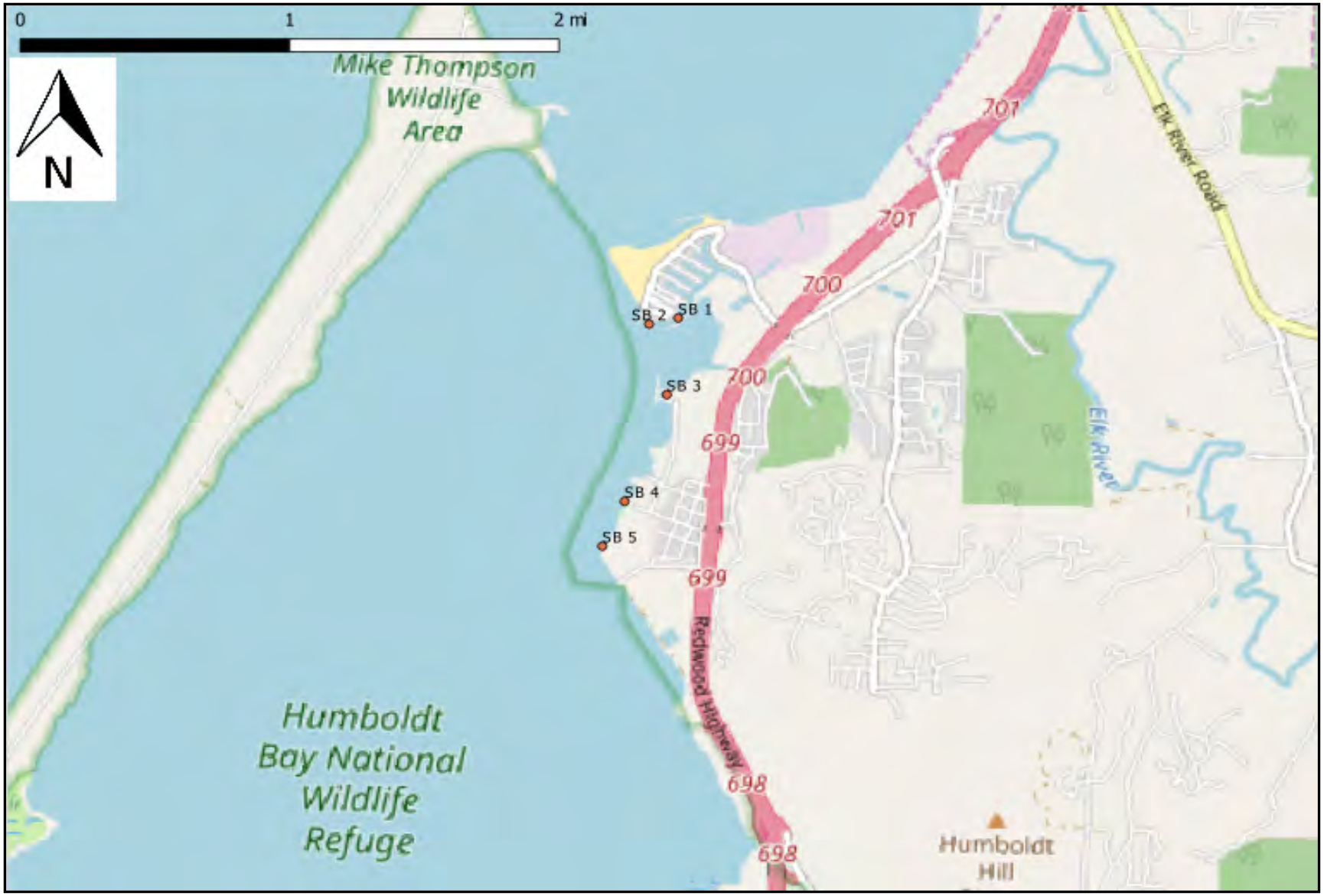


Figure 2.2-4. Locally Maintained Dredging Sites in South Humboldt Bay Analyzed in this PEIR

2.2.2 Dredged Material Processing Sites

In many cases, dredged material cannot be delivered directly to a beneficial use site from a dredging site due to distance, shallow water depths or other obstructions, or beneficial-use sites not being prepared to accept sediments at the time of dredging. Three potential processing sites for dewatering and temporary stockpiling have been identified around Humboldt Bay. At these sites, the following activities would occur: (1) dewatering of the material with decanted water returned to Humboldt Bay, the Pacific Ocean and/or percolated into the ground, (2) temporary stockpiling of sediments, and (3) stockpile management. Ultimately, the sediments would be transported to beneficial-use sites. This would typically occur using trucks, although there may be situations where the material could be reslurried at the processing site and pumped to a beneficial use site. Figure 2.2-5 shows the locations of the processing sites, which are further described below.

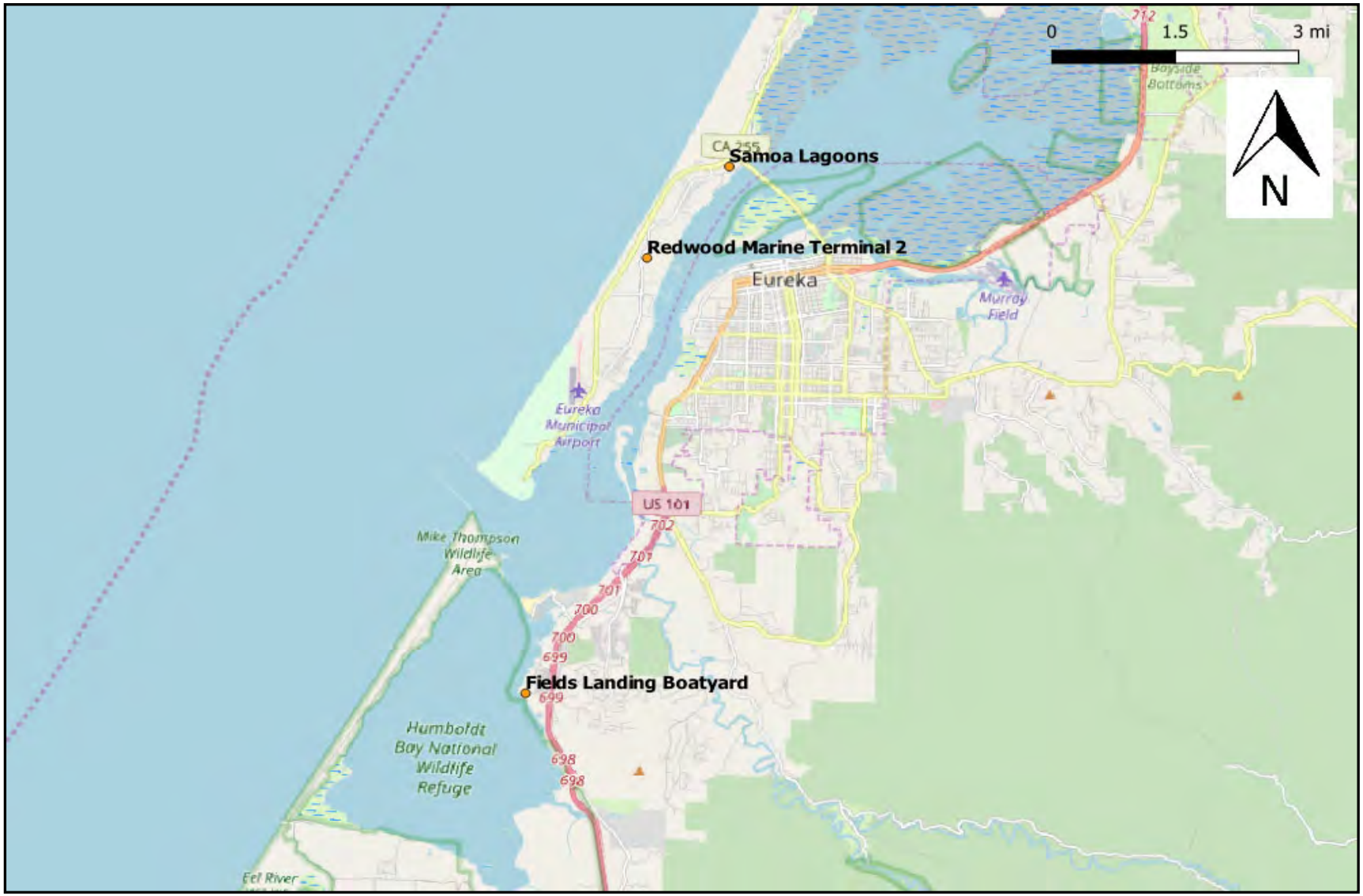


Figure 2.2-5. Dredged Material Processing Sites

2.2.2.1 Samoa Lagoons

The Samoa lagoons site is owned by the Harbor District. The site is designed for, and has historically been used for, placement and dewatering of dredged material from Humboldt Bay. The site consists of two dewatering basins, an upper primary disposal/dewatering basin and a lower secondary decant basin. The basins are constructed from sandy material and previously dredged bay sediments. The primary disposal basin is approximately 6.6 acres and the secondary decant basin is approximately 5.9 acres. Both the primary and secondary basins have a capacity to accommodate a total of 45,000 cubic yards (cy) of sediment including 2 feet (ft) of freeboard. The depth of existing dredged material in the primary and secondary basins ranges from zero to four feet. In past dredging operations, dredge materials were pumped to a central location in the elevated primary dewatering basin, where most of the heavier and larger grained spoils and fines settled out; the residual water was discharged through a weir into a 24-inch-diameter culvert to the secondary decant basin, with the residual water flowing through another 24-in weir to the decant water return ditch which flowed to a decant weir. Remaining decanted water was then routed through the existing return water outlet and discharged into Humboldt Bay. The lagoons are described in more detail in a 2010 Proposed Mitigated Negative Declaration for the site (Appendix B).

2.2.2.2 Redwood Marine Terminal II

Redwood Marine Terminal II is the site of a former pulp mill owned by the Harbor District, which is currently being repurposed for mariculture, land-based aquaculture, potentially fuel pellet manufacturing and other uses. The site could be used for dewatering and temporary stockpiling of up to 30,000 cy of dredged material. Temporary dewatering basins constructed with k-rails or other structures would be built on existing impervious surfaces (Figure 2.2-6). Dewatering basin size would be determined by the expected volume of dredge material to be processed during a dredging event.

Material could be deposited in the dewatering basin either by mechanical unloading (e.g., using an excavator) or pumped as a slurry. Sediment would be allowed to settle in the dewatering basin until decant water achieves enough clarity to be within a certain percentage of background turbidity of the receiving waters (either Humboldt Bay or the Pacific Ocean). Water turbidity would also be reduced by filtration through baffles, pipe filter socks, and/or drop inlet filters. The decant water would not be discharged until turbidity levels are below the thresholds established by regulatory approvals. After the initial discharge of decant water, the sediment in the dewatering basin would continue to settle and displace water as it compacts under its own weight, until it achieves a moisture content low enough to enable further handling.

Sediments may be stockpiled on impervious surfaces at Redwood Marine Terminal II for a limited time before being moved to a beneficial use site. All sediment processing operations would need to be designed so they do not substantially impact other operations at the site.

Figure 2.2-6. Potential Temporary Dewatering Basin Site – Redwood Marine Terminal II

2.2.2.3 Fields Landing Boatyard

Temporary dewatering basins, constructed with k-rails or other structures, would be built at the Field's Landing Boatyard on top of existing asphalt or concrete surfaces (Figure 2.2-7). The facility can accommodate approximately 2,000 cy of dredge material at a time. The construction of the dewatering basins and the dewatering process at the Boatyard would be similar to the process at Redwood Marine Terminal II.

Sediments may be stockpiled on impervious surfaces at the Boatyard before being moved to a beneficial use site. All sediment processing operations would need to be designed so they do not substantially impact other operations at the site (e.g., boat haul-outs and maintenance).

Figure 2.2-7. Potential Temporary Dewatering Basin Site – Field's Landing Boatyard

2.2.3 Beneficial Use Sites

Dredged sediments resulting from the Project may be suitable for beneficial uses throughout Humboldt Bay. Dredged sediment can be used as construction fill material, can help protect waterfront property from sea level rise, replenish beaches, increase resiliency of diked shoreline structures to sea level rise, raise the elevation of diked former tidelands now used for agriculture, create living shorelines, and restore historic salt marsh habitat.

This study has identified 76 potential sediment beneficial-use sites. Between 1,564,000 and 4,626,300 cy of dredged sediments could be used at these sites. These figures do not include sediment that could be used for beach replenishment or to enhance dike structures, because estimates for these components cannot be generated with existing information.

Of the 76 beneficial-use sites identified, 50 are within 3 miles of an LMS, and the most distant site is approximately 6.5 miles away. A detailed description of these sites is contained in *Humboldt Bay Potential Beneficial Uses of Dredged Sediment*, a report prepared by Trinity Associates as part of this PEIR and herein incorporated by reference (Appendix A).

2.3 Components of the Proposed Program

2.3.1 Dredging Methods and Sediment Transport

Maintenance dredging at LMSs in Humboldt Bay has historically been completed using an excavator or crane with a clamshell bucket, or cutterhead suction dredge. Each method has benefits and limitations. In recent years, dredged sediments have exclusively been transported to the Humboldt Open Ocean Disposal Site (HOODS) located three nautical miles northwest of the Humboldt Bay entrance where the dredged material is deposited. Disposal at HOODS is not considered a beneficial use because it removes the sediments from the ELC. The following section describes the dredging methods assessed in this PEIR, and the associated methods of transporting the dredged sediments, designed to facilitate beneficial uses of dredged sediments.

2.3.1.1 Excavator/Crane with Clamshell Bucket

Dredging performed using an excavator and/or crane with a clamshell bucket is generally conducted from a working barge. Material is excavated from the bay floor and deposited in a sealed dump scow located adjacent to the barge. Access for sediment removal by this dredge method can be limited by the size of the working barge (e.g., a barge that is too large to enter a marina fairway) and is limited to locations not obstructed by surface features such as a floating dock, although a long-reach excavator has some ability to reach under docks and remove a portion of the material. This method can require periods of dredging downtime while the removed sediment is transported to its destination. The dredged material placed in the scow also contains some portion of water that takes up space, somewhat reducing the volume of solids for transport.

Dredged material placed in a scow can be transported along navigation channels within the bay to various locations that are near beneficial use or processing sites. Positioning the scow with dredge material next to a working barge with an excavator can allow sediment to be offloaded from the scow using the excavator. Alternatively, sediment can be offloaded by re-slurrying while in the scow and using a slurry pump attached to the scow to pump the materials via floating, submerged, and/or onshore pipeline to the processing or beneficial use site.

2.3.1.2 Cutterhead Suction

Cutterhead suction dredging involves a mobile dredge that works from a hull deck equipped with pumps and a cutter device attached to a ladder extension. The ladder is comprised of a cutterhead, cutter drive and suction pipe that are suspended by a ladder gantry. The ladder of the cutter suction dredge is lowered under water, the dredge pump(s) is started and the cutterhead set in motion as it contacts the sediment. The cutter head loosens the material which is sucked up by the flow created from the dredge pumps. Cutterhead suction dredging is a more precise and controlled method of dredging that allows depth to be monitored more easily, and in marinas access to sediment beneath floating structures is enabled by the ladder extension. Debris encountered within the dredge prism can be problematic for this method of dredging; however, which requires work stoppage to remove debris that has become entangled in the cutter head.

Sediments dredged by this method are mixed with water and hydraulically transported via pipeline as a slurry. Floating pipelines can discharge directly into open water for sediment placement, or with the addition of onshore pipeline sections, sediment can be pumped to upland processing or beneficial-use sites. The dredge slurry is commonly 80 percent to 90 percent water in content and

can be pumped over long distances with or without the use of booster pump stations. Because of the high volume of water in the slurry, dewatering and water quality management at the discharge site are required.

2.4 Alternatives

The project description described above represents the preferred project. This Draft PEIR also analyzes the following project alternatives.

2.4.1 Alternative 1 – Suction Dredging Only

Under Alternative 1, the method of sediment removal at LMSs would be suction dredging only. Dredged sediments would be transported to processing sites or directly to beneficial-use sites via pipeline during a dredging event. Any sediments transferred to a processing site would be dewatered and stockpiled for future transport to a beneficial use site.

2.4.2 Alternative 2 – Clamshell Bucket Dredging Only

Under Alternative 2, the method of sediment removal at LMSs would be excavation using a clamshell bucket only. Dredged sediments would be transported to processing sites or directly to beneficial-use sites via barge, and the material would be off-loaded using an excavator or by re-slurrying and pumping the material during a dredging event. Any sediments transferred to a processing site would be dewatered and stockpiled for future transport to a beneficial use site.

2.4.3 Alternative 3 – Sediment Delivered Directly to Beneficial Use Sites Only

Under Alternative 3, the method of dredging may be either of the methods described above. In this scenario, dewatering and stockpiling of sediments at upland locations for future transport to a beneficial use site would not be conducted. Sediment would be piped directly to beneficial-use sites.

2.4.4 No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Project. Under this alternative, LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS rather than used for beneficial projects around the bay.

2.5 Project Setting

Humboldt Bay's early settlement and industrial development had a major influence on the hydrology, sediment yield, and morphology of the area in its current form. It is estimated that there were more than 10,000 acres of salt marsh around the margins of the Bay in 1870, before significant salt marsh conversion had occurred (Harbor District 2007). Currently, approximately 970 acres of

salt marsh remain due to diked conversion of wetlands to agricultural lands along the Bay margins, construction of a railroad along the eastern margins of the Bay that functioned as a dike, and constructing State Highway 101 east of Humboldt Bay (ELC CRSMP 2017). The existing Humboldt Bay shoreline is 102 miles, 53 percent (41 miles) of this is composed of earthen dikes, and 21 miles of dikes are rated "highly vulnerable" due to existing shoreline erosion or susceptible elevations below 9.7 ft (Laird 2013).

Shipping, commercial, and recreational fisheries, boating, and mariculture are important parts of the economy and culture in Humboldt Bay. Petroleum products, forest wood products, and pulp are important types of cargo arriving or leaving Humboldt Harbor. Seafood is commercially and recreationally harvested from shore and from boats. Recreational fishermen also harvest seafood from kayaks. The largest recreational boating facilities are two public marinas, the Woodley Island Marina, owned and operated by the Harbor District, and the Eureka Public Marina, owned and operated by the City of Eureka. Mariculture is limited to north Humboldt Bay, where oysters and clams are grown. The mariculture industry has a major stake in the maintenance of good water quality because it is critical for growth of oyster and clam seed and adults (ELC CRSMP 2017).

USACE efforts to stabilize the harbor entrance and maintain channels into and within the bay began in 1881. Construction of the two jetties stabilizing the entrance to Humboldt Bay began in 1889 and the last major modifications were made in 1973 after storms destroyed both jetty heads. At present, USACE annually dredges the ebb shoal bar and between the two jetties. This entrance channel and its interior shipping channels are frequently dredged by the USACE, and starting in 1990 the sediment—mostly clean sand—is disposed of at the HOODS approximately 3 miles west of the Bay's entrance (ELC CRSMP 2017). Until recently, the federal channels inside the bay were dredged annually; however, they are now dredged less frequently because of funding limitations (ELC CRSMP 2017).

Humboldt Bay is a complex ecosystem and valuable resource for California and the nation because of its natural resources, its aesthetic appeal and recreational opportunities, its ecological services, economic benefits, and its vital transportation links. Visitors and Humboldt County residents value Humboldt Bay for its natural and anthropogenic attributes. Portions of the diked former tidelands around Humboldt Bay, particularly in the Arcata Bottoms, are utilized for agriculture, primarily livestock grazing for dairy and beef production. The largest urban concentrations are in Arcata (population approximately 16,651), Eureka (population approximately 25,866), and Loleta/Table Bluff (population approximately 750).

2.6 Required Permits and Approvals

The Project would be subject to numerous federal, state, and local regulations that protect various aspects of environmental quality. More detailed information on regulatory requirements is provided in Chapter 3, *Environmental Setting and Effects of the Alternatives.* Table 2.6-1 presents a summary of related environmental laws, approvals, permits, and/or consultations potentially required for Program implementation.

Table 2.6-1. Permit Requirements Potentially Applicable to the Project

Agency with Jurisdiction	Regulation(s)	Required Authorization
North Coast Regional Water Quality Control Board (RWQCB)	Federal Clean Water Act, Sections 401 and 402 California Porter-Cologne Water Quality Control Act	401 Water Quality Certification or Waste Discharge Requirements, National Pollutant Discharge Elimination System (NPDES) general permit for discharge of stormwater from construction sites
U.S. Army Corps of Engineers (USACE)	Federal Clean Water Act, Section 404, 33 U.S.C 408	Permits for dredge and fill activities below ordinary high-water mark in waters of the United States; Federal action requires NEPA compliance
U.S. Fish and Wildlife Service (USFWS)	Federal Endangered Species Act (ESA)	Potential need for *take* authorization under ESA Section 7 would be determined through USACE consultation with USFWS
National Marine Fisheries Service (NMFS)	ESA	Potential need for *take* authorization under ESA Section 7 would be determined through USACE consultation with NMFS
California Department of Fish and Wildlife (CDFW)	California Endangered Species Act (CESA) California Fish and Game Code Section 2081 California Fish and Game Code Section 1602	Potential need for *take* authorization under Section 2081 of the California Fish and Game Code would be determined through consultation with CDFW
Humboldt Bay Harbor, Recreation and Conservation District (Harbor District)	State of California Harbors and Navigation Code	Permits for maintenance dredging and other work in tidal waters of Humboldt Bay
California Coastal Commission	California Coastal Act (CCA)	Coastal Development Permit
City of Eureka	--	Conditional Use Permit
City of Arcata	--	Conditional Use Permit
County of Humboldt	--	Conditional Use Permit

Chapter 3
Environmental Setting and Effects of the Alternatives

This section addresses existing environmental conditions and the Proposed Program's potential impacts on environmental resources, examining each resource in a separate subsection. The discussion for each resource topic consists of three sections: Environmental Setting, Regulatory Setting, and Impact Analysis. Environmental Setting describes existing environmental conditions in the areas that would be affected by the program. Regulatory Setting describes any federal, state, regional, and/or local laws, policies, and/or plans that apply to each resource discussed, and the Impact Analysis section discusses potential environmental impacts associated with the Proposed Program's actions, as well as any mitigation measures necessary to reduce environmental impacts to less than significant.

Thresholds of Significance and Level of Effect

CEQA requires an EIR to identify *significant* impacts—that is, impacts that exceed an adopted threshold of severity and thus require *mitigation* (i.e., measures or activities adopted to avoid the impact, reduce its severity, or compensate for it). Each resource section in this PEIR identifies the criteria used to assess the potential severity of the program's effects on the resource discussed in that chapter. To provide the degree of specificity required by CEQA and the CEQA Guidelines, the following terminology is used to evaluate the level of significance of impacts:

- A finding of ***no impact*** is made when the analysis concludes that the Proposed Program would not affect the particular environmental resource.
- An impact is considered ***less than significant*** if the analysis concludes that there would be no substantial adverse change in the environment and that no mitigation is needed.
- An impact is considered ***less than significant with mitigation*** if the analysis concludes that there would be no substantial adverse change in the environment with the inclusion of the mitigation measure(s) described.
- An impact is considered ***significant* or *potentially significant*** if the analysis concludes that there could be a substantial adverse effect on the environment.
- An impact is considered ***significant and unavoidable*** if the analysis concludes that there could be a substantial adverse effect on the environment and no feasible mitigation measures are available to reduce the impact to a less-than-significant level.
- An impact is considered ***beneficial*** if the analysis concludes that there would be a positive change in the environment.

3.1 Agriculture and Forestry

This section discusses the affected environment relevant to agriculture and forestry in the Proposed Program area. For the purposes of the affected environment and the subsequent impact analysis for agriculture and forestry resources, the Proposed Program area includes the 25 dredging sites in north and south Humboldt Bay; three sites where sediment may be dewatered and temporarily stockpiled, located at Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard;

and 76 sites where sediment may be beneficially used (as described in Chapter 2, *Project Description*, and Appendix A).

3.1.1 Environmental Setting

3.1.1.1 Agricultural Resources

Humboldt County is the state's 27th largest county in terms of agricultural production and leads the state's timber production, with 23 percent of the state's total timber value in 2017 (California Department of Food and Agriculture 2018). In 2017, the gross valuation for all agricultural commodities produced in Humboldt County was approximately $376.5 million, a 15 percent increase from the 2016 production values. Livestock and livestock products had the highest commodity value ($190.2 million), representing 58 percent of Humboldt County's production value. Timber production is the number two commodity, at $70.4 million, followed by nursery stock ($55.9 million), field crops ($5.3 million), and vegetable crops ($2.5 million) (Humboldt County Agricultural Commissioner 2017).

Prime and Non-prime Agricultural Lands

"Prime" agricultural land is land best suited for a wide range of agricultural crops. The California Farmland Mapping and Monitoring Program (FMMP), based on soil surveys produced by the U.S. Natural Resources Conservation Service (NRCS), is a nonregulatory program that provides a consistent and impartial analysis of agricultural land use and land use changes throughout California. Humboldt County is not mapped in the latest FMMP released by the California Department of Conservation (DOC 2017).

The County defines prime agricultural lands based on California Government Code Section 51201(c), which is described in Policy AG-S7 of the County's General Plan (Humboldt County 2017) (see Section 3.1.2.2, *Local,* for further discussion). The highly productive soils of the Mad River, Redwood Creek, and Eel River deltas surrounding Humboldt Bay, as well as other areas, provide the basis for Humboldt County's agricultural resources. The majority of its prime agricultural lands, which contain prime soils, are found in these areas. Per Section 51201(c), the ability to support livestock used for the production of food and fiber with an annual carrying capacity equivalent to at least one animal-unit per acre as defined by the U.S. Department of Agriculture does not apply to the Proposed Program area. The Proposed Program area is dominated by brackish marsh vegetation with little or no forage value, and thus does not have a livestock carrying capacity of one animal unit per acre. In addition, the Proposed Program area is not planted with crops. Due to the salinity in the soil indicated by the brackish marsh vegetation present it throughout the Proposed Program area, it is not capable of producing an unprocessed plant production adequate for economically viable operations. It is not necessary to provide for an economically viable agricultural area, as it is not currently in agricultural production. Therefore, the project area does not satisfy Criteria D, E, or F per Section 51201(c) of the California Government Code.

Prime agricultural soils in the Proposed Program area and vicinity are adjacent to Humboldt Bay (Figure 3.1-1). In total, approximately 51 acres of land within the Proposed Program area are designated as Prime agricultural soils. Placement of dredged sediments at beneficial-use sites would occur on prime soils.

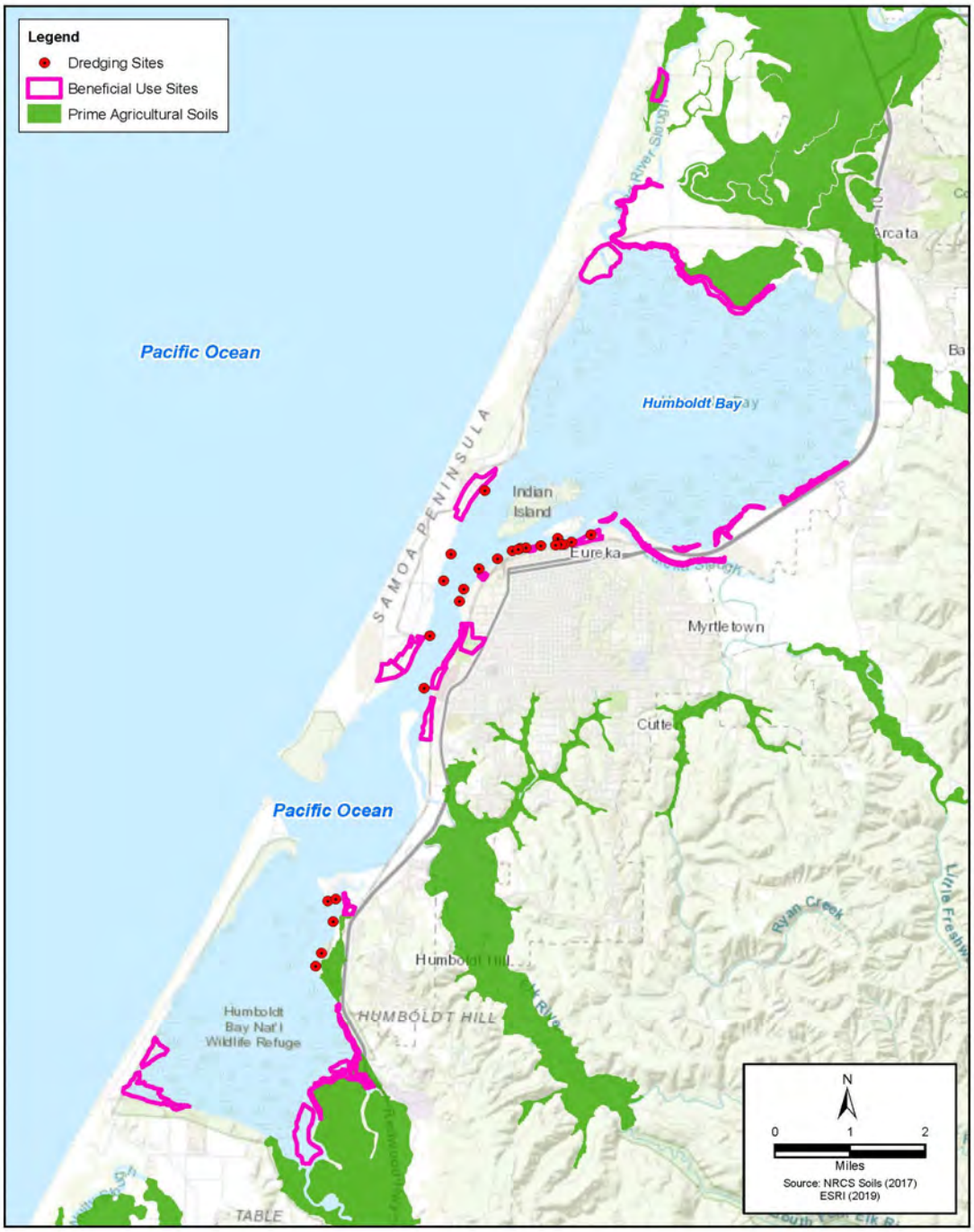


Figure 3.1-1. Prime Agricultural Soils

Williamson Act Contract Lands

Under the California Land Conservation Act of 1965, also known as the Williamson Act, local governments can enter into contracts with private property owners to protect land (within agricultural preserves) for agricultural and open space purposes for a 10-year period (see Section 3.1.3*, Impacts Analysis*, for further discussion). Humboldt County had approximately 202,934 acres of land under Williamson Act contracts in 2015 (the most recent year for which data is available) (DOC 2016). In addition, Humboldt County contains an additional 697 acres that are designated as Farmland Security Zone (FSZ) lands (DOC 2016). FSZs function similarly to land under Williams Act contracts; however, the length of the contract is 20 years rather than 10 years.

The nonrenewal process is the most common mechanism for termination of Williamson Act contracts. In Humboldt County as of 2015, approximately 2,649 acres of contract lands were in some stage of the nonrenewal process, and the amount of contract land actually terminated through nonrenewal expirations totaled approximately 440 acres (DOC 2016).

As shown in Figure 3.1-2, lands under Williamson Act contracts are in or in the vicinity of the southern portion of the Proposed Program area. In total, approximately 7.59 acres of land in the Proposed Program area are under active Williamson Act contracts.

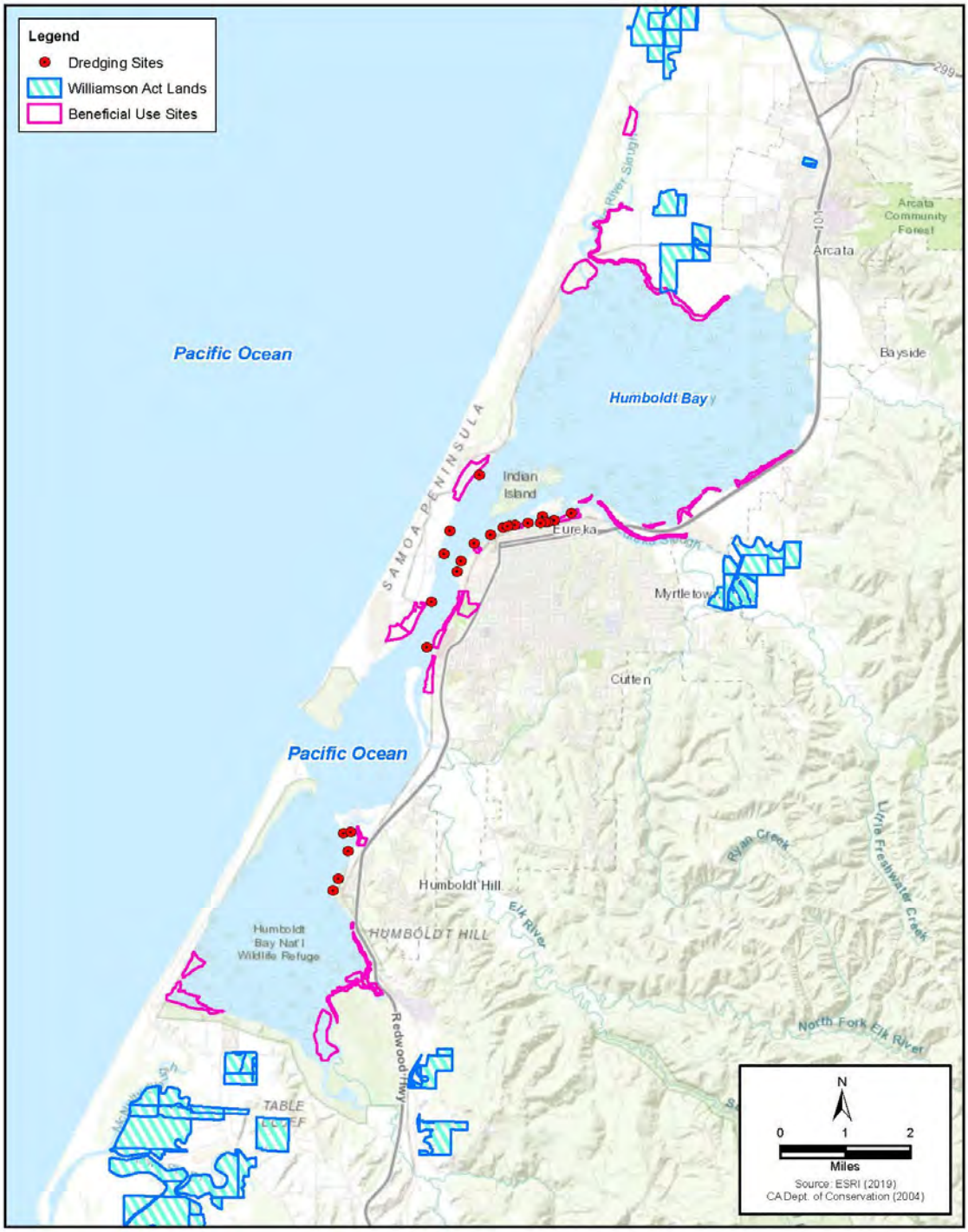


Figure 3.1-2. Williamson Act Contracts.

Agricultural Zoning

Lands mainly in the northern and southern portions of the Proposed Program area are zoned Agriculture Exclusive (AE), as shown in Figure 3.9–1. The AE classification is applied to fertile areas in which agriculture is and should be the predominant use, and where the protection of this use from encroachment by incompatible uses is essential to the general welfare. All general agricultural uses, including accessory uses and structures (e.g., silos, tank houses, barns, outbuildings, coops, and horse stables) are permitted in this district. Use permits may be granted for uses not enumerated in the district description, provided that the use is similar to, and compatible with, uses permitted in the AE zone. Aquatic habitat restoration for fish and wildlife management is an allowable use of AE zoned lands. Additionally, the Humboldt Bay National Wildlife Refuge owns tidelands, including saltmarsh and mudflat, in Arcata Bay and in South Bay within the Proposed Program area. The Refuge is federal property and is not subject to local land use zoning.

3.1.1.2 Forestry Resources

Approximately 1.9 million acres of forested land in Humboldt County accounts for more than 80 percent of the county's total land area. Of these 1.9 million acres of forestland, 1.7 million acres are considered to be suitable for timber production. About 1 million acres are designated as Timberland Production Zone (TPZ). This acreage is equal to 45 percent of the total land acreage in the county.

As stated previously, Humboldt County is first in the state's timber production (California Department of Food and Agriculture 2018). However, the county's timber industry has been in decline since 2000. Between 2000 and 2008, the total gross value of timber production dropped from $285.2 million to $108 million (Humboldt County 2017). In 2016, the county's total gross value of timber production was $70 million (Humboldt County Agricultural Commissioner 2017).

Forest Types

Trees generally are classified as hardwood (including oak, alder, and other deciduous or broadleaf species) or softwood (including fir, spruce, pine, redwood, and all other coniferous or needle-bearing species). Land cover types, including forest types, are described in Timber Production Zones

Lands throughout Humboldt County are zoned TPZ; however, as shown in Figure 3.1-3, no lands within the Proposed Program areas are zoned TPZ. The TPZ is intended to provide standards and restrictions for the preservation of timberlands for growing and harvesting timber. Permitted uses include growing and harvesting timber and accessory uses. Provided that they do not hinder the growing and harvesting of timber, permitted uses include management for watershed and wetland restoration; management for fish and wildlife habitat; a use integrally related to the growing, harvesting, and processing of forest products—including roads, log landings, and log storage areas; the erection, construction, alteration, or maintenance of gas, electric, water, or communication transmission facilities; grazing and other agricultural uses; construction of single-family dwelling units; and passive recreational use of the land by the public (Humboldt County Code 2020).

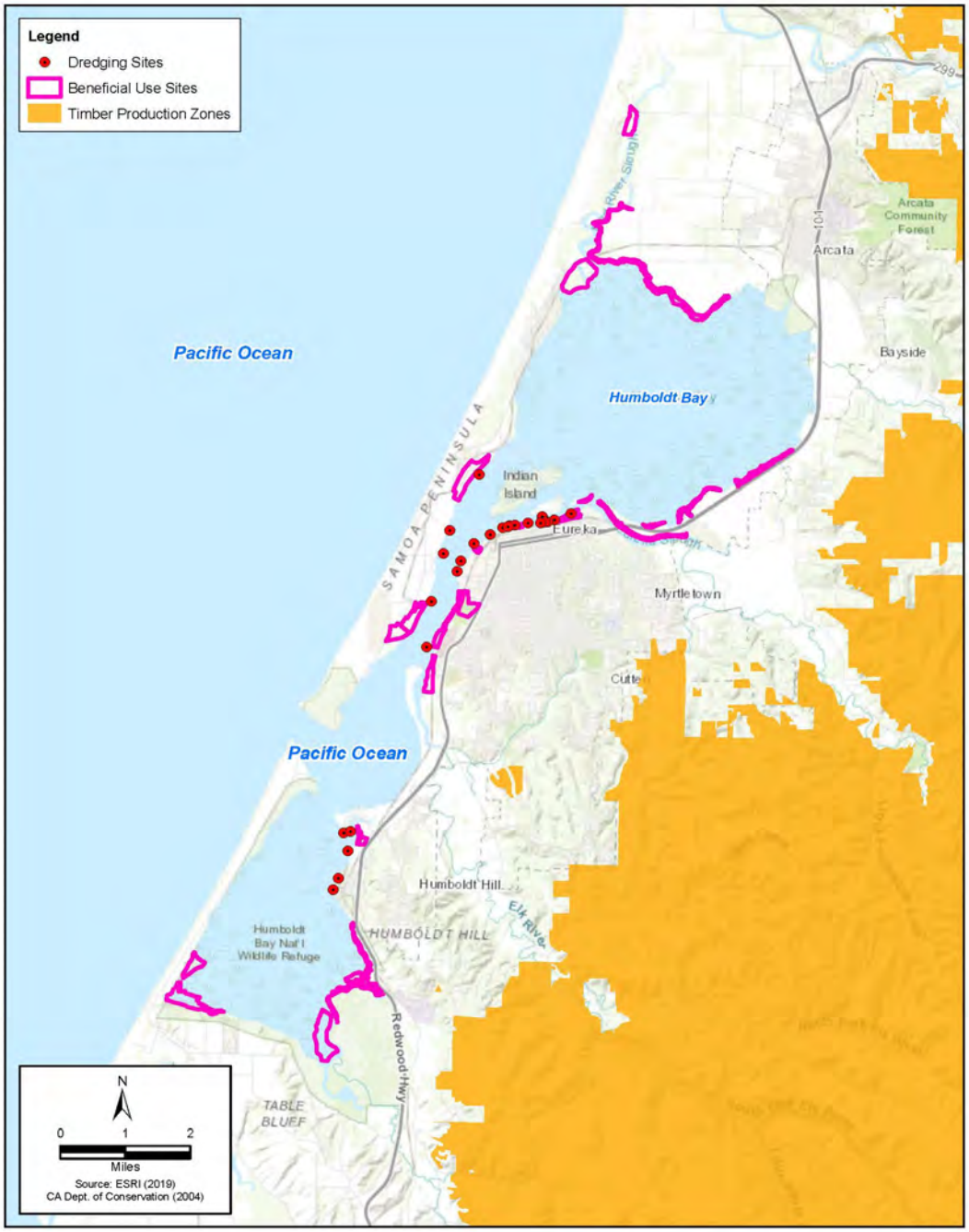


Figure 3.1-3. Timber Production Zones

3.1.2 Regulatory Setting

3.1.2.1 State

Williamson Act

The California Land Conservation Act of 1965, commonly known as the Williamson Act, enables local governments to form contracts with private landowners to promote continued agricultural or related open space uses. In return, landowners receive property tax assessments that are based on farming and open space uses rather than full market value and development potential. The State of California ceased subvention (subsidy) payments in 2009 because of statewide budget concerns. The contracts are renewable annually and may restrict the land to agricultural use for at least 10 years.

The landowner may end the contract by submitting a Notice of Nonrenewal, which starts a 9-year nonrenewal period during which the annual tax assessment continually increases until it is equivalent to current tax rates. The contract is then terminated. Contract cancellation involves an extensive review and approval process. In addition, if a contract is cancelled, the landowner may be required to pay a fee of up to 25 percent of the property value under state and local Williamson Act requirements. The local jurisdiction approving the cancellation must find that the cancellation is consistent with the purpose of the California Land Conservation Act or is in the public interest (California Government Code Section 51282).

An expanded version of the Williamson Act, known as the Farmland Security Zone Act, was enacted in 1998. A Farmland Security Zone Act contract offers landowners greater property tax reduction in return for an initial contract term of 20 years, with renewal occurring automatically each year. Land restricted by a Farmland Security Zone Act contract is valued for property assessment purposes at 65 percent of its land conservation act valuation, or 65 percent of its Proposition 13 valuation, whichever is lower.

Compatible use and allowable activities under the Williamson Act is any use determined by the county or city administering the preserve pursuant to Section 51231, 51238, or 51238.1 of the California Government Code. “Compatible use” includes agricultural use, recreational use or open-space use.

Z’berg-Nejedly Forest Practice Act of 1973

The Z’berg-Nejedly Forest Practice Act of 1973 (CCR Title 14, Article 7) is the primary forest regulation statute in California and generally is referred to as the Forest Practice Act (FPA). The FPA provides for creation of a State Board of Forestry to manage forest practices and resources, and the Board has developed forest practice rules to implement the FPA.

CAL FIRE enforces the requirements of the FPA and serves as lead agency for projects that fall within the scope of the FPA. If timber operations (as defined by California PRC § 4527) are part of a project (or would be affected by a project), these operations must be approved by CAL FIRE. CAL FIRE is responsible for ensuring that private landowners abide by this law when harvesting trees. Compliance with the Forest Practice Act and Board rules apply to all commercial harvesting operations for landowners of small parcels, to ranchers owning hundreds of acres, and large timber companies with thousands of acres.

The Timber Harvesting Plan (THP), which must outline the amount of timber intended to be harvested, how it would be harvested, and the steps that would be taken to prevent damage to the environment, is the environmental review document submitted by landowners to CAL FIRE. THPs are prepared by Registered Professional Foresters (RPFs) who are licensed to prepare these comprehensive, detailed plans. A THP that does not comply with all forestry and environmental regulations is returned to the RPF. It is only approved after the RPF and landowner agree to make the changes necessary to ensure compliance with all laws. CAL FIRE follows-up on approved THPs with site inspections and can shut down operations, cite or fine RPFs, Licensed Timber Operators (LTOs), and landowners if illegal operations are found (CAL FIRE 2020).

Timberland Production Zones

According to the Z'Berg-Warren-Keene-Collier Forest Taxation Reform Act (California Government Code §§ 51110–51119.5), enacted in 1976, counties must provide the zoning of land used for growing and harvesting timber as Timberland Production Zones. TPZs were established to preserve and protect timberland from conversion to other uses and avoid land use conflicts.

The Timberland Productivity Act (California Government Code §§ 5110–5115) of 1982 later formalized the state's policy in favor of sustainable harvest, focusing on the long-term availability of timber resources. Five compatible uses are identified for TPZ lands:

1. Watershed management
2. Fish and wildlife management, including hunting and fishing
3. Uses related to the growing, harvesting, and processing of forest products
4. Construction, alteration, or maintenance of utility facilities
5. Grazing

Lands zoned TPZ must be maintained for timber production for 10 years following the zoning declaration; after 10 years, the TPZ status automatically renews each year. If a property owner petitions to have the land rezoned out of TPZ, the land is normally subject to a 10-year slide-out process. Alternatively, if immediate rezoning is requested, an extensive review and approval process is required. The minimum parcel size for TPZ zoning is 160 acres, although smaller parcels may be zoned TPZ, if a joint timber management plan is prepared.

California Public Resources Code (PRC)

PRC Section 21060.1 contains the following definition of agricultural land:

A. Agricultural land means prime farmland, farmland of statewide importance, or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria, as modified for California.

B. In those areas of the state where lands have not been surveyed for the classifications specified in subdivision (a), "agricultural land" means land that meets the requirements of "prime agricultural land" as defined in paragraph (1), (2), (3), or (4) of subdivision (c) of Section 51201 of the Government Code.

The PRC provides the following definition for forest land:

Section 12220(g) defines forest land as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

Section 4526 defines timberland as land, other than land owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees.

California Government Code

California Government Code definitions applicable to the Proposed Program include the following.

Section 51104(g) defines "timberland production zone" to mean an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. Compatible uses are defined under Section 51104(h) and include the construction and maintenance of electric transmission facilities.

Section 51112 identifies situations which would warrant a decision that a parcel is not devoted to and used for growing and harvesting timber or for growing and harvesting timber and compatible uses.

Section 51113 allows the opportunity for a landowner to petition that his or her land be zoned timberland production.

Section 51201(c)(5) defines "prime agricultural land" as land that has returned from the production of unprocessed agricultural plant products an annual gross value of not less than $200 per acre for 3 of the previous 5 years.

3.1.2.2 Local

Humboldt County General Plan

The HCGP was adopted on October 23, 2017. As described in its Section 3.9, *Land Use*, the HCGP establishes land use designations to allow for the orderly development of lands within the County. The HCGP Land Use Element contains policies related to agriculture and forestry resources that are relevant to the Proposed Program.

Land Use Element

The HCGP Land Use Element governs how land is to be utilized, many of the issues and policies contained in other plan elements are linked in some degree to this element. The Land Use Element contains goals, policies, and programs concerning land use. The policies in the Land Use Element address countywide issues that are general in nature and may apply to numerous locations and land use designations within the planning area. The policies are grouped by topic and are preceded by a brief discussion of issues pertaining to the topic. The following is a summary of the policies included in the Land Use Element related to agriculture and forestry resources that apply to the Proposed Program.

Agricultural Resources

Policy AG-P5: Conservation of Agricultural Lands.

Agricultural lands would be conserved, and conflicts minimized between agricultural and non-agricultural uses through all of the following:

A. By establishing stable zoning boundaries and buffer areas that separate urban and rural areas to minimize land use conflicts.

B. By establishing stable Urban Development, Urban Expansion and Community Planning Areas and promoting residential in-filling of Urban Development Areas, with phased urban expansion within Community Planning Areas.

C. By developing lands within Urban Development, Urban Expansion and Community Planning Areas prior to the conversion of agricultural resource production lands (AE, AG) within Urban Expansion Areas.

D. By not allowing the conversion of agricultural resource production lands (AE, AG) to other land use designations outside of Urban Expansion Areas.

E. By assuring that public service facility expansions and non-agricultural development do not inhibit agricultural viability, either through increased assessment costs, degradation of the environment, land fragmentation or conflicts in use.

F. By increasing the effectiveness of the Williamson Act Program.

G. By allowing historical structures and/or sensitive habitats to be split off from productive agricultural lands where it acts to conserve working lands and structures.

H. By allowing lot-line adjustments for agriculturally designated lands only where planned densities are met and there is no resulting increase in the number of building sites.

Policy AG-P6: Agricultural Land Conversion – No Net Loss

Lands planned for agriculture (AE, AG) will not be converted to non-agricultural uses unless the Planning Commission makes the following findings:

A. There are no feasible alternatives that would prevent or minimize conversion.

B. The facts support an overriding public interest in the conversion; and

C. For lands outside of designated Urban Development Boundaries, sufficient off-setting mitigation has been provided to prevent a net reduction in the agricultural land base and agricultural production. This requirement will be known as the "No Net Loss" agricultural lands policy. "No Net Loss" mitigation is limited to one or more of the following:

   1. Re-planning of vacant agricultural lands from a non-agricultural land use designation to an agricultural plan designation along with the recordation of a permanent conservation easement on this land for continued agricultural use; or

   2. The retirement of non-agricultural uses on lands planned for agriculture and recordation of a permanent conservation easement on this land for continued agricultural use; or

   3. Financial contribution to an agricultural land fund in an amount sufficient to fully offset the agricultural land conversion for those uses enumerated in subsections a. and b. The operational details of the land fund, including the process for setting the amount of the financial contribution, will be established by ordinance.

Forest Resources

Goal FR-G4: Incompatible and Conflicting Uses.

Timberlands protected from the encroachment of incompatible uses and managed for the inclusion of compatible uses.

Policy FR-P8: Protection of High-Quality Timberlands.

Timberlands planned and zoned for timber production should be retained for timber production, harvesting and compatible uses, and reclassification of the Timberland Production Zones (TPZ) will be done in accordance with the statutory requirements.

Policy FR-P16: Public Utilities on TPZ Lands.

Where feasible avoid locating federal, state, or local public improvements and utilities in TPZ where the project or land acquisition will have a significant adverse effect on the production of timber or ecosystem services.

Land Use Designations

The HCGP Land Use Element contains the various land use designations and their permitted uses that are also displayed on the Plan's land use maps. The Proposed Program's applicable land use designation related to agriculture and forestry resources is listed below:

Resource Production Land Use Designations

Agricultural Exclusive (AE): This designation applies to bottomland farms and lands that can be irrigated; also used in upland areas to retain agricultural character. Typical uses include dairy, row crops, orchards, specialty agriculture, and horticulture.

Industrial Designations

Industrial, Resource Related (IR): This designation provides areas for resource-related industrial processing such as timber, agriculture and mineral products processing in areas not typically served by urban services and therefore not suitable for a broader range of industrial uses.

Open Space, Public Lands, and Tribal Land Designations

Natural Resources (NR): The purpose of this designation is to protect and enhance valuable coastal fish and wildlife habitats and provide for public and private use of their resources, including hunting, fishing, and other forms of recreation.

City of Arcata General Plan

The *Arcata General Plan* (AGP) establishes land use designations to allow for the orderly development and use of lands in the City. The AGP's Land Use and Resource Conservation and Management Elements contain goals and policies that are applicable to the Proposed Program. The following is a summary of the policies related to agriculture and forestry resources that apply to the Proposed Program.

Land Use Element

The AGP Land Use Element contains "goals, policies, and implementation measures for each land use category. These elements are intended to guide future land use decisions, preserve important

elements of the past, and maintain the present diversity of use and character" (City of Arcata 2008). The structure of the AGP Land Use element is designed with six major policies and more specific sub-policies that comprise each major policy. The major policies of the Land Use Element that are applicable to the Proposed Program are:

Policy LU-1: Overall Land Use Pattern: Land Use Plan Map

LU-1b: Coastal land-use plan.

LU-1e: Protection of natural resources and agricultural lands.

Policy LU-6: Agricultural and Natural Resource Lands

LU-6e: Relationship with the Open Space and Resource Conservation and Management Elements.

Resource and Conservation Management Element

Policy RC-1: Natural Biological Diversity/Ecosystem Function

RC-1a: Maintain biological and ecological integrity.

RC-1c: Habitat value protection.

Policy RC-2: Streams Conservation and Management

RC-2c: Allowable uses and activities in Environmental Buffer Areas.

Policy RC-3: Wetlands Management

RC-3l: Uses allowed in diked/reclaimed tidelands.

Policy RC-4: Open Waters of Arcata Bay and Tidelands

RC-4d: Diking, dredging, filling, and shoreline structures.

Policy RC-5: Agricultural Resources Management

RC-5d: Permanent protection for agricultural lands.

Policy RC-6: Forest Resources Management

RC-6a: Management of Arcata Community Forest.

Policy RC-9: Soils and Mineral Resources

RC-9b: Protection of productive soils and soils with limitations.

Land Use Designations

The AGP Land Use Element contains the various land use designations and their permitted uses that are also displayed on the Plan's land use maps. The Proposed Program's applicable land use designations related to agriculture and forestry resources are listed below:

- **Agriculture Exclusive** (AE): This designation is intended to preserve land for agricultural production. The A-E designation is appropriate for lands with prime agricultural soils and wetlands that could be used as grazed agricultural lands. Structures associated with agricultural production, such as barns and farmhouses, are appropriate uses in A-E areas.

- **Natural Resource** (NR): This designation is applied to public or private lands where protection of unique and/or sensitive\natural resources, or managed production of resources, are the primary objectives. The resources element describes three subdistrict zones within the NR district which are designated: Wetland Stream Protection Zone (NR-WSPZ), Timber Production Zone (NR-TPZ), and Public Trust Zone (NR-PTZ). Examples of lands designated NR include the Community Forest (NR-TPZ), Janes Creek /McDaniel Slough Linear Park (NR-WSPZ), and the Arcata Marsh and Wildlife Sanctuary (NRPTZ). Recreation may be considered as a secondary use when there are no adverse impacts on the protected resources. This designation is also applicable to productive resource lands, such as timber-producing forested areas (NR-TPZ) and aquaculture in Arcata Bay (NR-PTZ). The land between Humboldt State University and the Community Forest is an example of productive forest lands designated (NR-TPZ). The NR designation is not applied to small or "pocket" wetlands, that exist on parcels large enough to accommodate development without adversely affecting the wetlands. The designation is also not applied to wetlands used as grazed agricultural lands, or riparian areas in other zones. These resource areas are protected by applicable stream and wetlands standards.

City of Eureka General Plan

The city of Eureka General Plan (EGP) was adopted in October 2018, and establishes goals, policies, and programs to direct land use development decisions, manage resources, deliver public services, and provide infrastructure. The EGP contains goals and policies related to agriculture and forestry resources that are applicable to the Proposed Program. Relevant policies are as follows.

Agriculture and Timberlands Preservation

Policy AG-1.1: Agricultural Lands within Coastal Zone

Policy AG-1.6: Productive Use of Timberlands

Policy AG-1.7: Discourage Conflicts with Timberland Management

Policy AG-1.10: Timber Harvest Plans

Open Space

Policy NR-3.1: Preserve Open Space

Land Use Designations

The EGP contains various land use designations and their permitted uses. The Proposed Program's applicable land use designations related to agriculture and forestry resources are listed below:

Agriculture (A): Production of crops, livestock grazing, animal and poultry raising, apiaries, dairies, stables and associated residences and farmworker housing. Intended to protect land, including farmed or grazed wetlands, that is primarily suitable for long-term agricultural and wildlife habitat uses and to ensure adequate separation from adjacent development. Compatible commercial and public/quasi-public uses may be allowed as provided by the applied zoning district.

Timberland (T): Growing, harvesting, and processing of timber and other forest products, resource management activities, and associated support uses and residences. Intended to protect land that is

primarily suitable for long-term timber production and compatible resource related uses. Limited public recreation and agricultural uses may be allowed as provided by the applied zoning district.

3.1.3 Impacts Analysis

This section describes the environmental impacts on agriculture and forestry that could result from implementation of the Proposed Program.

3.1.3.1 Methodology

The evaluation of potential agriculture and forestry impacts is based on professional standards and a review of existing information for the Proposed Program area, including the existing agriculture and forestry resources sediment for pertinent Proposed Program dredging sites, as described and cited in Section 3.1.1, *Environmental Setting*. Potential impacts resulting from implementation of the Proposed Program, Alternatives 1, 2, and 3, and the No-Project Alternative were qualitatively assessed based on the environmental characteristics of the study area and the magnitude, intensity, and duration of activities related to dredging, processing, and placement of dredged material.

3.1.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below.

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use
- Conflict with existing zoning for agricultural use, or a Williamson Act contract
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC section 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g))
- Result in the loss of forest land or conversion of forest land to non-forest use
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use

3.1.3.3 Impacts and Mitigation Measures

Impact AF-1: Would the Proposed Program Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as Shown on the Maps Prepared Pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to Non-agricultural Use?

Proposed Program

The Proposed Program would include dredging, transport, and placement activities in Humboldt Bay. Humboldt County is not included in the latest California Department of Conservation FMMP. Therefore, the Proposed Program would not convert Prime Farmland, Unique Farmland, or

Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses, and no impacts would occur.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities considered by the Proposed Program and, accordingly, would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses. Therefore, no impacts would occur under this alternative.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities considered by the Proposed Program and, accordingly would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses. Therefore, no impacts would occur under this alternative.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under Alternative 3, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. These activities are a subset of the activities considered by the Proposed Program and, accordingly, would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses. Therefore, no impacts would occur under this alternative.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Therefore, this alternative would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses. No impacts would occur.

Impact AF-2: Would the Proposed Program Conflict with Existing Zoning for Agricultural Use or a Williamson Act Contract?

Proposed Program

Dredging

Dredging, the primary mechanism for sediment management, currently occurs within Humboldt Bay. The Proposed Program involves 20 dredging sites in North Bay and five in South Bay, as the existing LMSs. Dredging sites are not currently zoned for agricultural use.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard via pipeline or barge for processing. As shown in Figure 3.1-1 and Figure 3.1-2, none of the proposed Program processing sites are zoned for agricultural use or are under a Williamson Act contract. Therefore, it is assumed that the Program would not create new conflicts with existing zoning for agricultural use, or an impact on an existing Williamson Act contract would not occur.

Beneficial Use of Dredged Material

- **Waterfront Sites**. Dredged material could be placed at 16 waterfront sites (see Appendix A) to increase protection from tidal inundation related to sea level rise. As discussed in Appendix A, waterfront sites in the unincorporated areas of Humboldt County include properties zoned as Coastal Dependent Industrial, Residential, and Commercial. Sites in the City of Eureka are zoned Waterfront Commercial, General Commercial, and Natural Resources. No waterfront sites are not currently zoned for agricultural use as is described in Policy AG-S7 of the County's General Plan (Humboldt County 2017).
- **Beach Replenishment**. Five beach replenishment sites along Humboldt Bay have been identified for placement of dredged material under the Proposed Program (see Appendix A). These sites are in areas of high wave energy and experience erosion in the winter from storm waves and are not currently zoned for agricultural use.
- **Diked Shoreline Structures and Diked Former Tidelands**. Dredged material could be used at 23 locations to rebuild eroded dike segments, increase low (less than 10 feet) dike crest elevations, and increase the elevation of dikes at former tidelands in Humboldt Bay (see Appendix A). Dredged sediment could be used to increase resiliency of diked shoreline structures to sea level rise and raise the elevation of diked former tidelands now used for agriculture. Nine of the 23 diked sub-units protect agricultural uses. The Proposed Program involves rebuilding diked shoreline structures, which would protect existing agricultural uses.
- **Living Shorelines and Salt Marsh Habitat**. Under the Proposed Program, there are four potential living shoreline sites;16 salt marsh restoration sites, which could help protect vulnerable built shoreline structures and low-lying areas from wave-induced erosion or overtopping; and 11 salt marsh restoration sites where use of dredged sediments could occur to provide habitat, independent of protecting shoreline infrastructure (see Appendix A). Some potential living shoreline sites and salt marsh restoration sites in the Arcata Bay area and the South Bay area are located within areas zoned as Agriculture Exclusive (AE) (see Table 3 and 4, Appendix A).

Dredging, transport, and placement activities would not conflict with existing zoning for agricultural use, or a Williamson Act contract. Lands in the northern and southern portions of the Proposed Program area where sediment reuse sites are proposed, are zoned AE. A conditional use permit is required in the AE zone for the Proposed Program. A conditional use permit application would be required, pursuant to Humboldt County Code Section 3.1.2, which would allow all Proposed Program-related activities. A use permit from the City of Eureka would also be required for the Proposed Program. With approval of the conditional use permits, the Proposed Program would not conflict with the AE zoning district. No Williamson Act contracts occur within the Proposed Program area where dredging, processing, and beneficial-use sites are proposed. Therefore, impacts would be less than significant.

Additionally, a thin-layer sediment could be applied to some Proposed Program sites. This application could cover some, but not all, vegetation at a beneficial use site. Plant species could be affected by sediment placement due to smothering. This potential smothering of vegetation would be limited to sediment placement. However, the habitat is expected to recover rapidly after disturbance. The spatial extent of the impact would be small relative to the total amount agricultural area within the Program area and would not conflict with agricultural zoning or activities. Thus, this impact is considered less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would require approval of the conditional use permits. Therefore, conflicts with existing zoning for agricultural use, or a Williamson Act contract would be less than significant under this alternative.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would require approval of the conditional use permits. Therefore, conflicts with existing zoning for agricultural use, or a Williamson Act contract would be less than significant under this alternative.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under Alternative 3, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. These activities are a subset of to the activities pursued by the Proposed Program and would require conditional use permit. Therefore, conflicts with existing zoning for agricultural use, or a Williamson Act contract would be less than significant under this alternative.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Therefore, this alternative would not conflict with existing zoning for agricultural use, or a Williamson Act contract, and no impacts would occur.

Impact AF-3: Would the Proposed Program Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land (as Defined in PRC § 12220(g)), Timberland (as Defined by PRC § 4526), or Timberland-Zoned Timberland Production (as defined by Government Code § 51104(g))?

Proposed Program

Construction and Operation

The dredging, transport and placement activities would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)).

The Proposed Program area is zoned as follows.

- The Proposed Program area within the jurisdiction of unincorporated **Humboldt County** is zoned as Coastal Resource Dependent (C), Industrial/Coastal Dependent (MC), Agriculture Exclusive (AE), and Natural Resources (NR). No portion of the Proposed Program within Humboldt County's jurisdiction is zoned for forest land, timberland, or timberland zoned Timberland Production.
- The Proposed Program area within the **City of Eureka**'s jurisdiction is zoned as Natural Resources (NR); Service Commercial (CS), Waterfront Commercial (CW), Coastal Dependent Industrial (MC), Development Water (WD) (City of Eureka General Plan, Chapter 5 § 10.5.2907). However, no portions of the Proposed Program are zoned for forest land, timberland, or timberland zoned Timberland Production.
- Areas of the Proposed Program area within the **City of Arcata**'s jurisdiction are zoned AE (Arcata Zoning Code § 9.20.030). The City of Arcata also includes areas designated as Natural Resource (NR). This designation is applied to public or private lands where protection of unique and/or sensitive natural resources, or managed production of resources, are the primary objectives. The resources element of the AGP describes three subdistrict zones within the NR district which are designated: Wetland Stream Protection Zone (NR-WSPZ), Timber Production Zone (NR-TPZ), and Public Trust Zone (NR-PTZ). This designation is also applicable to productive resource lands, such as timber-producing forested areas (NR-TPZ). Land approximately 2.15 miles northeast of the north Humboldt Bay reuse sites are zoned as Timber Production (TP).

Therefore, the Proposed Program would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)), and no impact would occur.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined

by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)). Therefore, no impacts would occur.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)). Therefore, no impacts would occur.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under the Alternative 3, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. These activities are a subset of the activities pursued by the Proposed Program and accordingly would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)). Therefore, no impacts would occur.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Therefore, this alternative would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC § 12220(g)), timberland (as defined by PRC § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104(g)), and no impacts would occur.

Impact AF-4: Would the Proposed Project Result in the Loss of Forest Land or Conversion of Forest Land to Non-forest Use?

Proposed Program

Construction and Operation

As discussed above under Impact AF-3, the Proposed Program area does not contain any forest lands as defined in PRC Section 12220(g), timberland as defined by PRC section 4526, or timberland zoned Timberland Production as defined by Government Code section 51104(g); consequently, the Proposed Program would not result in the loss or conversion of forest land to a non-forest use. Therefore, no impact would occur.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities would occur in the Proposed Program area, which does not contain any forest lands and, accordingly, would not result in the loss or conversion of forest land to a non-forest use. Therefore, no impacts would occur.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities would occur in the Proposed Program area, which does not contain any forest lands and, accordingly, would not result in the loss or conversion of forest land to a non-forest use. Therefore, this alternative would not result in the loss or conversion of forest land to a non-forest use and no impacts would occur.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under the Alternative 3, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. These activities would occur in the Proposed Program area, which does not contain any forest lands and, accordingly, would not result in the loss or conversion of forest land to a non-forest use. Therefore, this alternative would not result in the loss or conversion of forest land to a non-forest use and no impacts would occur.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. These activities would occur in areas which do not contain any forest lands and, accordingly, would not result in the loss or conversion of forest land to a non-forest use. Therefore, the No-Project Alternative would not result in the loss or conversion of forest land to a non-forest use and no impacts would occur.

Impact AF-5: Would the Proposed Program Involve Other Changes in the Existing Environment that, Due to their Location or Nature, Could Result in Conversion of Farmland, to Non-agricultural Use or Conversion of Forest Land to Non-forest Use?

Proposed Program

The Proposed Program sites do not contain any agricultural uses or areas designated for Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Furthermore, there are no Williamson Act contracts or forest lands/timberlands within the Proposed Program sites. The Proposed Program involves dredging, transport, and sediment placement activities within areas zoned as AE. However, the Proposed Program would not involve changes in the existing environment that could result conversion of important farmland or other agricultural resources to a non-agricultural use. Furthermore, the Proposed Program would comply with applicable General Plan policies identified in 3.1.2, *Regulatory Setting*, above to ensure the preservation of agriculture and forest resources. The HCGP, AGP, and EGP include various policies, standards and implementation measures aimed at maintaining resource production lands in agricultural and timber use. Conditional use permits would also be required. Therefore, impacts related to changes to the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, impacts related to changes to the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use would be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, impacts related to changes to the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use would be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under the Alternative 3, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. These activities are a subset of the activities pursued by the Proposed Program and, accordingly, impacts related to changes to the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use would be less than significant.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Therefore, this alternative would not result in impacts related to changes to the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use. No impacts would occur.

3.2 Air Quality

This section examines the degree to which construction and operation of the Proposed Program may result in changes to regional and local air quality. This section also describes the applicable regulatory framework, existing ambient air quality conditions in the Proposed Program area, and characteristics and effects of air pollutants. The Proposed Program area is the study area for air quality. Please refer to Section 3.3, *Greenhouse Gas Emissions*, for a discussion of greenhouse gas emissions.

3.2.1 Environmental Setting

The Proposed Program area, described in Chapter 2, *Project Description*, is within the NCAB. Ambient air quality is affected by climatological conditions, topography, and the types and amounts

of pollutants emitted. The following sections describe the pollutants of concern and summarize how they move through the air, water, and soil within the air basin, and how air pollution is changed in the presence of other chemicals and particles. This section also summarizes local climate conditions, existing air quality conditions, and sensitive receptors that may be affected by program-generated emissions.

3.2.1.1 Pollutants of Concern

Criteria Pollutants

As discussed above, the federal and state governments have established National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS), respectively, for six criteria pollutants. Ozone is considered a regional pollutant because its precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are considered local pollutants that tend to accumulate in the air locally. Particulate matter (PM) is both a local and a regional pollutant. The primary criteria pollutants generated by the Proposed Program would be ozone precursors (nitrogen oxides [NO_X] and reactive organic gases [ROG]), NO_2, CO, PM, and SO_2.[1,2]

All criteria pollutants can have human health and environmental effects at certain concentrations. The ambient air quality standards for these pollutants (Table 3.2-1) are set to public health and the environment within an adequate margin of safety (CAA § 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants, and form the scientific basis for new and revised ambient air quality standards.

Principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the Proposed Program are discussed below.

Ozone (O^3)

Ozone, or smog, is a photochemical oxidant formed when ROG and NO_X (both by-products of the internal combustion engine) react with sunlight. ROG are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown, irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, NO_X also directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens due to impairments to the immune system.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoors. Exposure to ozone at certain

1 There are also ambient air quality standards for lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the Proposed Program. Accordingly, they are not evaluated further.
2 Most emission of NO_X are in the form of nitric oxide (NO) (Reşitoğlu 2018). Conversion to NO_2 occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO_2 is not considered a local pollutant of concern for the Proposed Program and is not evaluated further.

concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggravate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (USEPA 2019a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least-responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrement in forced airway volume in the most-responsive individual. Although the results vary, evidence suggest that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (USEPA 2016).

In addition to human health effects, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. Ozone can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products.

Carbon Monoxide (CO)

CO is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. In the Proposed Program area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects to ambient CO (CARB 2019a).

Particulate Matter (PM)

PM consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of particulates are now generally considered: respirable particles with an aerodynamic diameter of 10 micrometers or fewer, or PM_{10}, and fine particles with an aerodynamic diameter of 2.5 micrometers or fewer, or $PM_{2.5}$. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading. Particulate pollution can be transported over long distances and both PM_{10} and $PM_{2.5}$ may adversely affect humans, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Depending on its composition, both PM_{10} and $PM_{2.5}$ can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (USEPA 2018a).

Sulfur Dioxide

SO_2 is generated by industrial processes, natural sources such as volcanoes, and burning of fossil fuels. In recent years, emissions of SO_2 have been significantly reduced by the increasingly stringent controls placed on the sulfur content of fuels used in stationary sources and mobile sources. SO_2 is a precursor to fine PM formation in the form of sulfates, such as ammonium sulfate. Short-term exposure to SO_2 can aggravate the respiratory system, making breathing difficult. Controlled laboratory studies indicate that brief exposure (5 to 10 minutes) of exercising asthmatics to an average SO_2 level of 0.4 part per million (ppm) can result in increases in air resistance. Healthy adults do not show any symptoms to SO_2 at levels as high 1 ppm, even after up to 3 hours of exposure. SO_2 can also affect the environment by damaging foliage and decreasing plant growth (USEPA 2019b).

3.2.1.2 Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for Toxic Air Contaminants (TACs). Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment.

Air toxics are generated by many sources, including stationary sources, such as dry cleaners, gas stations, auto body shops, and combustion sources; mobile sources, such as diesel trucks, ships, and trains; and area sources, such as farms, landfills, and construction sites. Adverse health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) non-carcinogenic, and long-term (chronic) non-carcinogenic. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders. The principal TAC associated with the Proposed Program is DPM. Asbestos is typically a TAC of concern,, but the Proposed Program area is not within an area of mapped ultramafic rock, and there are no mapped ultramafic rock unit areas in the vicinity (California Department of Conservation 2000). In addition, no demolitions of structures are anticipated. Therefore, asbestos is not a TAC associated with the Proposed Program area.

Diesel Particulate Matter

DPM is generated by diesel-fueled equipment, vehicles, and harbor craft. Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). The International Agency for Research on Cancer has classified diesel engine exhaust as “carcinogenic to humans” (i.e., cancer causing) (International Agency for Research on Cancer 2012).

Odors

Offensive odors can be unpleasant and lead to citizen complaints to local governments and air districts. According to CARB’s (2005) *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities,

manufacturing, and agricultural activities. CARB provides recommended screening distances for siting new receptors near existing odor sources.

3.2.1.3 Climate and Meteorology

The climate of the region is dominated by a cold upwelling of seawater to the ocean surface off the Humboldt Coast. This cold ocean water cools the surface air. During the summer, winds flowing from the Pacific Ocean are drawn on shore by the difference in surface temperatures, resulting in daytime northwesterly winds. In winter, this temperature differential is lower, and surface winds may blow from many directions depending on storm patterns.

As a result of the region's topography and coastal air movements, inversion conditions are common in the NCAB. Inversions are created when warm air traps cool air near the ground surface and prevents vertical dispersion of air. Valleys, geographic basins, and coastal areas surrounded by higher elevations are the most common locations for inversions to occur. During the summer, inversions are less prominent, and vertical dispersion of the air is good. However, during the cooler months between late fall and early spring, inversions last longer and are more geographically extensive; vertical dispersion is poor, and pollution may be trapped near the ground for several concurrent days.

The mountains and hills within and surrounding the NCAB contribute to the variation of rainfall, temperature, and winds throughout the region. These variables characterize short-term weather conditions and observing long-term averages and trends in these characteristics provides a synopsis of typical climatological conditions in the NCAB. These meteorological conditions affect how air pollution from emissions sources within the NCAB moves through the air within the NCAB in the presence of other chemicals and particles. The Western Regional Climate Center—in collaboration with the National Oceanic and Atmospheric Administration—processes and publicizes regional climate summary data for the western United States. There are several meteorological stations located throughout the county that collect and record climatological data including temperature, precipitation, and wind speed and direction.

The meteorological data station most representative of local climate conditions within the study area is the Eureka WFO Woodley Island Station. The annual average temperature at the station is 53 degrees Fahrenheit (°F), with an average winter temperature of 47°F and an average summer temperature of 58°F. Total annual precipitation averages about 39 inches, occurring mostly during the winter (Western Regional Climate Center 2019a, 2019b). The Arcata Airport northeast of the Proposed Program area collects information on wind speeds and patterns. The data indicate a prominence of easterly winds that average 6 miles per hour (Western Regional Climate Center 2019c).

3.2.1.4 Existing Air Quality Conditions

Ambient Criteria Pollutant Concentrations

The existing air quality conditions in the Proposed Program area can be characterized by monitoring data collected in the region. Table 3.2-1 summarizes data for criteria air pollutant levels from the Eureka-Jacobs and Eureka-Humboldt Hill monitoring stations, which are the currently operating stations in Humboldt County, for the last 3 years for which complete data are available (2016–2018). Air quality concentrations are expressed in terms of ppm or micrograms per cubic m ($\mu g/m^3$).

As shown in Table 3.2-1, no violations of CO or NO_2 NAAQS and CAAQS were reported. However, the monitoring station has detected a few violations of the $PM_{2.5}$ NAAQS and one violation of the 8-hour ozone NAAQS and CAAQS. As discussed above, the CAAQS and NAAQS define clean air and represent the maximum amount of pollution that can be present in outdoor air without harmful effects on people and the environment. Existing violations of the ozone and PM ambient air quality standards indicate that some individuals exposed to these pollutants may experience certain health effects, including increased incidence of cardiovascular and respiratory ailments.

Table 3.2-1. Ambient Air Quality Monitoring Data from the Eureka-Jacobs and Eureka-Humboldt Hill Stations (2016–2018)

	Eureka-Jacobs			Eureka-Humboldt Hill		
Pollutant Standards	2016	2017	2018	2016	2017	2018
1-Hour Ozone (O_3)						
Maximum Concentration (ppm)	0.047	0.063	0.045	0.058	0.091	0.054
Number of Days Standard Exceeded[1]						
CAAQS 1-Hour (>0.09 ppm)	0	0	0	0	0	0
8-Hour Ozone (O_3)						
State Maximum Concentration (ppm)	0.045	0.059	0.042	0.051	0.084	0.050
National Maximum Concentration (ppm)	0.045	0.059	0.041	0.051	0.084	0.050
National 4th Highest Concentration (ppm)	0.043	0.043	0.038	0.049	0.053	0.049
Number of Days Standard Exceeded[1]						
CAAQS 8-Hour (>0.070 ppm)	0	0	0	0	1	0
NAAQS 8-Hour (>0.070 ppm)	0	0	0	0	1	0
Carbon Monoxide (CO)						
Maximum 1-Hour Concentration (ppm)	1.3	2.2	1.3	0.5	2.4	0.5
Maximum 8-Hour Concentration (ppm)	1.0	1.7	0.9	0.5	2.2	0.5
Number of Days Standard Exceeded[1]						
NAAQS 8-Hour (≥9 ppm)	0	0	0	0	0	0
CAAQS 8-Hour (≥9.0 ppm)	0	0	0	0	0	0
NAAQS 1-Hour (≥35 ppm)	0	0	0	0	0	0
CAAQS 1-Hour (≥20 ppm)	0	0	0	0	0	0
Nitrogen Dioxide (NO_2)						
State Maximum 1-Hour Concentration	48	22	58	9	18	11
Annual Average Concentration	2	2	2	0	0	0
Number of Days Standard Exceeded[1]						
CAAQS 1-Hour (0.18 ppm)	0	0	0	0	0	0
NAAQS 1-Hour (0.10 ppm)	0	0	0	0	0	0
Particulate Matter (PM_{10})[3]						
State[3] Maximum 24-Hour Concentration	-	-	-	-	-	-
National[2] Maximum 24-Hour Concentration	53.6	114.1	71.0	-	-	-
State Annual Average Concentration[4]	-	-	-	-	-	-
Number of Days Standard Exceeded[1]						
CAAQS 24-Hour (>50 μg/m^3)[5]	-	-	-	-	-	-

Pollutant Standards	Eureka-Jacobs			Eureka-Humboldt Hill		
	2016	2017	2018	2016	2017	2018
NAAQS 24-Hour (>150 μg/m³)[5]	0	0	0	-	-	-
Fine Particulate Matter ($PM_{2.5}$)						
National[2] Maximum 24-Hour Concentration (μg/m³)	20.0	49.0	39.6	10.0	52.0	8.3
24-hour Standard 98th Percentile (μg/m³)	16.4	28.0	30.2	9.5	-	-
National Annual Average Concentration	6.0	8.3	7.7	3.4	-	-
Number of Days Standard Exceeded[1]						
NAAQS 24-Hour (>35 μg/m³)[5]	0	3	6	0	1	0

Sources: CARB 2019b; USEPA 2018b.

[1] An exceedance is not necessarily a violation.

[2] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[3] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California approved samplers.

[4] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[5] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

mg/m³ = milligrams per cubic meter; > = greater than; ≥ = greater than or equal to; - = insufficient data

Attainment Status

Local monitoring data (Table 3.2-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are further defined as shown below.

- **Nonattainment**: Assigned to areas where monitored pollutant concentrations consistently violate the standard in question
- **Maintenance**: Assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past, but are no longer in violation of that standard
- **Attainment**: Assigned to areas where pollutant concentrations meet the standard in question over a designated period of time
- **Unclassified**: Assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question

Table 3.2-2 summarizes the attainment status of the Proposed Program area in Humboldt County with respect to the NAAQS and CAAQS.

Table 3.2-2. Federal and State Attainment Status of the Proposed Program Area in Humboldt County

Pollutant	NAAQS	CAAQS
Ozone	Attainment	Attainment
CO	Attainment	Attainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Attainment	Attainment
SO_2	Attainment	Attainment
NO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	No standard	Attainment
Visibility-Reducing Particles	No standard	Unclassified
Hydrogen Sulfide	No standard	Unclassified
Vinyl Chloride	No standard	Unclassified

Sources: USEPA 2019c; CARB 2019c.

Sensitive Receptors

Sensitive receptors are locations where human populations, especially children, seniors, and sick persons, are found and there is reasonable expectation of continuous human exposure according to the averaging period for ambient air quality standards. Typical sensitive receptors include residences, parks, hospitals, and schools. In general, sensitive receptors are concentrated in the cities and towns in Humboldt County. The city of Eureka, adjacent to Humboldt Bay within the Proposed Program area, contains concentrations of sensitive receptors. In addition, scattered rural residences are located throughout the undeveloped or rural lands of the Proposed Program area. Small communities, including Fields Landing and King Salmon, would be affected by the Proposed Program. Sensitive receptors are located within 1,000 ft of locally maintained dredging sites.

3.2.2 Regulatory Setting

The federal Clean Air Act (CAA) and its subsequent amendments form the basis for the nation's air pollution control effort. USEPA is responsible for implementing most aspects of the CAA. A key element of the CAA is the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, CARB is responsible for enforcing air pollution regulations and ensuring NAAQS and CAAQS are met. CARB, in turn, delegates regulatory authority for stationary sources and other air quality management responsibilities to local air agencies. The North Coast Unified Air Quality Management District (NCUAQMD) is the local air agency within the Proposed Program area. The following sections provide more detailed information on federal, state, and local air quality regulations that apply to the Proposed Program.

3.2.2.1 Federal

Clean Air Act

The CAA was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as

NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards would be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3.2-3 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

Table 3.2-3. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[1]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[2]	None[2]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine Particulate Matter ($PM_{2.5}$)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15 μg/m^3
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide[3]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day Average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Visibility-reducing Particles	8-hour	-[3]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: CARB 2016

[1] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[2] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for SIPs.

[3] The annual and 24-hour NAAQS for SO_2 only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.

[4] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.

ppm = parts per million; μg/m^3 = micrograms per cubic meter; SO_2 = sulfur dioxide

Non-road Diesel Rule

USEPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment used for program activities, including heavy-duty trucks and off-road construction equipment, would be required to comply with the emission standards.

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy Standards (CAFE) were first enacted in 1975 to improve the average fuel economy of cars and light duty trucks. The National Highway Traffic Safety Administrative (NHTSA) sets the CAFE standards, which are regulatory updated to require additional improvements in fuel economy. The standards were last updated in October 2012 to apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017 through 2025, and are equivalent to 54.5 miles per gallon. However, On August 2, 2018, NHTSA and USEPA proposed to amend the fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 (Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule). On September 19, 2019, USEPA and NHTSA issued a final action on the One National Program Rule, which is considered part 1 of the SAFE Vehicles Rule and a precursor to the proposed fuel efficiency standards. The One National Program Rule enables USEPA/NHTSA to provide nationwide uniform fuel economy and GHG vehicle standards, specifically by 1) clarifying that federal law preempts state and local tailpipe GHG standards, 2) affirming NHTSA's statutory authority to set nationally applicable fuel economy standards, and 3) withdrawing California's CAA preemption waiver to set state-specific standards.

USEPA and NHTSA published their decisions to withdraw California's waiver and finalize regulatory text related to the preemption on September 27, 2019 (84 *FR* 51310). California, 22 other states, the District of Columbia, and two cities filed suit against Part One of the SAFE Vehicles Rule on September 20, 2019 (*California et al. v. United States Department of Transportation et al.*, 1:19-cv-02826, U.S. District Court for the District of Columbia). On October 28, 2019, the Union of Concerned Scientists, Environmental Defense Fund (EDF), and other groups filed a protective petition for review after the federal government sought to transfer the suit to the D.C. Circuit (*Union of Concerned Scientists v. National Highway Traffic Safety Administration*). Opening briefs for the petition are currently scheduled to be completed on November 23, 2020. The lawsuit filed by California and others is stayed pending resolution of the petition.

USEPA and NTHSA published final rules to amend and establish national CO2 and fuel economy standards on April 30, 2020 (Part Two of the SAFE Vehicles Rule) (85 *FR* 24174 The revised rule changes the national fuel economy standards for light duty vehicles from 46.7 mpg to 40.4 mpg in future years. California, 22 other states, the District of Columbia filed a petition for review of the final rule on May 27, 2020. The fate of the SAFE Vehicles Rule remains uncertain in the face of pending legal deliberations.

3.2.2.2 State

California Clean Air Act

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor

to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that would require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 3.2-3.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into the SIP. In California, USEPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

Statewide Truck and Bus Regulation

Originally adopted in 2005, the on-road truck and bus regulation requires heavy trucks to be retrofitted with particulate matter filters. The regulation applies to privately and federally owned diesel-fueled trucks with a gross vehicle weight rating greater than 14,000 pounds. Compliance with the regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses would have 2010 model year engines or newer.

Statewide Advanced Clean Truck Regulation

CARB adopted the Advanced Clean Truck Regulation in June 2020 to accelerate a large-scale transition of zero-emission medium-and-heavy-duty vehicles. The regulation requires the sale of zero-emission medium-and-heavy-duty vehicles as an increasing percentage of total annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55 percent of Class 2b – 3 truck sales, 75 percent of Class 4 – 8 straight truck sales, and 40 percent of truck tractor sales. By 2045, every new medium-and-heavy-duty truck sold in California would be zero-emission. Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services to better ensure that fleets purchase available zero-emission trucks.

State Tailpipe Emission Standards

Like USEPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft operating in California. New equipment used for program activities would be required to comply with the standards.

Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The Proposed Program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer this program.

Toxic Air Contaminant Regulations

California regulates TACs primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 ("Hot Spots" Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The "Hot Spots" Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

CARB has identified diesel particulate matter (DPM) as a TAC and has approved a comprehensive Diesel Risk Reduction Plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM emissions and the associated health risk by 75 percent by 2010 and by 85 percent by 2020. The plan identifies 14 measures that CARB would implement over the next several years. The Proposed Program would be required to comply with any applicable diesel control measures from the Diesel Risk Reduction Plan.

3.2.2.3 Regional and Local

North Coast Unified Air Quality Management District

At the regional level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The Proposed Program area is located in the North Coast Air Basin (NCAB) and within the Proposed Program area, NCUAQMD is tasked with preparing regional programs and policies designed to improve air quality. The NCUAQMD has published a study titled *1995 PM_{10} Attainment Plan*, which presents available information about the nature and causes of exceedances of standards for respirable PM_{10}, and to identify cost-effective control measures that can be implemented to bring ambient PM_{10} levels down (NCUAQMD 2019).

In addition, NCUAQMD develops and adopts various rules to reduce emissions throughout the NCAB and implement the *1995 PM_{10} Attainment Plan* (Davis pers. comm.). The Proposed Program may be subject to the following district rules. This list of rules may not be all encompassing, as additional NCUAQMD rules may apply as specific program details are further developed.

- **Rule 104** (Prohibitions) establishes general limitations related to public nuisances, particulate matter, fugitive dust emissions, and sulfur oxide emissions.

- **Rule 110** provides for no net increase in emissions, pursuant to Section 40918 of the Health and Safety Code, from new or modified stationary sources that emit, or have the potential to emit, 25 tons per year or more of any nonattainment pollutant or its precursors.
- **Rule 300** (State Airborne Toxic Control Measures) incorporates California State Air Toxic Control Measures per Health and Safety Code Section 39666.

Humboldt Bay Harbor, Recreation, and Conservation District

Humboldt Bay Management Plan

The Humboldt Bay Harbor, Recreation, and Conservation District manages Humboldt Bay for the promotion of commerce, navigation, fisheries, and recreation, and the protection of natural resources. The Humboldt Bay Management Plan aims to ensure compliance with NCUAQMD Rules for particulates (Policy HTM-3) (Humboldt Bay Harbor, Recreation, and Conservation District 2007).

Humboldt County

Humboldt County General Plan

The HCGP's Air Quality Element, Circulation Element, and Land Use Element contain policies related to air quality that are relevant to the Proposed Program. The Air Quality Element identifies goals, policies, and standards that are meant to balance Humboldt County's actions regarding land use, circulation, and other issues with their potential effects on air quality (Humboldt County 2017). In summary, relevant policies are concerned with supporting NCUAQMD rules and the *1995 PM_{10} Attainment Plan*, buffering sensitive receptors from pollution sources, and controlling and reducing particulate matter emissions. Relevant policies are as follows.

- **AQ-P1. Reduce Length and Frequency of Vehicle Trips**. Reduce the length and frequency of vehicle trips through land use and transportation policies by encouraging mixed-use development, compact development patterns in areas served by public transit, and active modes of travel.
- **AQ-P2. Reduce Localized Concentrated Air Pollution**. Reduce or minimize the creation of "hot spots" or localized places of concentrated automobile emissions.
- **AQ-P4. Construction and Grading Dust Control**. Dust control practices on construction and grading sites would achieve compliance with NCAQMD fugitive dust emission standards.
- **AQ-P5. Air Quality Impacts from New Development**. During environmental review of discretionary permits, reduce emissions of air pollutants from new commercial and industrial development by requiring feasible mitigation measures to achieve the standards of the NCAQMD.
- **AQ-P6. Buffering Land Uses**. During environmental review of discretionary commercial and industrial projects, consider the use of buffers between new sources of emissions and adjacent land uses to minimize exposure to air pollution.
- **AQ-P7. Interagency Coordination**. Coordinate with the NCAQMD early in the permit review process to identify expected regulatory outcomes and minimize delays for projects involving:
    a.) CEQA environmental review;
    b.) Building demolition projects that may involve removal of asbestos-containing material subject to National Emission Standards for Hazardous Air Pollutants; and
    c.) Grading and mining operations subject to State Airborne Toxic Control Measures for naturally occurring asbestos.

Rely on the air quality standards, permitting processes, and enforcement capacity of the NCAQMD to define thresholds of significance and set adequate mitigations under CEQA to the maximum extent allowable.

City of Eureka

City of Eureka General Plan

The *City of Eureka 2040 General Plan* (EGP)'s Air Quality and Climate Change Section contains policies related to air quality that are relevant to the Proposed Program. The Air Quality and Climate Change Section identifies the role the City of Eureka can play to help the NCAB attain federal and state air quality standards, as well as protect city residents and business from impacts of air pollution (City of Eureka 2018). In summary, relevant policies are concerned with supporting NCUAQMD rules and the PM_{10} *Attainment Plan*, buffering sensitive receptors from pollution sources, and controlling and reducing particulate matter emissions. Relevant policies are as follows.

- **AQ 1.1. Regional Coordination**. Cooperate with the NCUAQMD, Redwood Coast Energy Authority, and other agencies to develop a consistent and effective approach to air quality planning and management, as well as to reduce greenhouse gas emissions and air quality impacts in the region.
- **AQ 1.3. New Development**. Require new discretionary developments to incorporate mitigation measures that utilize Best Management Practices and reduce emissions from both construction and operational activities, consistent with the NCUAQMD requirements and State regulations.
- **AQ 1.5. NCUAQMD Consultation**. Require consultation and coordination with the NCUAQMD for any projects that may have a potential health risk or may expose the public to hazardous air pollutants, as well as determining compliance with adopted rules and regulations.
- **AQ. 1.6. Buffering Land Uses**. Require buffering of uses, facilities, and operations that may produce toxic or hazardous air pollutants and/or odors (e.g., commercial and industrial uses, highways, etc.) to provide an adequate distance from sensitive receptors (e.g., housing and schools), consistent with CARB recommendations.
- **AQ 1.7. Large Employers**. Encourage large employers to allow for flexibility in the work schedule that would reduce emissions of air pollutants, such as more alternative schedules and telecommuting, in addition to providing incentives for public transit and carpooling.

City of Eureka Municipal Code

The City of Eureka Municipal Code describes performance standards related to odor, requiring that any process that creates or emits any odors, dust, and fumes must not be found objectionable by the Planning Commission (Chapters 155 and 156).

City of Arcata

The AGP's Air Quality Element contains policies related to air quality that are relevant to the Proposed Program. The Air Quality Element identifies several policies that would improve air quality in the city and support NCUAQMD rules (City of Arcata 2008). Relevant policies are as follows.

- **AQ-2b:** Implement transportation measures to reduce vehicle trips, miles traveled, and air pollutant emissions.
- **AQ-2e:** Recognize that poor air quality is caused by the combination of high pollutant emissions and meteorological conditions which do not allow for dispersal of pollutants.

- **AQ-2f: Enforce air quality control measures and monitoring at construction sites**. Construction emissions would be controlled because, although they are temporary in nature, they can often be the greatest air quality impact of a project. Require the following control measures for construction activities when necessary:
    - Water all active construction areas twice per day and use erosion control measures to prevent water runoff containing silt and debris from entering the storm drain system.
    - Cover trucks hauling soil, sand, and other loose material.
    - Pave, water, or apply non-toxic soil stabilizers on unpaved access roads and parking areas.
    - Sweep paved access roads and parking areas daily.
    - Sweep streets daily if visible material is carried onto adjacent public streets.
- **AQ-3a Air quality standards and monitoring**: Identify potential emission sources of airborne toxins from mobile and stationary sources.
- **AQ-3c Cooperation in enforcement activities and programs**: Cooperate with the NCUAQMD in implementing and enforcing the district's rules and programs.
- **AQ-4a Odor Controls**: Identify potential sources of noxious odors and regulate those sources to avoid adverse effects on adjacent sensitive receptors. Noxious odors are defined as foul smelling airborne emissions that are sufficiently concentrated to cause physical discomfort to those inhabiting adjacent areas. Regulations imposed to reduce effects of these odors would include limiting hours for odor emissions, periodic monitoring, and filtering to reduce concentrations.

3.2.3 Impacts Analysis

This section describes the environmental impacts on air quality that could result from implementation of the Proposed Program.

3.2.3.1 Methods for Analysis

This section evaluates the air quality effects that would result from the Proposed Program and alternatives. Air quality impacts associated with the alternatives analyzed in this section could result from implementation of the Proposed Program through the generation of criteria pollutants, TAC, and odor emissions resulting from construction (e.g., construction of temporary dewatering basins and associated facilities) and operation (e.g., dredging, material processing, sediment transport to material processing and beneficial-use sites). These potential impacts would occur on a temporary basis during construction and on an annual basis during operational activities.

The air quality analysis focuses on how Proposed Program emissions compare to those generated under existing conditions and whether new emission sources under the Proposed Program would result in air quality impacts. A qualitative assessment of impacts was performed for Proposed Program activities that would be similar under existing conditions and a quantitative assessment of impacts was performed for Proposed Program activities that would result in new emission sources. Where applicable and available, quantified emissions were then compared to air district recommended thresholds.[3]

[3] Use of dredged sediments at beneficial sites was not analyzed as specific details are unavailable and would be too speculative to estimate at this time; therefore, such activities are outside the scope of the CEQA analysis and would require their own environmental analyses.

Construction and operational activities would occur within Humboldt County and NCUAQMD jurisdiction. Emissions from marine dredging and marine vessels during dredged sediment transport would not change, relative to existing conditions. As such, emissions from dredging activities are assumed to remain at current levels. Criteria pollutant emissions from equipment use during new project activities were estimated using emission factors from the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Equipment types, quantities, and operating details were provided by the District. Criteria pollutant emissions from new on-road vehicles (e.g., employee vehicles, haul trucks) operating within the air basin while traveling to and from the project site were evaluated using CARB's EMFAC2017 emissions model (version 1.02) and data provided by the District. Where data was unavailable, CalEEMod default data (e.g., equipment load factor, horsepower, employee trip length) were used. Per the District, Proposed Program activities would not all occur concurrently. As such, daily criteria pollutant emissions were estimated for each program activity and only summed during overlapping activities to determine the maximum daily emissions. There are three sets of overlapping activities and their emissions are presented in Table 3.2-5 through Table 3.2-7. The modeling inputs and calculations are provided in Appendix C.

3.2.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below:

- Conflict with or obstruction of implementation of the applicable air quality plan
- A cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard
- Exposure of sensitive receptors to substantial pollutant concentrations
- Other emissions (such as those leading to odors) adversely affecting a substantial number of people

Attainment of State and Federal Ambient Air Quality Standards

Appendix G of the State CEQA Guidelines indicates that, where available, the significance criteria established by local air districts may be relied on to evaluate whether implementation of a project would conflict with attainment or maintenance of the state and federal ambient air quality standards. NCUAQMD has not established CEQA significance criteria to determine the significance of impacts that would result from projects such as the Proposed Program. However, NCUAQMD Rule 110 identifies thresholds for new or modified stationary sources, which represent levels above which emissions from these sources could conflict with regional attainment efforts. NCUAQMD's thresholds from Rule 110 are presented in Table 3.2-4.

Table 3.2-4. NCUAQMD Regional Air Quality Significance Threshold

	Significance Thresholds	
Pollutant	Daily (pounds per day)	Annual (tons per year)
ROG	50	40
CO	500	100
PM_{10}	80	15
$PM_{2.5}$	50	10
SO_X	80	40
NO_X	50	40

Source: NCUAQMD 2015.
Notes: NCUAQMD has developed a threshold for lead. However, lead emissions are not associated with the Proposed Program and the threshold is therefore not shown in this table.

The thresholds presented in Table 3.2-4 are based on the emissions levels identified under the New Source Review (NSR) program, which is a permitting program established by Congress as part of the CAA Amendments of 1990 to ensure that air quality is not significantly degraded by new sources of emissions. The NSR program requires stationary sources to receive permits before construction and/or use of equipment. By permitting large stationary sources, the NSR program ensures that new emissions would not slow regional progress toward attaining the NAAQS. Although the NSR thresholds are related to stationary-source emissions, they represent emissions levels required to attain the NAAQS based on the regional attainment status of Humboldt County. Therefore, to support the impact determinations for Impacts AQ-1 and AQ-2, this analysis assesses the Proposed Program's construction-related and operational emissions using the NSR thresholds listed above. Accordingly, construction and operational activities could conflict with applicable air quality plans or result in a cumulatively considerable contribution to a cumulative impact if maximum daily or annual emissions exceed any of the thresholds presented in Table 3.2-4.

Human Health Concerns

The California Supreme Court's decision in *Sierra Club v. County of Fresno* (6 Cal. 5th 502) (hereafter referred to as the *Friant Ranch Decision*) reviewed the long-term, regional air quality analysis contained in the environmental impact report for the proposed Community Plan Update and Friant Ranch Specific Plan (Friant Ranch Project). The Friant Ranch Project is a 942-acre master plan development in unincorporated Fresno County within the San Joaquin Valley Air Basin, an air basin currently in nonattainment under the NAAQS and CAAQS for ozone and $PM_{2.5}$. The Court found that the environmental impact report's air quality analysis was inadequate because it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The Court's decision clarifies that environmental documents must attempt to connect a project's air quality impacts on specific health effects or explain why it is not technically feasible to perform such an analysis.

As discussed in 3.2.1, *Environmental Setting*, all criteria pollutants that would be generated by the Proposed Program are associated with some form of health risk (e.g., asthma, lower respiratory problems). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. As discussed above, the primary criteria pollutants of concern generated by the Proposed Program are

ozone precursors (ROG and NO_X), CO, PM (including DPM), and SO_2. Ozone is considered a regional criteria pollutant, whereas CO and SO_2 are localized pollutants. PM can be both a local and a regional pollutant, depending on its composition. The following sections discuss thresholds and analysis considerations for regional and local project-generated criteria pollutants with respect to their human health implications.

Regional Project-Generated Criteria Pollutants

Adverse health effects induced by regional criteria pollutant emissions generated by the Proposed Program (ozone precursors and PM) are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (ROG and NO_X) contribute to the formation of ground-borne ozone on a regional scale. Emissions of ROG and NO_X generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollution may be transported over long distances or formed through atmospheric reactions. As such, the magnitude, and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project. Moreover, exposure to regional air pollution does not guarantee that an individual would experience an adverse health effect—as discussed above, there are large individual differences in the intensity of symptomatic responses to air pollutants. These differences are influenced, in part, by the underlying health condition of an individual, which cannot be known.

As discussed above, NCUAQMD has developed NSR thresholds that would not interfere with the attainment or maintenance of ambient air quality standards (Rule 110). The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. Although recognizing that air quality is cumulative problem, NCUAQMD typically considers projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor in nature and to not adversely affect or interfere with air quality such that the NAAQS or CAAQS would be exceeded. Emissions generated by the Proposed Program could increase photochemical reactions and the formation of tropospheric ozone and secondary PM, which, at certain concentrations, could lead to increased incidence of specific health consequences. Although these health effects are associated with ozone and particulate pollution, the effects are a result of cumulative and regional emissions.

Localized Project-Generated Criteria Pollutants, Air Toxics (DPM), and Odors

Localized pollutants generated by a project are deposited and potentially affect populations near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts on adjacent sensitive receptors. Locally adopted thresholds and analysis procedures for the localized pollutants of concern associated with the Proposed Program are identified below.

Carbon Monoxide, Particulate Matter, and Sulfur Dioxide

NCUAQMD Rule 110 identifies significance thresholds for CO, PM, and SO_X (see Table 3.2-4). CO, PM, and SO_X emissions below these thresholds would not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. Accordingly, program activities that generate CO, PM, and SO_X emissions below NCUAQMD's thresholds as presented in Table 3.2-4 would not contribute to a

significant localized air quality impact. On-road mobile sources could result in a CO hot spot if resulting emissions exceed ambient air quality standards for CO.

Toxic Air Contaminants

NCUAQMD has not adopted separate thresholds to evaluate receptor exposure to DPM emissions,, but recommends the use of the California Air Pollution Control Officers Association's (CAPCOA's) *Health Risk Assessments for Proposed Land Use Projects* to evaluate and reduce impacts. CAPCOA presents the "significant risk" thresholds utilized by the majority of the air districts in the state, which include excess cancer risk as exceeding 10 in 1 million and non-carcinogenic TACs resulting in a hazard index greater than 1 for the maximum exposed individual (CAPCOA 2009). For the purposes of this analysis, CAPCOA's guidance thresholds are used to support the impact determination under Impact AQ-3.

Asbestos

NCUAQMD operates a registration program for all construction, grading, quarrying, and surface mining operations within its jurisdiction. An applicant must register with NCUAQMD before engaging in specific activities covered by the airborne toxics control measure regulation for naturally occurring asbestos. As part of the registration process, the applicant may be required to submit a dust control plan. However, projects are exempt if they are located in an area not designated as an ultramafic rock unit area by the California Geological Survey (CGS). The Proposed Program area is not within an area of mapped ultramafic rock, and there are no mapped ultramafic rock unit areas in the vicinity (California Department of Conservation 2000). Therefore, the Proposed Program is exempt from NCUAQMD's registration program.

Odors

There are no quantitative thresholds related to odors. The potential for significant odor impacts under Impact AQ-4 is addressed qualitatively in the context of compliance with NCUAQMD Rule 104 (Public Nuisance).

3.2.3.3 Impacts and Mitigation Measures

Impact AQ-1: Would the Proposed Program Conflict with or Obstruct Implementation of the Applicable Air Quality Plan?

Proposed Program

As shown in Table 3.2-2, Humboldt County is currently designated as a nonattainment area for the state PM_{10} standard. NCUAQMD's *1995 PM_{10} Attainment Plan* presents control strategies to reduce PM_{10} emissions in the county, including public transit improvements, rideshare programs, park and ride lots, traffic flow improvements, best management practices (BMPs) for the disposal of vegetation, and development and implementation of incentives programs. These control strategies are primarily focused on land use development projects and are not directly applicable to the Proposed Program. However, the Proposed Program, which aims to increase the beneficial use of dredged sediments, would not conflict with, or impede these strategies. In addition, the Proposed Program is not anticipated to have direct effects on population or regional housing and is not anticipated to result in substantial new regional employment opportunities, as dredging and sediment transport activities in the area are currently occurring. The Proposed Program would also

comply with all applicable regulatory standards (e.g., NCUAQMD Rule 104, Fugitive Dust Emissions) as required by NCUAQMD to support the attainment plan. For instance, compliance with NCUAQMD Rule 104 may include, but is not limited to, covering open-bodied trucks when used for transporting materials likely to give rise to airborne dust and using water or chemicals for control of dust.

The types of emissions that could result from the Proposed Program have been analyzed under Impact AQ-2. As described under Impact AQ-2, emissions associated with the Proposed Program would not exceed applicable NCUAQMD thresholds. Therefore, the Proposed Program would not conflict with the regional emission strategies, in addition to socioeconomic assumptions, used to develop the attainment plan, and would not conflict with or obstruct with implementation of applicable air quality plans.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, would not be inconsistent with the control strategies outlined in NCUAQMD's *1995 PM_{10} Attainment Plan*. Alternative 1 likewise is not anticipated to have direct effects on population or regional housing and would continue to comply with applicable regulatory standards. The types of emissions generated by Alternative 1 would be the same as those described above for the Proposed Program and would not exceed applicable NCUAQMD thresholds (as described under Impact AQ-2). Therefore, Alternative 1 would not conflict with or obstruct with implementation of applicable air quality plans.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, would not be inconsistent with the control strategies outlined in NCUAQMD's 1995 PM10 Attainment Plan. Alternative 2 likewise is not anticipated to have direct effects on population or regional housing and would continue to comply with applicable regulatory standards. The types of emissions generated by Alternative 2 would be the same as those described above for the Proposed Program and would not exceed applicable NCUAQMD thresholds (as described under Impact AQ-2). Therefore, Alternative 2 would not conflict with or obstruct with implementation of applicable air quality plans.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal through either suction or clamshell bucket dredging. Dredge material processing sites would not be constructed, and no construction emissions would result. Dredged sediments would not be processed or stockpiled; rather, dredged sediments would be transported directly to beneficial-use sites via pipelines or barges for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities would still be a subset of the activities pursued by the Proposed Program, with the exception that no construction emissions would occur. Operational emissions associated with material processing also would not occur.

Similar to the Proposed Program, Alternative 3 would not be inconsistent with the control strategies outlined in NCUAQMD's *1995 PM_{10} Attainment Plan*. Alternative 3 likewise is not anticipated to have direct effects on population or regional housing, would continue to comply with applicable regulatory standards, and would not exceed applicable NCUAQMD thresholds (as described under Impact AQ-2). Therefore, Alternative 3 would not conflict with or obstruct with implementation of applicable air quality plans.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., sediment transport) activities would occur. There would be no increase in emissions, population, or employment relative to existing conditions and no additional air quality impacts are anticipated under the No-Project Alternative. Therefore, the No-Project Alternative would not conflict with or obstruct with implementation of applicable air quality plans.

Impact AQ-2: Would the Proposed Program Result in a Cumulatively Considerable Net Increase of any Criteria Pollutant for which the Project Region Is a Nonattainment Area for an Applicable Federal or State Ambient Air Quality Standard?

Proposed Program

Activities under existing conditions are assumed to include the following: 1) dredging and 2) transport of dredge sediments to HOODS. The Proposed Program involves 1) dredging, 2) transport of dredge sediments to material processing facilities or beneficial reuse sites, 3) construction of material processing facilities, 4) material processing, and 5) transport of processed sediments. Program activities could result in the generation of criteria pollutants from on-road vehicle and marine vessel movement, use of mobile and stationary equipment, and excavation and earthmoving (e.g., dredging, material transport, dewatering, transport of processed sediment). The following sections generally describe the anticipated construction and operational emissions under existing conditions and the Proposed Program.

The permitted annual dredging quantity (100,000 cy) would be the same under the Proposed Program as existing conditions. As such, emissions from dredging activities are assumed to remain at current levels with no new or worsening air quality impacts.

The Proposed Program is anticipated to reduce the use of marine vessels for dredged sediment transport. Under existing conditions, materials are transported approximately 3.25 miles to the HOODS facility. Under the Proposed Program, dredged sediments would no longer be barged out to the Humboldt Open Ocean Disposal Site; rather, dredged sediments would be transported for processing directly to the three material processing sites (i.e., existing site at Samoa Lagoons and two new processing sites at Redwood Marine Terminal II and Fields Landing Boatyard). All material processing facilities and beneficial reuse sites would be within 3.25 miles, with many as close as 1 mile. As such, emissions from marine vessels are assumed to remain at or below current levels. Under the Proposed Program, transport of dredged sediments would require use of pumps and/or excavators (i.e., 1 excavator operating 8 hours per day, 2 pumps operating 5 hours per day) to offload materials to processing facilities or beneficial reuse sites. These pumps and/or excavators

and associated employees (e.g., 6 daily employees) would be a new emissions source associated with the transport of dredged sediments, generating exhaust emissions (e.g., ROG, NO_X, CO, PM, SO_X) from fuel combustion in equipment and worker vehicles. Anticipated emissions from these activities are shown in Table 3.2-5.

Table 3.2-5. Emissions from Operational Transport of Dredge Sediment to Processing Facilities/Beneficial Reuse Site

Pollutant	Daily (pounds per day)	Threshold (pounds/day)	Exceed Threshold?
ROG	2.3	50	No
CO	13.6	500	No
PM_{10}	0.8	80	No
$PM_{2.5}$	0.7	50	No
SO_X	<0.1	80	No
NO_X	20.9	50	No

Source: See Appendix C.

Construction of material processing facilities would require minor amounts of off-road equipment and on-road vehicles. The Proposed Program would construct temporary dewatering basins and associated facilities (i.e., 1 excavator at 8 hours per day per site) at two new material processing sites. Construction of the basins would require minimal site preparation (e.g., clearing) and structure construction (e.g., k-rail, impermeable liner, and associated pipes). The size of the basin to be constructed could vary depending on the expected volume of dredge material to be processed during a dredging event. Once dredge material has been processed, the basin and associated facilities could potentially be deconstructed and then reconstructed on an as-needed basis. These construction activities would generate exhaust emissions from fuel combustion in construction equipment and worker vehicles. Material processing would require yard equipment (i.e., 1 dozer and 1 pump operating 5 hours per day per site) and employees (e.g., 6 daily employees during construction and operational activities). Anticipated emissions from these activities are shown in Table 3.2-6.

Table 3.2-6. Emissions from the Construction of Material Processing Facilities and Operational Material Processing

Pollutant	Daily (pounds per day)	Threshold (pounds/day)	Exceed Threshold?
ROG	4.3	50	No
CO	23.5	500	No
PM_{10}	1.9	80	No
$PM_{2.5}$	1.7	50	No
SO_X	<0.1	80	No
NO_X	42.9	50	No

Source: See Appendix C.

Operational activities would include sediment transport (i.e., up to 500 total cy per day) to material processing and beneficial-use sites via haul trucks for use (e.g., for beach replenishment, diked shoreline structures, diked former tidelands). Work trucks and employee vehicles (i.e., 10-cy trucks for up to 50 truck trips per day at 30 miles per trip, and 6 daily employees) would generate exhaust emissions during these activities. Fugitive dust would be generated by material movement (e.g.,

excavation, truck loading) and by vehicles traveling over roadways. Anticipated emissions from these activities are shown in Table 3.2-7.

Table 3.2-7. Emissions from the Operational Transport of Processed Sediments

Pollutant	Daily (pounds per day)	Threshold (pounds/day)	Exceed Threshold?
ROG	0.9	50	No
CO	2.6	500	No
PM_{10}	37.5	80	No
$PM_{2.5}$	6.2	50	No
SO_X	<0.1	80	No
NO_X	19.3	50	No

Source: See Appendix C.

As shown in Table 3.2-5 through

Table 3.2-7, transport of dredge sediments to material processing facilities or beneficial reuse sites, construction and operation of material processing, and transport of processed sediments under the Proposed Program could result in increased emissions, relative to existing conditions. However, not all new activities under the Proposed Program would occur concurrently. Rather, they would occur at different times from one another. For instance, transport of dredged sediments to dewatering basins or beneficial reuses sites (Table 3.2-5) would occur separately from activities such as material processing (Table 3.2-6) and on-road haul truck transport (

Table 3.2-7). As such, emissions presented in Table 3.2-5 through

Table 3.2-7 represent the maximum daily criteria pollutants generated by new sources. As shown, new emission sources under the Proposed Program would not exceed applicable NCUAQMD thresholds. In addition, any emissions increase associated with new emissions sources would be minor relative to the larger reductions anticipated with reduced marine vessel activity under the Proposed Program as marine vessels are more emission intensive (e.g., more polluting) than off-road equipment and on-road vehicles. Therefore, given the above, the Proposed Program would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard. This impact would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would include similar types of construction and operational activities as those of the Proposed Program, resulting in similar, less-than-significant air quality impacts as those under the Proposed Program.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would include similar types of construction and operational activities as those of the Proposed Program, resulting in similar less-than-significant air quality impacts as those under the Proposed Program.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

No construction activities would occur under Alternative 3. Relative to the Proposed Program, operational activities and emissions under Alternative 3 would be reduced. Impacts would be less than significant.

No-Project Alternative

The No-Project Alternative would not result in a change in emissions relative to existing conditions. No construction (e.g., dewatering basins) or new or additional operational (e.g., sediment material transport, sediment material, trucking of processed sediment material) activities would occur under the No-Project Alternative. Therefore, the No-Project Alternative would not result in a cumulatively considerable net increase of any criteria pollutant, relative to existing conditions. There would be no impact.

Impact AQ-3: Would the Proposed Program Expose Sensitive Receptors to Substantial Pollutant Concentrations?

Proposed Program

Under the Proposed Program, heavy-duty equipment, vehicles, and harbor craft required for construction and operational activities would generate DPM and localized criteria pollutants that could expose nearby receptors to increased health risks. Health risks from DPM exposure are generally assessed over a period of 30 years. The specific duration of construction at each is anticipated to be far less than the 30-year duration typically associated with chronic health impacts. For example, construction of temporary dewatering basins may require between a few days to a couple of weeks at any given site depending on factors such as the dredged sediment volume to be processed. Routine operations may occur daily, but emissions associated with this type of activity are typically from employee and work trucks, which are expected to be relatively minor. Emissions from more intensive activities, such as dredging and material processing in Humboldt Bay and the Proposed Program area, would occur on an as-needed basis, annually, or even less frequently. In addition, most of the activities would occur in or adjacent to land with suitable land use designations and zoning for infrastructure (e.g., industrial). However, similar to existing conditions, some locally maintained dredging sites would remain close (less than 1,000 feet) to sensitive receptors. Emissions dissipate as a function of distance; therefore, pollutant concentrations and associated health risks would be lower as distance to program activities increases. Under the Proposed Program, the same receptors would be exposed to DPM and localized criteria pollutant emissions.

As discussed above, health risks from exposure to increased regional air pollution are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). Technical limitations of existing models to correlate project-level regional emissions to specific health consequences are recognized by air quality management districts throughout the state, including the San Joaquin Valley Air Pollution Control District and South Coast Air Quality Management District, which provided amici curiae briefs for the Friant Ranch legal proceedings (San Joaquin Valley Air Pollution Control District 2015; South Coast Air Quality Management District 2015). The Sacramento Metropolitan Air Quality Management District (2019) also acknowledges that "neither the Sac Metro Air District nor any other air district currently have methodologies that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a proposed project's mass

emissions." Ultimately, given these technical modeling limitations and because the extent of construction and operational activities is not known at this time, a correlation of project-generated regional and local emissions (including DPM) to specific health risks is not possible.

As described under Impact AQ-2, Proposed Program emissions would not exceed applicable NCUAQMD thresholds and, as such, the Proposed Program not anticipated to result in unsafe concentrations of criteria pollutants leading to significant health risks. Therefore, the Proposed Program would not expose sensitive receptors to substantial pollutant concentrations and impacts would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would include the same types of construction and operational activities as those of the Proposed Program, resulting in similar, less-than-significant health risk impacts on sensitive receptors.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would include the same types of construction and operational activities as those of the Proposed Program, resulting in similar, less-than-significant health risk impacts on sensitive receptors.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

No construction activities would occur under Alternative 3. Relative to the Proposed Program, operational activities and emissions under Alternative 3 would be reduced. However, emissions from sediment transport activities would still occur and be similar in nature, resulting in resulting in similar, less-than-significant health risk impacts on sensitive receptors.

No-Project Alternative

The No-Project Alternative would not result in a change in emissions relative to existing conditions. No construction (e.g., dewatering basins) or new or additional operational (e.g., dewatering, sediment transport, beneficial use) activities would occur under the No-Project Alternative. Therefore, the No-Project Alternative would not expose sensitive receptors to any increased pollutant concentrations, relative to existing conditions. There would be no impact.

Impact AQ-4: Would the Proposed Program Result in Other Emissions (such as those Leading to Odors) Adversely Affecting a Substantial Number of People?

Proposed Program

Construction activities would require the use of diesel-powered equipment and haul trucks. Odors from diesel-powered construction equipment and vehicles would be temporary and intermittent and would dissipate rapidly as a function of distance. Dredging activities may also generate odors from diesel equipment, vehicles, and harbor craft during routine operations. Sediment transport to beneficial-use sites may also generate odors from diesel equipment and vehicles on local roadways, but these emissions would be minor. Potential odors generated during construction would be addressed through mandatory compliance with NCUAQMD Rule 104. Therefore, it is not anticipated that construction activities would emit objectionable odors adversely affecting a substantial number of people.

CARB (2005) acknowledges that odors from commercial activities are the most common sources of odor complaints and public concern. They specifically identify the following land uses as having the highest potential for odor emissions:

- Sewage treatment plants
- Landfills
- Recycling facilities
- Petroleum refineries
- Biomass operations
- Auto body shops
- Coating operations
- Fiberglass manufacturing
- Foundries
- Rendering plants
- Livestock operations

Although not specifically listed above, material processing sites (e.g., dewatering and stockpiling of dredged sediments) have the potential to generate odors from natural processes. The Proposed Program would result in new odor sources at Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard. The decay of organic material in dredged sediments can generate gases, specifically hydrogen sulfide, which is commonly described as having a foul or "rotten egg" smell. The intensity of odors generated at the material processing sites depends on a number of variables, including the volume of dredge and stockpiled material, the types of dewatering processes, and facility controls. Weather conditions (e.g., wind speed, wind direction, ambient recapture) also affect the dispersion of odors and whether they may be perceptible at specific receptor locations.

Material processing sites would be located within 1,000 ft of sensitive receptors. For instance, the proposed Fields Landing Boatyard material processing site is approximately 600 ft from residences. In addition, winds in the Proposed Program area are blowing from the northwest to the southwest toward residential receptors. However, implementation of Mitigation Measure AQ-1, in conjunction with compliance with NCUAQMD Rule 104, would reduce odor emissions to less-than-significant levels.

AQ-1: Implement Odor-Control Mechanisms and Odor Complaint Monitoring Program at Material Processing Sites and During Sediment Transport

As needed to control odor, material processing sites and sediment transport must include odor-control mechanisms and implement an odor complaint monitoring program. Odor control should target the primary odor sources: material processing and stockpiling activities. Odor-control technologies may include but are not limited to covered sediment handling areas (e.g., with tarps), and covering sediment during transport. As needed, processing sites would prohibit the stockpiling of dewatered material in outdoor open areas. The monitoring program would consist of a standard complaint logging procedure, including date, time, and origin of compliant along with a description of the atmospheric conditions present during the time of the complaint. The complaints would be followed by an inspection of the processing site and sediment

transport vehicles and procedures to determine the source of the nuisance odor and any actions that should be taken to remedy the problem.

Alternative 1 – Suction Dredging Only

Alternative 1 would include the same types of construction and operational activities as those of the Proposed Program and emissions (such as those leading to odors) would be a subset of the emissions under the Proposed Program described above. Implementation of AQ-1, in conjunction with compliance with NCUAQMD Rule 104, would reduce odor emissions to less-than-significant levels.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would include the same types of construction and operational activities as those of the Proposed Program and emissions (such as those leading to odors) would be a subset of the emissions under the Proposed Program described above. Implementation of AQ-1, in conjunction with compliance with NCUAQMD Rule 104, would reduce odor emissions to less-than-significant levels.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

No construction activities would occur under Alternative 3. Relative to the Proposed Program, operational activities, and emissions (such as those leading to odors) under Alternative 3 would be reduced. However, emissions from sediment transport activities would still occur and be a subset of the emissions under the Proposed Program described above. Implementation of AQ-1, in conjunction with compliance with NCUAQMD Rule 104, would reduce odor emissions to less-than-significant levels.

No-Project Alternative

The No-Project Alternative would not result in a change in emissions relative to existing conditions. No construction (e.g., dewatering basins) or new or additional operational (e.g., dredging, dewatering, sediment transport) activities would occur under the No-Project Alternative. Therefore, the No-Project Alternative would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. There would be no impact.

3.3 Greenhouse Gas Emissions

This section provides an overview of the regulatory framework applicable to greenhouse gas (GHG) emissions at the statewide, regional, and local scales and evaluates the potential environmental impacts associated with implementation of the Proposed Program. GHG emissions refer to airborne pollutants that affect global climate conditions. These gaseous pollutants have the effect of trapping heat in the atmosphere, and consequently altering weather patterns and climatic conditions over long timescales. Consequently, unlike other resource areas that are primarily concerned with localized project impacts (e.g., within 1,000 ft of the project site), the global nature of climate change requires a broader analytic approach. Accordingly, whereas the GHG analysis focuses on emissions generated from program activities in the Plan Area, the climate change study area includes the global context. Please refer to Section 3.2, *Air Quality*, for a discussion of criteria pollutants and air quality.

3.3.1 Environmental Setting

3.3.1.1 Global Climate Change

The process known as the "greenhouse effect" keeps the atmosphere near Earth's surface warm enough for the successful habitation of humans and other life forms. The greenhouse effect is created by sunlight that passes through the atmosphere. Some of the sunlight striking Earth is absorbed and converted to heat, which warms the surface. The surface emits a portion of this heat as infrared radiation, some of which is re-emitted toward the surface by GHGs. Human activities that generate GHGs increase the amount of infrared radiation absorbed by the atmosphere, thus enhancing the greenhouse effect and amplifying the warming of Earth.

Increases in fossil fuel combustion and deforestation have exponentially increased concentrations of GHGs in the atmosphere since the Industrial Revolution (IPCC 2018). Rising atmospheric concentrations of GHGs in excess of natural levels result in increasing global surface temperatures—a process commonly referred to as *global warming*. Higher global surface temperatures, in turn, result in changes to Earth's climate system, including increased ocean temperature and acidity, reduced sea ice, variable precipitation, and increased frequency and intensity of extreme weather events (IPCC 2018). Large-scale changes to Earth's system are collectively referred to as "climate change."

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC estimates that human-induced warming reached approximately 1 degree Celsius (°C) above pre-industrial levels in 2017, increasing at 0.2°C per decade. Under the current nationally determined contributions of mitigation from each country until 2030, global warming is expected to rise to 3°C by 2100, with warming to continue afterwards (IPCC 2018). Large increases in global temperatures could have substantial adverse effects on the natural and human environments worldwide and in California.

3.3.1.2 Greenhouse Gases

The principle anthropogenic (human-made) GHGs contributing to global warming are CO_2, methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds, including sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic sources.

The primary GHGs of concern associated with the Proposed Program are CO_2, CH_4, and N_2O. Principal characteristics of these pollutants are discussed below.

- **Carbon dioxide** enters the atmosphere through fossil fuels (oil, natural gas, and coal) combustion, solid waste decomposition, plant and animal respiration, and chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or *sequestered*) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.

- **Nitrous oxide** is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) methodology defined in IPCC reference documents. IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalent (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a global warming potential of 1 by definition).

Table 3.3-1 lists the global warming potential of CO_2, CH_4, and N_2O; their lifetimes; and their abundance in the atmosphere.

Table 3.3-1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gases	Global Warming Potential (100 years)	Lifetime (years)
CO_2	1	--[a]
CH_4	25	12
N_2O	298	114

Source: CARB 2019d
[a] CARB has not identified a lifetime for CO_2.
CH_4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide

All GWPs used for CARB's GHG inventory and to assess attainment of the state's 2020 and 2030 reduction targets are considered over a 100-year timeframe (as shown in Table 3.3-1). However, CARB recognizes the importance of SLCPs and reducing these emissions to achieve the state's overall climate change goals. SLCPs have atmospheric lifetimes on the order of a few days to a few decades, and their relative climate forcing impacts, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2 (California Air Resources Board 2017).

Recognizing their short-term lifespan and warming impact, SLCPs are measured in terms of CO_2e using a 20-year time period. The use of GWPs with a time horizon of 20 years better captures the importance of the SLCPs and gives a better perspective on the speed at which SLCP emission controls would impact the atmosphere relative to CO_2 emission controls. The SLCP Reduction Strategy addresses the three primary SLCPs: CH_4, hydrofluorocarbon gases, and anthropogenic black carbon. Methane has lifetime of 12 years and a 20-year GWP of 72. Hydrofluorocarbon gases, which would not be generated by the Proposed Program, have lifetimes of 1.4 to 52 years and a 20-year GWP of 437 to 6,350. Anthropogenic black carbon has a lifetime of a few days to weeks and a 20-year GWP of 3,200 (CARB 2017a).

3.3.1.3 Greenhouse Gas Reporting

A GHG inventory is a quantification of all GHG emissions and sinks[4] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 3.3-2 outlines the most recent global, national, statewide, and county GHG inventories

[4] A *GHG sink* is a process, activity, or mechanism that removes a GHG from the atmosphere.

to help contextualize the magnitude of potential project-related emissions. There is no GHG inventory specifically for the Proposed Program area. Mobile sources (e.g., vehicle trips) generate the largest amounts of GHG emissions in the Proposed Program area. Other smaller sources of GHG emissions in the Proposed Program area include dredging, material processing, and sediment transport.

Table 3.3-2. Global, National, State, and Local Greenhouse Gas Emissions (metric tons per year)

Emissions Inventory	CO_2e (rounded)
2010 IPCC Global	52,000,000,000
2017 USEPA National	6,457,000,000
2017 CARB State	424,100,000
2015 Humboldt County	822,509
2015 City of Arcata	219,447

Sources: IPCC 2014; EPA 2019; CARB 2019b; City of Arcata 2017; Humboldt County n.d.
CARB = California Air Resources Board; CO_2e = carbon dioxide equivalent; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; IPCC = Intergovernmental Panel on Climate Change

3.3.1.4 Potential Climate Change Effects

Climate change is a complex process that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change would result in sea level rise (both globally and regionally) as well as changes in climate and rainfall, among other effects, there remains uncertainty about characterizing precise local climate characteristics and predicting precisely how various ecological and social systems would react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent would take further research to define. Specifically, significant impacts from global climate change worldwide and in California include the following:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in atmospheric water vapor, due to the atmosphere's ability to hold more water vapor at higher temperatures (California Natural Resources Agency 2018).
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (IPCC 2018).
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2018).
- Declining Sierra Mountains snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (California Natural Resources Agency 2018).
- Increasing the number of days conducive to ozone formation (e.g., clear days with intense sun light) by 25 percent to 85 percent (depending on the future temperature scenario) by the end of the twenty-first century in high ozone areas, including Southern California (California Natural Resources Agency 2018).

- Increasing the potential for erosion of California's coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level (California Natural Resources Agency 2018).
- Exacerbating the severity of drought conditions in California such that durations and intensities are amplified, ultimately increasing the risk of wildfires and consequential damage incurred (California Natural Resources Agency 2018).
- Under changing climate conditions, agriculture is projected to experience lower crop yields due to extreme heat waves, heat stress and increased water needs of crops and livestock (particularly during dry and warm years), and new and changing pest and disease threats (California Natural Resources Agency 2018).
- The impacts of climate change, such as increased heat-related events, droughts, and wildfires, pose direct and indirect risks to public health, as people would experience earlier death and worsening illnesses. Indirect impacts on public health include increased vector-borne diseases, stress and mental trauma due to extreme events and disasters, economic disruptions, and residential displacement (California Natural Resources Agency 2018).

3.3.2 Regulatory Setting

3.3.2.1 Federal

There is currently no federal overarching law specifically related to climate change or the reduction of GHG emissions. Under the Obama Administration, USEPA had been developing regulations under the CAA. There have also been settlement agreements between USEPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as USEPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding." USEPA has also adopted a Mandatory Reporting Rule and Clean Power Plan. Under the Clean Power Plan, USEPA issued regulations to control CO_2 emissions from new and existing coal-fired power plants. However, on February 9, 2016, the Supreme Court issued a stay of these regulations pending litigation. Former USEPA Administrator Scott Pruitt also signed a measure to repeal the Clean Power Plan. The fate of the proposed regulations is uncertain given the change in federal administrations and the pending deliberations in federal courts.

NHTSA sets the CAFE standards to improve the average fuel economy and reduce GHG emissions generated by cars and light duty trucks. NHTSA and USEPA have proposed to amend the current fuel efficiency standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026 by maintaining the current model year 2020 standards through 2026 SAFE Vehicles Rule. The Rule would decrease the stringency of CAFE standards to 1.5 percent each year through model year 2026, as compared with the standards issued in 2012, which would have required about 5 percent annual increases.

3.3.2.2 International

In 2015, the 21st Session of the Conference of Parties (COP21) took place in Paris, France. The session included representatives from 196 parties to the United Nations Framework Convention on Climate Change. The outcomes from the Paris Agreement at COP21 include limiting global temperature increase well below 2°C, establishing binding commitments by all parties to make Nationally Determined Contributions (NDC) and to pursue domestic policies aimed at achieving

NDCs, and regular reporting by all countries on their emissions and progress made in implementing and achieving their NDCs. In April 2016, 174 states and the European Union signed the agreement, including the United States. However, on November 4, 2019, President Donald Trump formally notified the United Nations that the United States would withdraw from the Paris Agreement. This announcement begins a 1-year process for exiting the deal, which can occur no sooner than November 2020.

The Under2 Coalition is an international coalition of jurisdictions that signed the Global Climate Leadership Memorandum of Understanding (Under2 MOU) following President Trump's decision to withdraw from the Paris Agreement. The Under2 MOU aims to limit global warming to 2°C, to limit GHGs to below 80 to 95 percent below 1990 levels, and/or achieve a per capita annual emissions goal of less than 2 metric tons by 2050. The Under2 MOU has been signed or endorsed by 135 jurisdictions (including California) that represent 32 countries and 6 continents.

3.3.2.3 State

California has adopted statewide legislation to address various aspects of climate change and GHG emissions. Much of this legislation establishes a broad framework for the State's long-term GHG reduction and climate change adaptation program. The governor has also issued several Executive Orders (EOs) related to the State's evolving climate change policy. Of particular importance are Assembly Bill (AB) 32 and Senate Bill (SB) 32, which outline the State's GHG reduction goals of achieving 1990 emissions levels by 2020 and a level 40 percent below 1990 emissions levels by 2030. In the absence of federal regulations, control of GHGs is generally regulated at the state level. It is typically approached by setting emission reduction targets for existing sources of GHGs, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans. Summaries of key policies, legal cases, regulations, and legislation at the state level that are relevant to the Proposed Program are identified below.

Assembly Bill 1493

With the passage of AB 1493, also known as Pavley I, in 2002, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Although litigation challenged these regulations and USEPA initially denied California's related request for a waiver, the waiver request was granted. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars measure) was adopted for vehicle model years 2017–2025 in 2012. Together, the two standards are expected to increase average fuel economy to roughly 54.5 miles per gallon in 2025.

Executive Order S-3-05

EO S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows. by 2010, reduce GHG emissions to 2000 levels (approximately 457 million metric tons of CO_2e); by 2020, reduce emissions to 1990 levels (approximately 427 million metric tons CO_2e); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million metric tons CO_2e). EOs are binding only on state agencies. Accordingly, EO S-3-05 would guide State agencies' efforts to control and regulate GHG emissions but would have

no direct binding effect on local government or private actions. The Secretary of the California Environmental Protection Agency is required to report to the Governor and State legislature biannually on the impacts of global warming on California, mitigation and adaptation plans, and progress made toward reducing GHG emissions to meet the targets established in this EO.

Senate Bills 1078, 107, and X1-2

SBs 1078 and 107, California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities, energy service providers, and Community Choice Aggregations to procure an additional 1 percent of retail sales per year from eligible renewable sources until 20 percent is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program. SB X1-2 (2011) set forth a longer-range target of procuring 33 percent of retail sales by 2020.

Assembly Bill 32

One goal of EO S-03-05 was further reinforced by AB 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, which requires the state to reduce GHG emissions to 1990 levels by 2020. Since AB 32 was adopted, CARB, the CEC, CPUC, and the Building Standards Commission have been developing regulations that would help meet the goals of AB 32. Under AB 32, CARB is required to prepare a Scoping Plan and update it every 5 years. The Scoping Plan was approved in 2008, the first update approved in 2014, and an additional update was approved in 2017 (see discussion of SB 32 below). The Scoping Plan identifies specific measures to reduce GHG emissions to 1990 levels by 2020 and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the AB 32 Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state.

Executive Order S-01-07—Low Carbon Fuel Standard

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard (LCFS) for California in 2007. EO S-01-07 mandates (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and (2) that a low-carbon fuel standard for transportation fuels be established in California. The EO initiates a research and regulatory process at CARB.

Senate Bill 97

SB 97 required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the CEQA guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 350—De Leon (Clean Energy and Pollution Reduction Act of 2015)

SB 350 was approved by the California legislature in September 2015 and signed by Governor Brown in October 2015. Its key provisions are to require the following by 2030: (1) a renewables portfolio standard of 50 percent and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. These mandates would be implemented by future actions of the CPUC and CEC.

Senate Bill 32 and Assembly Bill 197

SB 32 requires CARB to ensure that statewide GHG emissions are reduced to at least 40 percent below 1990 levels by 2030. The companion bill, AB 197, creates requirements to form a Joint Legislative Committee on Climate Change Policies, requires CARB to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit, requires CARB to prepare reports on sources of GHGs and other pollutants, establishes 6-year terms for voting members of ARB, and adds two legislators to CARB as non-voting members.

Pursuant to SB 32, CARB updated the prior AB 32 Scoping Plan to address implementation of GHG reduction strategies to meet the 2030 reduction target. The final plan was approved in December 2017. The 2017 plan continues the discussion from the original scoping plan and 2014 update of identifying scientifically backed policies within six of the state's economic sectors to reduce GHGs. The updated Scoping Plan includes various elements, including doubling energy efficiency savings, increasing the LCFS from 10 to 18 percent, adding 4.2 million zero-emission vehicles on the road, implementing the Sustainable Freight Strategy, implementing a post-2020 Cap-and-Trade Program, creating walkable communities with expanded mass transit and other alternatives to traveling by car, and developing an Integrated Natural and Working Lands Action Plan to protect land-based carbon sinks.

Senate Bill 605 and Senate Bill 1383

SB 605 directed CARB, in coordination with other State agencies and local air districts, to develop a comprehensive Short-Lived Climate Pollutant (SLCP) Reduction Strategy. SB 1383 directed CARB to approve and implement the SLCP Reduction Strategy to achieve the following reductions in SLCPs.

- 40 percent reduction in methane below 2013 levels by 2030
- 40 percent reduction in hydrofluorocarbon gases below 2013 levels by 2030
- 50 percent reduction in anthropogenic black carbon below 2013 levels by 2030

The bill also establishes the following targets for reducing organic waste in landfills and methane emissions from dairy and livestock operations.

- 50 percent reduction in organic waste disposal from the 2014 level by 2020
- 75 percent reduction in organic waste disposal from the 2014 level by 2025
- 40 percent reduction in methane emissions from livestock manure management operations and dairy manure management operations below the dairy sector's and livestock sector's 2013 levels by 2030

CARB and CalRecycle are currently developing regulations to achieve the organic waste reduction goals under SB 1383. In January 2019 and June 2019, CalRecycle proposed new and amended regulations in Titles 14 and 27 of the CCR. Among other things, the regulations set forth minimum standards for organic waste collection, hauling, and composting. The final regulations would take effect on or after January 1, 2022.

Short-Lived Climate Pollutant Reduction Strategy

CARB adopted the SLCP Reduction Strategy in March 2017 as a framework for achieving the methane, hydrofluorocarbon, and anthropogenic black carbon reduction targets set by SB 1383. The SLCP Reduction Strategy includes 10 measures to SLCPs, which fit within a wide range of ongoing planning efforts throughout the State, including CARB's and CalRecycle's proposed rulemaking on organic waste diversion (discussed above).

Senate Bill 100

The state's existing renewables portfolio standard requires all retail sellers to procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt-hours of those products sold to their retail end-use customers achieve 25 percent of retail sales by December 31, 2016 (achieved), 33 percent by December 31, 2020, 40 percent by December 31, 2024, 45 percent by December 31, 2027, and 50 percent by December 31, 2030. SB 100 revised and extended these renewable resource targets to 50 percent by December 31, 2026, 60 percent December 31, 2030, and 100 percent (carbon-free) by December 31, 2045.

Executive Order B-55-18

EO B-55-18 acknowledges the environmental, community, and public health risks posed by future climate change. It further recognizes the climate stabilization goal adopted by 194 states and the European Union under the Paris Agreement. Although the United States was not party to the agreement, California is committed to meeting the Paris Agreement goals and going beyond them wherever possible. Based on the worldwide scientific agreement that carbon neutrality must be achieved by midcentury, EO B-55-18 establishes a new state goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. The EO charges the CARB with developing a framework for implementing and tracking progress toward these goals. This EO extends EO S-3-05 but is only binding on state agencies.

3.3.2.4 Regional and Local

North Coast United Air Quality Management District

As discussed in Section 3.2, *Air Quality*, NCUAQMD is responsible for air quality planning within the North Coast Air Basin. The NCUAQMD has not adopted GHG thresholds. In 2011, NCUAQMD adopted Rule 111, *Federal Permitting Requirements for Sources of GHGs,* into District rules to establish a threshold above which New Source Review and federal Title V permitting applies, and to establish federally enforceable limits on the potential to emit GHGs for stationary sources. However, these regulations are only applicable to stationary sources (NCUAQMD 2019).

Humboldt County

Humboldt County General Plan

The HCGP was adopted in 2017. The General Plan's Air Quality Element contains additional policies related to air quality that are relevant to the GHG emissions issues associated with the Project (Humboldt County 2017). These policies are as follows.

- **Goal AQ-G4 GHGs**: Successful mitigation of GHGs associated with the General Plan to levels of non-significance as established by the Global Warming Solutions Act and subsequent implementation of legislation and regulations.
- **Policy AQ-9P County CAP**: Through public input and review, develop and implement a multi-jurisdictional CAP to achieve reductions in greenhouse gas emissions consistent with the state Global Warming Solutions Act and subsequent implementing legislation and regulations
- **Policy AQ-P11 Review of Projects for GHG Emission Reductions**: The County will evaluate the GHG emissions of new large scale residential, commercial and industrial projects for compliance with state regulations and require feasible mitigation measures to minimize GHG emissions.
- **Standard AQ-S2 Evaluate GHG Impacts**: During environmental review of large scale residential, commercial and industrial projects, include an assessment of the project's GHG emissions and require feasible mitigation consistent with best practices documented by the California Air Pollution Control Officers Association in their 2008 white paper "CEQA & Climate Change" or successor documents.
- **Implementation Measure AQ-IM3 County-wide CAP**: Develop and implement a CAP that effectively mitigates the carbon emissions attributable to the General Plan, consistent with the requirements of the state Global Warming Solutions Act and subsequent implementing legislation and regulations.
- **Implementation Measure AQ-IM5 GHG Emissions**: Update the General Plan and Land Use Ordinances, as appropriate, to reflect the adopted countywide CAP and the new state laws and regulations for GHG emissions when they become available.

Humboldt County Climate Action Plan

There is no adopted climate action plan (CAP) for Humboldt County. Humboldt County is in the process of developing a regional CAP with local agencies. The CAP would explore locally oriented strategies to reduce emissions from vehicle travel, livestock, electricity consumption, and other sources of GHGs. The first public CAP workshop is scheduled for spring 2020 (Humboldt County 2019).

Humboldt Bay Area Plan (HBAP)

The HBAP was updated in 2014 and includes recommendations, policies, and standards to manage the coastal zone. The Plan specifies that new development will "be consistent with requirements imposed by an air pollution, control district" (Humboldt County 2014).

City of Eureka

City of Eureka General Plan

The City of Eureka's *2040 General Plan* was adopted in October 2018 and establishes a roadmap for long-term physical, social, and economic future of for the city. It includes goals, policies, and programs to direct land use and development decisions, manage resources, deliver public services, and provide infrastructure (City of Eureka 2018). The General Plan's Air Quality Element contains goals, policies, and programs related to GHG emissions. These policies are as follows.

- **Goal AQ-1.1 Regional Coordination**: Cooperate with the North Coast Unified Air Quality Management District, Redwood Coast Energy Authority, and other agencies to develop a consistent and effective approach to air quality planning and management, as well as to reduce GHG emissions and air quality impacts in the region.

- **Goal AQ-1.2 GHG Reduction**: Continue to work with Redwood Coast Energy Authority to implement appropriate measures to reduce regional greenhouse gas emissions in Eureka, such as incentivizing the use of alternative energy sources, and periodically update the City's GHG inventory and reduction plan, consistent with State reduction targets and regulations.
- **Goal AQ-1.14 Education and Outreach**: Provide educational opportunities and assist in engaging with the public regarding air quality, its health impacts, and potential actions that people can take to improve air quality and minimize GHG emissions.
- **Implementation AQ-1**: Prepare a CAP that provides the framework for the City to reduce greenhouse gas emissions to meet the State targets identified for 2040 through City operations, and existing and future development. GHG emission reductions related to land use, mobility, energy, and solid waste will be addressed in the CAP.

City of Eureka Climate Action Plan

The Eureka City Council is currently exploring ways to reduce its carbon footprint as part of a future CAP. However, this process is ongoing and a data for a draft CAP has not been released (Redwood News 2019).

City of Arcata Climate Action Plan

The City of Arcata not drafted or adopted a CAP. The City of Arcata has; however, prepared a *Community Greenhouse Gas Reduction Plan* which identified six action areas to change the way we use energy. This includes energy efficiency, renewable energy, sustainable transportation, waste and consumption reduction, carbon sequestration and other methods, and cross-cutting approaches (City of Arcata 2006). The City of Arcata also has a *Community Greenhouse Gas Emissions Inventor*y which was prepared in 2017 (City of Arcata 2017).

3.3.3 Impacts Analysis

This section describes the environmental impacts on GHG that could result from implementation of the Proposed Program.

3.3.3.1 Methods for Analysis

This section evaluates the GHG effects that would result from the Proposed Program and alternatives. GHG impacts associated with the alternatives analyzed in this section could result from implementation of the Proposed Program through the generation GHG emissions resulting from construction (e.g., construction of temporary dewatering basins and associated facilities) and operation (e.g., dredging, material processing, sediment transport to material processing and beneficial-use sites). These potential impacts would occur on a temporary basis during construction and on an annual basis during operational activities.

The GHG analysis focuses on how Proposed Program emissions compare to those generated under existing conditions and whether new emission sources under the Proposed Program would result in air quality impacts. A qualitative assessment of impacts was performed for Proposed Program activities that would be similar under existing conditions and a quantitative assessment of impacts was performed for Proposed Program activities that would result in new emission sources.

Construction and operational activities would occur within Humboldt County and NCUAQMD jurisdiction. Emissions from marine dredging and marine vessels during dredged sediment transport would not change, relative to existing conditions. As such, emissions from dredging

activities are assumed to remain at current levels. GHG emissions from new equipment and on-road vehicles introduced by the project were estimated using the same methods described under Section 3.2.3.1, *Methods for Analysis*, of the *Air Quality* section. Per the District, Proposed Program activities would not all occur concurrently. As such, similar to air quality emissions, annual GHG emissions were estimated for each program activity and only summed during overlapping activities to determine the maximum annual emissions, which are presented in Tables 3.2-3 through 3.2-5. The modeling inputs and calculations are provided in Appendix C.

3.3.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

State CEQA Guidelines Section 15064.4 provides guidance to lead agencies for determining the significance of environmental impacts pertaining to GHG emissions. State CEQA Guidelines Section 15064.4(a) states that a lead agency should make a good-faith effort that is based, to the extent possible, on scientific and factual data to describe, calculate, or estimate the amount of GHG emissions that would result from implementation of a project. State CEQA Guidelines Section 15064.4(b) also states that, when assessing the significance of impacts from GHG emissions, a lead agency should consider (1) the extent to which the project may increase or reduce GHG emissions compared with existing conditions, (2) whether the project's GHG emissions would exceed a threshold of significance that the lead agency has determined to be applicable to the project, and (3) the extent to which the project would comply with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The State CEQA Guidelines allow lead agencies to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, to evaluate the significance of project-generated GHG emissions, provided that the thresholds are supported by substantial evidence, and/or to develop their own significance threshold. The State CEQA Guidelines also state that the significance criteria established by the applicable air quality management district may be relied on to make the determination.

The California Supreme Court's decision in *Center for Biological Diversity et al. vs. California Department of Fish and Wildlife, the Newhall Land and Farming Company* (62 Cal.4th 204) confirmed that there are multiple potential pathways for evaluating GHG emissions consistent with CEQA. Several air quality management agencies throughout the state have also drafted or adopted varying threshold approaches and guidelines for analyzing GHG emissions in CEQA documents. Common threshold approaches include (1) compliance with a qualified GHG reduction strategy, (2) numeric "bright-line" thresholds, (3) efficiency-based thresholds, (4) performance-based reductions[5], and (5) compliance with regulatory programs.

[5] Performance-based thresholds are based on a percentage reduction from a projected future condition; for example, reducing future Business As Usual (BAU) emissions to meet the SB 32 target (40 percent below 1990 levels) through a combination of State measures, project design features (e.g., renewable energy), or mitigation

Threshold Approach

Local jurisdictions in the Proposed Program area have not adopted qualified GHG reduction plans and tiering per State CEQA Guidelines Section 15183.5 is not an applicable option to assess the Proposed Program's GHG impacts. NCUAQMD's numeric thresholds only apply to new stationary sources, such as generators and boilers; therefore, this threshold cannot be used to assess program activities. There are no adopted efficiency-based metrics or performance-based thresholds that are applicable to the Proposed Program. Therefore, this analysis estimates GHG emissions associated with new activities under the Proposed Program and further evaluates operational GHG impacts based on compliance with regulatory programs, which is recognized by the Supreme Court as an acceptable pathway for evaluating project-level GHG emissions under CEQA (62 Cal.4th 204). Where applicable, the analysis considers guidance issued by CARB (2019) and OPR (2018).

3.3.3.3 Impacts and Mitigation Measures

Impact GHG-1: Would the Proposed Program Generate GHG Emissions, Either Directly or Indirectly, that may Have a Significant Impact on the Environment?

Proposed Program

Activities under existing conditions are assumed to include the following: 1) dredging and 2) transport of dredge sediments to HOODS. The Proposed Program involves 1) dredging, 2) transport of dredge sediments to material processing facilities or beneficial reuse sites, 3) construction of material processing facilities, 4) material processing, and 5) transport of processed sediments. Program activities could result in the generation of GHG emissions from on-road vehicle and marine vessel movement, use of mobile and stationary equipment, and excavation and earthmoving (e.g., dredging, material transport, dewatering, transport of processed sediment). The following sections generally describe the anticipated construction and operational GHG emissions under existing conditions and the Proposed Program.

The estimated annual dredging quantity (100,000 cy) would be the same under the Proposed Program as existing conditions. As such, emissions from dredging activities are assumed to remain at current levels with no new or worsening GHG impacts.

The Proposed Program is anticipated to reduce the use of marine vessels for dredged sediment transport. Under existing conditions, materials are transported approximately 3.25 miles to the HOODS facility. Under the Proposed Program, dredged sediments would no longer be barged out to the Humboldt Open Ocean Disposal Site; rather, dredged sediments would be transported for processing directly to the three material processing sites (i.e., existing site at Samoa Lagoons and two new processing sites at Redwood Marine Terminal II and Fields Landing Boatyard). All material processing facilities and beneficial reuse sites would be within 3.25 miles, with many as close as 1 mile. As such, GHG emissions from marine vessels are assumed to remain at or below current levels. Under the Proposed Program, transport of dredged sediments would require use of pumps and/or excavators (i.e., one excavator operating 8 hours per day and two pumps operating 5 hours per day) to offload materials to processing facilities or beneficial reuse sites. These pumps and/or excavators and associated employees (i.e., six daily employees) would be a new GHG emissions source and anticipated emissions from these activities are shown in Table 3.3-3.

Table 3.3-3. GHG Emissions from Operational Transport of Dredge Sediment to Processing Facility/Beneficial Reuse Site

GHG Emission	Metric Tons/Year
CO_2	187.0
CH_4	0.01
N_2O	<0.01
CO_2e	187.1

Source: See Appendix C.
CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent

Construction of material processing facilities would require minor amounts of off-road equipment and on-road vehicles. The Proposed Program would construct temporary dewatering basins and associated facilities (i.e.,1 excavator operating 8 hours per day per site) at two new material processing sites. Construction of the basins would require minimal site preparation (e.g., clearing) and structure construction (e.g., k-rail, impermeable liner, and associated pipes). The size of the basin to be constructed could vary depending on the expected volume of dredge material to be processed during a dredging event. Once dredge material has been processed, the basin and associated facilities could potentially be deconstructed and then reconstructed on an as-needed basis. These construction activities would generate GHG emissions fuel combustion in construction equipment and worker vehicles. Material processing would require yard equipment (i.e., 1 dozer and 1 pump operating 5 hours per day per site) and employees (i.e., 6 daily employees for construction and operation). Anticipated GHG emissions from these activities are shown in Table 3.3-4.

Table 3.3-4. GHG Emissions from the Construction of Material Processing Facilities and Operational Material Processing

GHG Emission	Metric Tons/Year
CO_2	224.30
CH_4	<0.10
N_2O	<0.01
CO_2e	226.30

Source: See Appendix C.

Operational activities would sediment transport (i.e., up to 500 total cy per day) to material processing and beneficial-use sites via haul trucks for use (e.g., for beach replenishment, diked shoreline structures, diked former tidelands). Work trucks and employee vehicles (i.e., 10-cy trucks for up to 50 truck trips per day at 30 miles per trip, and 6 daily employees) would generate GHG emissions during these activities. Anticipated GHG emissions from these activities are shown in Table 3.3-5.

Table 3.3-5. GHG Emissions from the Operational Transport of Processed Sediments

GHG Emission	Metric Tons/Year
CO_2	115.3
CH_4	<0.1
N_2O	<0.0
CO_2e	120.7

Source: See Appendix C.

As shown in Table 3.3-3 through Table 3.3-5, transport of dredge sediments to material processing facilities or beneficial reuse sites, construction and operation of material processing, and transport of processed sediments under the Proposed Program could result in increased GHG emissions, relatively to existing conditions. However, such increases would be minor relative to the larger reductions anticipated with reduced marine vessel activity under the Proposed Program as marine vessels are more emission intensive than off-road equipment and on-road vehicles. Therefore, GHG emissions associated with the Proposed Program are anticipated to be similar or less than existing conditions.

Potential GHG impacts resulting from the Proposed Program are further evaluated based on compliance with regulatory programs and associated state agency guidance, specifically for the energy, mobile, off-road, and waste sectors where the Proposed Program would generate GHG emissions. The following regulations and guidance are applicable to the Proposed Program. Refer to Section 3.3.2, *Regulatory Setting*, for additional information.

- **Energy**: The 2017 Climate Change Scoping Plan outlines strategies to reduce energy demand and fossil fuel use, while increasing energy efficiency and renewable energy generation. These strategies include transitioning to cleaner fuels, increasing efficiency in existing buildings, and electrifying end uses. Several of these strategies are reflected in State laws and regulatory programs. For example, SB 100 requires an RPS of 60 percent renewable by 2030. SB 100 also sets a target of 100 percent carbon-free electricity by 2045.
- **Mobile**: Federal, State, and local regulatory efforts target three elements of emissions reduction from mobile sources: vehicle fuel efficiency, the carbon content of fuels, and vehicle miles traveled (VMT). Most adopted programs and regulations focus on fuel efficiency (e.g., CAFE standards, Pavley standards) and reducing the carbon intensity of transportation fuels (e.g., LCFS). Vehicle electrification is also rapidly becoming part of the State's approach to reducing mobile source emissions (e.g., electric vehicle charging infrastructure requirement). SB 743 is intended to close the VMT and emissions reduction gap in the mobile source sector. OPR (2018) and CARB (2019) have released guidance that establish VMT reduction targets needed to meet statewide GHG planning goals through 2050.
- **Off-road**: CARB adopted an airborne toxic control measure to reduce public exposure to diesel particulate matter and other air contaminants by establishing idling restrictions, emission standards, and other requirements for heavy-duty diesel engines and alternative idle reduction technologies to limit the idling of diesel-fueled commercial motor vehicles with gross vehicle weight ratings greater than 10,000 pounds. This measure limits idling from diesel-fueled commercial vehicles to no more than 5 minutes at any given time. CARB also promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. This

regulation aims to reduce emissions by encouraging the replacement of older, dirtier engines with newer emission-controlled models.

- **Waste**: The 2017 Climate Change Scoping Plan aims to reduce waste emissions by diverting waste away from landfills through waste reduction, reuse, composting, and material recovery. It does not set quantitative targets for reducing waste emissions but does aim to reduce the amount of waste that enters landfills. AB 341 also established a statewide recycling goal of 75 percent by the year 2020.

The Proposed Program would consume energy during operation as dredged sediments are pumped to material processing sites and haul trucks for sediment transport. However, the Proposed Program would not affect or conflict with the state's ability to meet its RPS goals.

The Proposed Program would operate vehicles and equipment during construction and operation and would not conflict with the state's fuel economy or LCFS. The Proposed Program would increase VMT as dredged sediments would now be transported to beneficial-use sites from material processing sites via haul trucks instead of deposited directly to the HOODS. However, the increase in on-road emissions by haul trucks is anticipated to be offset by the reduction in marine vessel activity. As such, mobile source emissions are expected to be similar to or less than existing conditions and would not adversely affect the state's long-term (2050) mobile source GHG reduction targets.

The Proposed Program would require the use of diesel-powered equipment and vehicles during construction and operation. Though equipment and vehicles would comply with diesel regulations (see Section 3.2.2, *Regulatory Setting*).

Impact GHG-2: Would the Proposed Program Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs?

Proposed Program

AB 32 and SB 32 outline the state's GHG emissions reduction targets for 2020 and 2030, respectively. Although not legislatively adopted, EO S-03-05 establishes the state's long-term goal to reduce GHG emissions 80 percent from 1990 levels by 2050. EO B-55-18 sets a more ambitious state goal of net zero GHG emissions by 2045.

In 2008 and 2014, CARB adopted the Scoping Plan and First Update, respectively, as a framework for achieving AB 32. The Scoping Plan and First Update outline a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted the Climate Change Scoping Plan in November 2017 as a framework to achieve the 2030 GHG reduction goal described in SB 32. There is no state plan for addressing GHG reductions beyond 2030. As discussed above, neither Humboldt County nor the City of Eureka have adopted local CAPs.

Based on CARB's 2017 Scoping Plan, many of the reductions needed to meet the 2030 target would come from state regulations, including cap-and-trade, the State's SLCP Reduction Strategy, the requirement for increased renewable energy sources in California's energy supply, and increased emission reduction requirements for mobile sources. The Scoping Plan indicates that reductions would need to come in the form of changes pertaining to vehicle emissions and mileage standards, changes pertaining to sources of electricity and increased energy efficiency at existing facilities, and state and local plans, policies, or regulations that would lower GHG emissions relative to business-as-usual conditions. The 2017 Scoping Plan carries forward GHG reduction measures from the First

Update, as well as new potential measures to help achieve the state's 2030 target across all sectors of the California economy, including transportation, energy, and industry.

The purpose of the Proposed Program is to promote beneficial use of dredged sediments. GHG emissions generated by construction activities would be short-term and would cease once construction is complete. Operational activities would be long term, but declining emission factors associated with vehicles, equipment, and energy would further reduce emissions intensities over time. Activities under the Proposed Program does not propose any land use development that would directly result in population growth and, as such, the GHG reduction measures in the 2017 Scoping Plan (e.g., public transit expansion, travel demand strategies, waste diversion, land use planning) largely do not apply. The Proposed Program would be affected by the scoping plan measures related to fuel and clean vehicle standards because activities would involve the use of equipment required for construction and operational activities. These measures would lead to cleaner vehicles and equipment for the activities and thus lower GHG emissions. The Proposed Program would result in similar of reduced mobile sector emissions and fossil fuel uses and would not conflict with the state's regulatory framework to reduce GHG emissions and meet the state's long term EO (e.g., EO B-55-18) goals.

As discussed under Impact GHG-1, the Proposed Program would not conflict with regulatory programs and associated state agency guidance. Therefore, the Proposed Program would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Alternative 1 – Suction Dredging Only

Construction and operational activities and emissions from Alternative 1 would be similar to the Proposed Program. Therefore, impacts would be a subset of the impacts under the Proposed Program described above and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Alternative 2 – Clamshell Bucket Dredging Only

Construction and operational activities and emissions from Alternative 2 would be similar to the Proposed Program. Therefore, impacts would be a subset of the impacts under the Proposed Program described above and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Construction and operational activities and emissions from Alternative 3 would be reduced when compared to the Proposed Program. Therefore, impacts would be a subset of the impacts and reduced under the Proposed Program described above and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

No-Project Alternative

The No-Project Alternative would not result in a change in GHG emissions relative to existing conditions. No construction (e.g. dewatering basins) or new or additional operational (e.g., sediment transport) activities would occur under the No-Project Alternative. Therefore, the No-Project Alternative would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. There would be no impact.

3.4 Energy

This section discusses the energy use associated with construction and operation of the Proposed Program. This section also describes the applicable regulatory framework and the existing state of energy resources in the plan area.

3.4.1 Environmental Setting

3.4.1.1 State and Regional Energy Resources and Use

California has a diverse portfolio of energy resources that produced 2,535.7 trillion British thermal units (BTUs)[6] in 2017, approximately 44 percent of which was in the form of biofuels and other renewable energy (US EIA 2020a).[7] Overall, California's crude oil production has declined during the past 30 years,, but the state remains one of the top producers of crude oil in the nation, accounting for about 5 percent of total U.S. production in 2017 (US EIA 2018). California is among the top states in the nation in electricity generation from renewable resources. In 2017, the state was the leader in total utility-scale electricity generation from renewable resources, including hydroelectric power. California typically leads the nation in generation from solar, geothermal, and biomass energy. In 2017, the state was also the nation's second-largest producer of electricity from conventional hydroelectric power and the fifth-largest producer from wind energy (US EIA 2018).

According to the U.S. Energy Information Administration (2018), California consumed approximately 7,881.3 trillion BTUs of energy in 2017. Per capita energy consumption (i.e., total energy consumption divided by the population) in California is among the lowest in the country, with each state resident responsible for 200 million BTUs in 2017, which ranked 48th among all states (US EIA 2020b). Natural gas accounted for the greatest share of energy consumption (28 percent), followed by motor gasoline (22 percent), distillate and jet fuel (16 percent), interstate electricity (8 percent), renewable energy (16 percent), and the remainder from a variety of other sources (US EIA 2020c). The transportation sector consumed the highest quantity of energy (40 percent), followed by the industrial (23 percent), commercial (19 percent), and residential (18 percent) sectors (US EIA 2020d).

Gasoline is the most used transportation fuel in California, with 97 percent of all gasoline being consumed by light-duty cars, pickup trucks, and sport utility vehicles. In 2015, 15.1 billion gallons of gasoline were sold, according to the State Board of Equalization (California Energy Commission 2019a). Diesel fuel is the second largest transportation fuel used in California, representing 17 percent of total fuel sales behind gasoline. According to the state Board of Equalization, in 2015 4.2 billion gallons of diesel, including off-road diesel, was sold (California Energy Commission 2019b).

As discussed in the *2017 Integrated Energy Policy Report*, CEC staff projects that petroleum-based fuels would continue to represent the largest shares of transportation fuel demand through at least 2030. However, CEC staff projects that demand for gasoline is expected to wane over time, primarily due to increases in fuel efficiency and electrification. Based on a middle-case scenario, gasoline consumption in the state is predicted to fall from just under the current 15 billion gallons in 2016 to just over 12 billion gallons in 2030. During the same period, demand for jet fuel and diesel fuel is

[6]One BTU is the amount of energy required to heat 1 pound of water by 1°F at sea level. BTU is a standard unit of energy used in the United States and is on the English system of units (foot-pound-second system).

[7]Note, 2017 data are the most recent available at the U.S. Energy Information Administration website.

projected to remain constant at approximately 4 billion gallons of gasoline-equivalent for each fuel type (California Energy Commission 2018:212–213).

In Humboldt County, gasoline and diesel consumption for light-duty vehicles in Humboldt County in 2010 was about 76 million gallons (Humboldt County 2017).

3.4.2 Regulatory Setting

3.4.2.1 Federal

Energy Policy Act (2005)

The Energy Policy Act of 2005, intended to establish a comprehensive, long-term energy policy, is implemented by the U.S. Department of Energy. The Energy Policy Act addresses energy production in the United States, including oil, gas coal, and alternative forms of energy and energy efficiency and tax incentives. Energy efficiency and tax incentive programs include credits for the construction of new energy-efficient homes, production or purchase of energy-efficient appliances, and loan guarantee for entities that develop or use innovative technologies that avoid the production of greenhouse gases (GHGs).

Update to Corporate Average Fuel Economy Standards (2009)

The Corporate Average Fuel Economy (CAFE) standards incorporate stricter fuel economy standards promulgated by the State of California into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25 percent by 2016. The federal Environmental Protection Agency (EPA), the National Highway Traffic Safety Administration (NHTSA), and the California Air Resources Board (CARB) issued joint Final Rules for CAFE standards and GHG emissions regulations for 2017 to 2025 model year passenger vehicles, which require an industry-wide average of 54.5 miles per gallon (mpg) in 2025.

3.4.2.2 State

Assembly Bill 2076, Reducing Dependence on Petroleum (2000)

The CEC and CARB are directed by Assembly Bill (AB) 2076 (passed in 2000) to develop and adopt recommendations for reducing dependence on petroleum. A performance-based goal is to reduce petroleum demand to 15 percent less than 2003 demand by 2020.

Assembly Bill 1493, Pavley Rules (2002, amendments 2009)/Advanced Clean Cars (2011)

Known as Pavley I, AB 1493 provided the nation's first GHG standards for automobiles. AB 1493 required CARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible beginning in 2009. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars [ACC] measure) was adopted for vehicle model years 2017–2025 in 2012. Together, the two standards are expected to increase average fuel economy to roughly 54.5 mpg in 2025. The increase in fuel economy will help lower the demand for fossil fuels.

Executive Order S-01-07, Low Carbon Fuel Standard (2007)

Executive Order (EO) S-01-07 mandated (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and (2) that a low carbon fuel standard for transportation fuels be established in California. The EO initiated a research and regulatory process at CARB. CARB has since adopted and implemented the Low Carbon Fuel Standard, which requires a progressive reduction in the carbon intensity of fuels over time.

3.4.2.3 Regional and Local

City of Eureka

General Plan

The City of Eureka's *2040 General Plan* was adopted in October 2018 and establishes a roadmap for long-term physical, social, and economic future for the city. It includes goals, policies, and programs to direct land use and development decisions, manage resources, deliver public services, and provide infrastructure (City of Eureka 2018). The General Plan's goals related to energy that are applicable to the Proposed Plan:

- **Goal U-5**: Increased renewable energy provision and overall energy efficiency and conservation throughout the City.
- **Goal U-5.1**: Energy Conservation. Promote energy conservation, and development of alternative, nonpolluting, renewable energy sources for community power in both the public and private sectors.

3.4.3 Impacts Analysis

3.4.3.1 Methodology

This section evaluates the effects related to energy that would result from the Proposed Program and associated alternatives. Consistent with Appendix F and Section 15126.2 of the California Environmental Quality Act (CEQA) Guidelines, this section qualitatively addresses energy use for all phases and components, including transportation-related energy, during construction of the beneficial use and processing sites. The Proposed Program's energy usage would result from construction (e.g., construction of temporary dewatering basins and associated facilities) and operation (e.g., dredging, material processing, sediment transport to material processing and beneficial-use sites). These potential impacts would occur on a temporary basis during construction and on an annual basis during operational activities. The qualitative energy analysis performed for the Proposed Program considers typical construction and operational activities that would be undertaken for implementation of the alternatives, as described in Chapter 2, *Project Description*.

3.4.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in either of the conditions listed below.

- Wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operations.
- Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency.

In addition, Appendix F to the State CEQA Guidelines recommends consideration of the following impact possibilities and potential energy conservation measures when preparing an EIR:

- The project's energy requirements and energy-use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
- The effects of the project on local and regional energy supplies and requirements for additional capacity.
- The effects of the project on peak- and base-period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

3.4.3.3 Impacts and Mitigation

Impact EN-1: Would the Proposed Program Have the Potential for Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources?

Proposed Plan

Energy consumption associated with implementation of the Proposed Program would involve the use of cutterhead or clamshell dredge, diesel-powered heavy equipment, portable diesel generators, and heavy-duty trucks for material hauling and deliveries and light-duty vehicles for worker commute trips, almost all of which would involve the consumption of petroleum-based gasoline or diesel fuel. In addition to direct fuel consumption, some battery-operated support equipment and electric equipment may be used during the construction period, which would rely on electricity from the existing grid. Energy usage construction equipment and vehicles would be temporary and intermittent, occurring only during dredging activities and construction of beneficial use and processing sites, as well as the transport of materials to those sites. There would be an irreversible impact from the consumption of diesel fuel (and other fuels) related to these construction activities.

Although dredging activities under the Proposed Program would require energy consumption, the fuel requirements would be temporary in nature and limited to the period of active dredging, construction of Program sites and material transport. Fuel required for construction and transport would likely represent a negligible increase in regional demand and an insignificant amount relative to the more than 19 billion gallons of fuel sold in the state as of 2015 (California Energy Commission 2019). Given the extensive network of fueling stations throughout the Proposed Program vicinity and the fact that dredging, construction, and transport activities would be short-term, it is not anticipated that any new or expanded sources of energy or infrastructure would be required to meet the energy demands of the Proposed Program. All dredging activities would be in the service of the management of sediment in and around navigation channels and is therefore not anticipated to

result in a wasteful, inefficient, or unnecessary consumption of energy resources. In addition, the Proposed Program is not anticipated to result in substantial new regional energy demands, as dredging and sediment transport activities in the area are currently occurring, with dredge materials being transported approximately 3 miles offshore to the HOODS facility. Material transport to beneficial use and processing sites would also represent a temporary incremental increase in energy usage within the Proposed Program Area. However, this energy usage would not result in an adverse increase on energy demands within the Program area, requiring additional energy infrastructure or sources. Impacts would be less than significant under the Proposed Program.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, would require the consumption of energy from dredging equipment and vehicles. However, the consumption of energy as a result of Alternative 1 are not anticipated to adversely increase existing energy demands within the Program area, therefore impacts would be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediment would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and, accordingly, would require consumption of energy from dredging equipment and vehicles. However, the consumption of energy as a result of Alternative 2 are not anticipated to result in an increase existing energy demands within the Program area, therefore impacts would be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal through either suction or clamshell bucket dredging. Dredge material processing sites would not be constructed, and no construction emissions would result. Dredged sediments would not be processed or stockpiled; rather, dredged sediments would be transported directly to beneficial reuse sites via pipelines or barges. Although Alternative 3 would require energy consumption, the fuel requirements would be temporary in nature and limited to the period of active dredging and sediment transport via pumping. Energy required for dredging and transport would likely represent a negligible increase in regional demand, therefore impacts would be less than significant.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., sediment transport) activities would occur. There would be no increase in energy demands relative to existing conditions and no additional impacts are anticipated under the No-Project Alternative.

Impact EN-2: Would the Proposed Program Have Potential for Conflict with or Obstruction of a State or Local Plan for Renewable Energy or Energy Efficiency?

Proposed Plan

There are no state or local plans specifically related to the use of energy resources for construction or dredging activities. Dredging activities would involve the use of vehicles and equipment that consume diesel and gasoline. Construction equipment and vehicles are subject to the state's ongoing regulatory programs, including the in-use off-road diesel fueled fleets regulation and CARB's Portable Equipment Registration Program, both of which have fuel efficiency co-benefits. The Proposed Plan would not conflict with any state or local plans for renewable energy or energy efficiency.

Alternative 1 – Suction Dredging Only

As discussed under the Proposed Program, there are no state or local plans specifically related to the use of energy resources for construction or dredging activities. All equipment would be subject to the state's ongoing regulatory programs, and Alternative 1 would not conflict with any state or local plans for renewable energy or energy efficiency.

Alternative 2 – Clamshell Bucket Dredging

As discussed under the Proposed Program, there are no state or local plans specifically related to the use of energy resources for construction or dredging activities. All equipment would be subject to the state's ongoing regulatory programs, and Alternative 2 would not conflict with any state or local plans for renewable energy or energy efficiency.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

As discussed under the Proposed Program, there are no state or local plans specifically related to the use of energy resources for construction or dredging activities. All equipment would be subject to the state's ongoing regulatory programs, and Alternative 3 would not conflict with any state or local plans for renewable energy or energy efficiency.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Plan would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. Thus, no impacts would result related to plans for renewable energy or energy efficiency.

3.5 Cultural Resources

The term *cultural resources*, as used in this document, refers to all *built environment* (e.g., structures, bridges, railroads, water conveyance systems, etc.) resources, culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance. This section describes the regulatory and environmental setting for cultural resources in the vicinity of the program. It also describes the effects on cultural resources from implementation of the Humboldt

Bay Sediment Management plan, as well as mitigation measures that would reduce significant impacts.

3.5.1 Environmental Setting

All affected areas would be within Humboldt Bay. There are 25 LMSs located along the interior shores of the bay where in-water dredging may occur, three land sites where sediments may be dewatered and temporarily stockpiled, and 76 land and water sites where sediments may be beneficially placed.

3.5.1.1 Geomorphic Context

The basement rock in the Humboldt Bay region is the Franciscan Formation (City of Humboldt 2019). It is unconformably overlain by the Wildcat Group, a late Miocene to middle Pleistocene-aged sequence of marine and terrestrial deposits. At Eureka, the Wildcat Group is overlain by middle and late Pleistocene-aged coastal plain and fluvial deposits called the Hookton Formation, which is expected to be as much as 400 ft thick. Along the margins of Humboldt Bay, the Hookton Formation is overlain by bay muds and other estuarine deposits estimated to be less than 5-6,000 years old (City of Humboldt 2019).

Humboldt Bay formed in the late-Pleistocene and early Holocene between 15,000 and 10,000 years before present as sea levels transgressed, filling the mouths of the Mad, Eel, and Elk River valleys (Schlosser and Eicher 2012). During that period, the eustatic sea level typically rose 20.7 ft (6.3 m) every thousand years, with accelerated rise between 14,000–13,000 BP (23.6 m rise) and 12,000 and 11,000 BP (17.0 m rise) (ICF 2013). Subsequent to the formation of Humboldt Bay, the Mad River cut a new channel north of the bay, and the Eel River was diverted by the tectonic uplift of Table Bluff to the south. Today, the shoreline at Humboldt Bay is approximately 400 ft higher than it was 15,000 years ago and the bay is fed by Elk River, Jacoby Creek, Freshwater Creek, and Salmon Creek.

The northern spit of Humboldt Bay was formed on sedimentary and volcanic rocks deposited on the ocean floor that were later deformed and metamorphosed. As sea levels rose after the last glacial maximum and shorelines migrated east toward their current position, the Humboldt Bay spit primarily formed by longshore transport of river sediment from the Mad and Little Rivers prograded across the mouth of the bay (Schlosser and Eicher 2012). During the Holocene, these areas were traditionally shifting sand dunes, which Llewelyn Loud described as being 85 ft tall and a threat to any settlement built on the attractive bay shore leeward of the north spit dunes. More recently, formerly shifting dunes have been subject to overstabilization using both native species and non-native species such as European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus edulis*).

A sounding map from 1852 shows the natural depth of the bay at mean low tide was as deep as 18 ft (5.5 m),, but with significant sandbars no more than several ft below the surface. Littoral areas, the location of the LMSs targeted in this program, were between 8 and 9 ft (2.4 and 2.7 m) deep. Today, the USACE dredges Humboldt Bay shipping channels to between 38–48 ft (12–15 m) deep, with LMSs target depths between 5 and 35 ft (1.5 and 10.7 m) below mean lower low water.

In summary, determining precisely when Humboldt Bay was inundated is difficult, as several variables must be considered. Sea levels rose approximately 400 ft within the last 15,000 years, forming Humboldt Bay and likely eroding or inundating previously terrestrial archaeological sites.

The main factor that would raise ground level is alluvial and marine sedimentation, which would add overburden atop cultural strata and thus increase its depth below surface.

3.5.1.2 Previous Studies

ICF archaeologists reviewed archaeological studies and databases to determine what work has been done in the vicinity of program activities, and if any known cultural resources have been discovered there. To date, very little archaeological work has been completed in the immediate vicinity of Humboldt Bay (Planwest et. al 2008). The seminal work continues to be Llewellyn Loud's 1918 publication of *Ethnogeography and Archaeology of the Wiyot Territory*. Loud interviewed Wiyot tribe members and Euro-American settlers, which ultimately led him to document Wiyot cultural practices as well as 172 archaeological and active cultural sites in Wiyot tribal lands. Additionally, Loud conducted an archaeological excavation of the Wiyot village of Tuluwat (CA-HUM-67), work which was continued by successive researchers through the 1940s. Tuluwat is discussed in more detail later in this section. Notably, Loud (1918:266–270) recorded several villages in the Eureka area near the proposed activities. These descriptions include:

- **Site 65** was a village of three or four houses located at the base of a bluff on the point of land later occupied by the Occidental Mill (also called McKay & Co. Occidental Mill). Most Wiyots driven out shortly after 1852, likely going to Gunther Island.
- **Site 58** was a larger village of perhaps eight or 10 houses as of 1858. It was located on Eureka slough, with Lucas Prairie behind it, and was the home of several well-known Wiyot leaders.
- **Site 17** was a village located on the north spit a quarter of a mile south of the Fairhaven shipyards. It was characterized by sizeable shell middens and was occupied at least through the late 1870s.
- **Site 73** was a village of eight or 10 plank houses, as of 1851. Notably, it was located on the bay shore of Bucksport.
- **Site 77** was a village called *ikso'ri*, comprised of six or fewer houses located on the sandspit at the mouth of the Elk River.
- **Site 79** was a village located on Buhnes Point (also called Humboldt Point) that was reported to have numerous graves and to constitute a place of traditional or mythological significance. Loud reports that the site was vacated by the native inhabitants after the formation of the Humboldt City on the site in 1850 and was subsequently "washed away."

Several other early and mid-twentieth century ethnographic studies have contributed to our current understanding of prehistoric Wiyot culture. The photographer/filmmaker and ethnographer Edward S. Curtis published *The North American Indian* (1970) in 1924. In the 13th volume of the 20-volume set, Curtis describes Wiyot myths as told to him by the elder Jerry James. In 1936, ethnographers Gladys Nomland and A.L. Kroeber published their paper Wiyot Towns in *University of California Publications in American Archaeology and Ethnology*, expanding on Loud's narratives about Wiyot settlements, ceremonies, and population. Between 1910 and 1923, Hart Mariam researched and interviewed Wiyot tribe members, eventually compiling a useful distinction of the three Soo-lak-te-luk groups that make up the Wiyot tribe.

No underwater archaeological studies within Humboldt Bay were readily available for inclusion in this report and much of the rest of the terrestrial cultural studies in the vicinity of the bay have been small, targeted projects that lack depth and breadth compared to the early twentieth century

research. In recent decades, there have been few primary source studies that systematically survey relevant parts of Humboldt Bay and fewer still that uncovered archaeological material. Consequently, it is difficult to predict what archaeological material encountered by ground disturbance in the area would look like.

3.5.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to cultural resources and applicable to the program.

3.5.2.1 Federal

This program would require a series of permit from USACE, which is responsible for all navigation channels within Humboldt Bay and, as such, must be in compliance with Section 106 of the National Historic Preservation Act (NHPA). The Proposed Program would also be expected to comply with Section 404 (33 U.S.C. § 1344) of the CWA, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. § 1413). Compliance with other federal regulations, such as the National Environmental Policy Act (NEPA), would be clarified in a subsequent report if federal funds become available to the program.

The NHPA of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on such properties and allow the Advisory Council on Historic Preservation an opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation. The function of Section 106 is codified in 36 Code of Federal Regulations (CFR) 800.

3.5.2.2 State

Historical resources are considered under CEQA as well as PRC Section 5024.1, which established the California Register of Historical Resources (CRHR). PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet the listing criteria of the NRHP. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the State Historic Preservation Officer (SHPO) before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or eligible for inclusion in the NRHP or registered or eligible for registration as California Historical Landmarks.

CEQA requires consideration of impacts of a project on unique archaeological resources and historical resources. A unique archaeological resource, as defined in PRC Section 21083.2(g), is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, a high probability exists that it:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information
- Has a special and particular quality such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person

Section 15064.5(a) of the State CEQA Guidelines generally defines a historical resource as:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR;
2. A resource listed in a local register of historical resources or identified in a historical resource survey meeting the requirements in PRC Section 5024.1(g); and
3. Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines is historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the determination is supported by substantial evidence in light of the whole record; or a resource determined by a lead agency to be "historical," as defined in PRC Section 5020.1(j) or 5024.1.

California Register of Historical Resources

The CRHR includes resources that are listed in or are formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest (PRC Section 5024.1; CCR Title 14 § 4850). Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts), or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA, unless a preponderance of evidence indicates otherwise (State CEQA Guidelines, Section 15064.5[a][2]). The definitions, from the California Public Resources Code Section 5020.1(j) are:

> historical resource includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." Specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing the California Register of Historical Resources, included in the local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR §15064.5(a) (1-3)).

Historic property, is defined by 36 CFR 800.16(l) as

> any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. A cultural resource may be eligible for listing in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- Is associated with the lives of persons important in our past.
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- Has yielded, or may be likely to yield, information important in prehistory or history.

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the contractor or the project applicant immediately must halt potentially damaging excavation in the area of the burial and notify the County Coroner to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code, Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, the coroner must contact the NAHC by phone within 24 hours of making that determination (Health and Safety Code, Section 7050[c]). Following the coroner's findings, the property owner, contractor, or project applicant, and the NAHC-designated Most Likely Descendant are to determine the ultimate treatment and disposition of the remains, and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting on notification of a discovery of Native American human remains are identified in PRC Section 5097.9.

Assembly Bill 52

AB 52, enacted in 2014, amends sections of CEQA relating to Native Americans. AB 52 establishes a new category of cultural resources, named tribal cultural resources (TCRs), and states that a project that may cause a substantial adverse change in the significance of a TCR may have a significant effect on the environment. Section 21074 was added to the Public Resources Code to define TCRs, as summarized:

1. TCRs are either of the following:
    a. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
        i. Included or determined to be eligible for inclusion in the California Register of Historical Resources.
        ii. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
    b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency would consider the significance of the resource to a California Native American tribe.
2. A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.
3. A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

AB 52 requires the lead agency to begin consultation with any tribe that is traditionally or culturally affiliated with the geographic area. In addition, AB 52 includes the following time limits for certain responses regarding consultation:

- Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency would provide formal notification to the

designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice.

- After provision of the formal notification by the public agency, the California Native American tribe has 30 days to request consultation.
- The lead agency must begin consultation process within 30 days of receiving a California Native American tribe's request for consultation.

AB 52 (Chapter 532, Statutes of 2014) establishes a formal consultation process for California Native American tribes as part of CEQA and equates significant impacts on tribal cultural resources with significant environmental impacts (new PRC § 21084.2).

3.5.2.3 Local

Pursuant to current general plan policy and CEQA, Humboldt County conducts cultural resource surveys in association with discretionary projects. These surveys may recommend that a site or structure be given special status, thereby qualifying it for protection and other benefits. The designations relate to eligibility for inclusion on the National Register of Historic Places or the State of California Register of Historical Resources. The County also has its own Local Official Register of Historic Resources, which provides protective status to resources that have local significance. Unlike the California Register, properties cannot be listed on the County Inventory or the National Register without the owner's consent.

The HCGP (Humboldt County 2017) lays out a series of strategies to define, identify, and protect cultural resources while appropriately consulting Native American tribes residing in the county as well as other relevant parties. Many of these echo the regulatory demands of NHPA, NEPA, and CEQA. Crucially, the HCGP reiterates a PRC stipulation that the exact location of Native American grave sites, burial grounds, sacred sites, sensitive cultural places, and prehistoric and historic archaeological sites would not be publicly disclosed in order to prevent the possibility of theft or vandalism. Furthermore, the plan offers specific prescriptions for mitigating the effects of projects/programs, including avoidance of the resource, capping for protection, and data recovery (where the others are infeasible). The Humboldt County Board of Supervisors may designate areas of historical concern, in which all structures 45 years or older may be assessed for register eligibility, a process requiring written notice to all the affected property owners and at least one public hearing by the Board of Supervisors prior to approving the designation. Nominating entities would also be encouraged to nominate properties to the California Register of Historical Resources as well as registers across the federal, state, and local systems. A county Cultural Resources Advisory Committee has been created to advise County staff and Council in these matters.

The City of Arcata maintains a General Plan for 2020 (last amended October 2008) that guides the treatment of historic properties within its limits. They too, echo many of the sentiments of the NHPA, including maintaining a local historic landmark database of notable properties at least 50 years old, for which the city offers owners incentives for their preservation and upkeep. Additionally, the city imposes controls on demolition and exterior renovation within historic districts of the city, especially the Arcata Plaza Area Historic District and including the Bayside Specific Plan District, and the "South of Samoa" (SOS) Specific Plan District. The city of Arcata has also determined that all proposed discretionary projects under the CEQA would be subject to cultural resources sensitivity review by the Northwest Information Center. In that spirit, during such project the city would contract for a general cultural overview of the city and its environs. Such an

overview would include a survey and a report covering planned mitigation strategies regarding impacts on archeological resources, monitoring plans, and inadvertent discovery protocols.

Within the City of Eureka, California Government Code section 37361 provides the city with broad local authority to impose conditions to protect and enhance places, buildings, structures, works of art, and other objects having a special character or special historical or aesthetic interest or value. The City initiated a historic preservation program in 1996 through legislative action to adopt the Historic Preservation Ordinance. This ordinance established the Local Register of Historic Places (LRHP), criteria for inclusion on the LRHP, and created an administrative body, the Historic Preservation Commission, to review projects subject to the ordinance.

3.5.2.4 Native American Consultation

California SB 18 requires local governments to consult with tribes prior to making certain planning decisions and to provide notice to tribes at certain key points in the planning process. The intent of SB 18 is to provide California Native American tribes an opportunity to participate in local land use decisions at an early planning stage, for the purpose of protecting, or mitigating impacts to, cultural places. In accordance with the requirements of SB 18, Humboldt Bay Harbor District Planner George Williamson sent an e-mail to representatives from three Native American entities with possible interest in requesting consultation. These included:

- Ted Hernandez – Wiyot Tribe
- Janet Eidsness – Blue Lake Rancheria
- Erika Cooper – Bear River Band

On January 29, 2018, Janet Eidsness responded that Blue Lake Rancheria would like to engage in consultation, and on February 2, 2018, Ted Hernandez requested the same for the Wiyot Tribe.

On July 30, 2020, Humboldt Bay Harbor District staff held a virtual meeting with tribal representatives Ted Hernandez (Wiyot Tribe) and Janet Eidsness (Blue Lake Rancheria). This meeting discussed the description of the overall Proposed Program and key components of tribal concern. Discussion also took place in regard to the use of sediment to protect known tribal resources from potential sea-level rise and erosion. During this meeting it was determined that the measures within the *Harbor District Protocol for Inadvertent Archaeological Discoveries for Ground Disturbing Project Permits, Leases, and Franchises* (Humboldt Bay Harbor District 2015), are expected to suffice as mitigation measures for the Proposed Program. Additionally, it was decided that the Harbor District would consult with the tribes on Program specific sites and beneficial-use sites to provide the tribes a chance to screen each location for potential impacts.

3.5.3 Impacts Analysis

3.5.3.1 Methodology

This impact analysis compares the known extent of disturbance, as well as the disturbance methods, to the resources potentially affected and estimates the effect program-related actions would have on a given resource. A determination would be made regarding the significance of these impacts.

3.5.3.2 Thresholds of Significance

Adverse effects on historic properties include but are not limited to the following.

- Physical destruction of or damage to all or part of the property
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties and applicable guidelines
- Removal of the property from its historic location
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long term preservation of the property's historic significance

The methods used in this analysis are qualitative but draw on studies that are grounded in solid quantitative analysis and modeling, especially regarding the probability for encountering intact archaeological materials.

3.5.3.3 Impacts and Mitigation Measures

Impact CUL-1: Would the Proposed Program Have the Potential for Disturbance in Previously-dredged Underwater Areas of Humboldt Bay; Adversely Affect Known or Unknown Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?

Encountering intact archaeological materials or human remains during dredging in previously disturbed areas is unlikely. Because there have been no underwater archaeological surveys in the bay and no archaeological materials were recorded during previous dredging work, there are no known archaeological sites in the 25 "LMSs." The dredging schedule for many of the LMSs varies between annually and every 25 years, with the most common interval being dredging every 7 years. Such common disturbance would make encountering archaeological data increasingly less likely on any subsequent disturbance.

The Native American occupation of the United States' Pacific Coast is well documented, with notable early examples including evidence of coastal migration in the 16,000-year old site at Coopers Ferry (Davis et al. 2019) and sophisticated coastal seafaring cultures in the Channel Islands likely more than 13,000-years old (Erlandson et al. 2012). In the Proposed Program area, the Wiyot people have inhabited the Humboldt Bay region for thousands of years. The most significant known prehistoric sites in the area are located on Duluwat Island (also called Indian Island), which is adjacent to

dredging sites along the Eureka city waterfront. Archaeological evidence showed that the island had been inhabited for at least 1,000 years, a tenure long enough to significantly alter the topography of the island by shell midden formation. Duluwat Island was the site of the Native American villages of EtpidoL wotperoL (CA-HUM-68) and Tuluwat (CA-HUM-67)(also spelled Dulawo't) before February 25, 1860, when Euromerican settlers massacred approximately 100 Wiyot during their World Renewal Ceremony at Tuluwat village. Subsequent (generally amateur) excavation on this island examined the major shell middens, house floors, and fire features associate with the two villages, finding items they attributed to both Wiyot and Yurok cultural traditions (Elasser 1986).They also uncovered more than 400 burials associated with those groups. In the last 20 years Wiyot have secured deeds to a majority of the island from the City of Eureka. In 2013, the Wiyot held their World Renewal Ceremony on the island for the first time in more than 150 years. Tuluwat was designated a State Historic Landmark in 1964 and is listed on the National Register of Historic Places; EtpidoL wotperol is eligible for the National Register of Historic Places.

The historic-period resources most likely to be encountered by the ground disturbance described in this PEIR would be the many shipwrecks recorded in and near Humboldt Bay; however, none of these have been encountered during previous maintenance dredging activities. There are at least 70 known shipwrecks in the Humboldt Bay region, with most occurring in the channel while under tow between 1850 and 1899 (Malovos 1973). Within the date ranges that would qualify for listing within the National Register of Historic Places, there were at least 29 shipwrecks in the channel between 1850 and 1899, 12 wrecks in the channel between 1900 to 1940, and two wrecks in the channel between 1941 to 1971. However, one study (Simpson 1998) noted that shipwreck salvage operations were a lucrative business throughout Humboldt Bay's historic period and at least 22 shipwrecks were recorded having been salvaged or sold at auction between 1850 and 1947. This would have simultaneously limited the amount of available archaeological data about the shipwreck and demonstrated the ship's value and given clues about the salvage operation itself.

The State Lands Commission administers the California Shipwreck and Historic Maritime Resources Program. The Commission maintains a list of known shipwrecks in State waters and seeks and provides information about historic shipwrecks and sunken aircraft. Any shipwreck sunk more than 50 years is presumed to be of archaeological or historical significance and is protected under State law. Public Resources Code sections 6309, 6313, and 6314 describe the Commission's authority over shipwrecks and other submerged archaeological sites. Evaluation of this program's potential to impact historically significant shipwrecks is complicated by the facts that not all coastal shipwrecks are known, and the locations of those that are known may not be accurately recorded or remain in their documented position.

Despite the potential for intact bay strata to contain archaeological material, previous dredging conducted at all LMSs would have disturbed or destroyed any prehistoric archaeological materials. Given the above information, the potential for proposed ground disturbance to adversely affect underwater prehistoric or historical-period archaeological materials in previously disturbed areas, impacts are anticipated to be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a

subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. Impacts are anticipated to be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. Impacts are anticipated to be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. Impacts are anticipated to be less than significant.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be new or additional impacts to Cultural Resources under the No-Project Alternative.

Impact CUL-2: Would the Proposed Program Propose any Processing and Dewatering Actions in Terrestrial Areas around Humboldt Bay with Potential to Adversely Affect Known or Unknown Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?

Within the context of the proposed actions, three potential processing sites for dewatering and temporary stockpiling have been identified around Humboldt Bay. At these sites, the following activities would occur: (1) dewatering of the material with decanted water returned to Humboldt Bay, the Pacific Ocean and/or percolated into the ground, (2) temporary stockpiling of sediments, and (3) stockpile management. Of the three sites, two sites have impervious concrete surfaces where the work and stockpiling would take place—these are the Redwood Marine Terminal II on the north spit and the Fields Landing Boatyard on the mainland in the community of Fields Landing. One processing site, Samoa Lagoons, does not have an impervious surface.

The Samoa Lagoons are located on the north spit, northeast of the town of Samoa, and were designed and historically used for dewatering and placement of dredged material. The site has two basins constructed of sandy material (presumably dune sand) and previously dredged bay sediments within which there are between 0–4 ft deep dredged sediments. The primary disposal basin is 6.6 acres and the secondary decant basin is 5.9 acres, with a combined capacity of 45,000 cy of sediment. During processing, water from the dredged material is decanted, passing through both basins and a series of decant weirs before being discharged into Humboldt Bay.

Roughly 1.5 miles northeast of the Samoa Lagoons, also on the east side of the northern spit, is the Manila site. The Manila site (CA-HUM-321) is a shell midden within the town of Manila whose geologic context approximates that of the two north spit dredge material processing sites at Redwood Marine Terminal II and Samoa Lagoons. A study of the shell midden suggests that the Wiyot people at the Manila site chiefly utilized bay and littoral resources rather than those from the ocean (Tushingham et al. 2016). The authors of the study also suggest the site may have been occupied year-round but recommend additional study to support that theory. The Samoa Lagoons are also approximately 3 miles northeast of Site 17, on the north spit, as described by Llewellyn Loud (1918:1969). At this site, Loud describes a Wiyot village with four or five houses and three concentrations of shell deposition.

It is also important to consider that the dunes on the north spit moved and shifted position frequently and drastically until they were stabilized with vegetation and other controls in the twentieth century. Archaeological sites covered by dunes likely would be relatively well preserved, as they were insulated from environmental degradation such as weather, waves, animals, and other variables.

However, on-land sites where dredged materials are dewatered, processed, and stockpiled would lead to very little ground disturbance. Proposed work at Redwood Marine Terminal II and the Fields Landing Boatyard would be conducted on impervious surfaces. The ground disturbance at Samoa Lagoons, a site which has no impervious surface, would not exceed the lateral extent and depth of previous disturbance at the site. Consequently, work associated with dewatering, processing, and stockpiling at Redwood Marine Terminal II, the Fields Landing Boatyard, and Samoa Lagoons would have less-than-significant effects on archaeological or historical resources, tribal cultural resources, or human remains because all such work would not disturb intact strata.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. Impacts on archaeological or historical resources, tribal cultural resources, or human remains are anticipated to be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. Impacts on archaeological or historical resources, tribal cultural resources, or human remains are anticipated to be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described

above for the Proposed Program. Impacts on archaeological or historical resources, tribal cultural resources, or human remains are anticipated to be less than significant.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be new or additional impacts to Cultural Resources under the No-Project Alternative.

Impact CUL-3: Would the Proposed Program Propose Placement of Treated Dredge Materials at Beneficial Use Areas around Humboldt Bay with Potential to Adversely Affect Known or Unknown Prehistoric and Historic Archaeological Resources Pursuant to CEQA Guidelines Section 15064.5; or a Tribal Cultural Resource as Defined in Public Resources Code Section 21074; or Disturbance of Human Remains, Including those Interred Outside of Formal Cemeteries?

The Proposed Program has identified 76 sites where treated dredge materials can be beneficially used. Treated dredge materials may be used: as construction fill material, to help protect waterfront property from sea level rise, replenish beaches, increase resiliency of diked shoreline structures to sea level rise, raise the elevation of diked former tidelands now used for agriculture, create living shorelines, and restore historic salt marsh habitat.

Placing dredged materials at beneficial use areas is unlikely to affect archaeological sites or historic properties if the existing ground surface remains intact and the materials are distributed relatively evenly across the landscape to avoid exerting disproportionate pressure. This would include vehicles and heavy machinery used to transport and work with dredge material. Dredged materials are expected to match pH and chemical composition at beneficial use areas such that subsurface archaeological sites would not be affected by chemical contact through seepage. With the inclusion of MM-CUL-1 (Detect and Avoid Archeological Sites During the Program) and MM-CUL-2 (Notice to Tribal Heritage Preservation Officers), impacts would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. With the inclusion of MM-CUL-1 impacts are anticipated to be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. With the inclusion of MM-CUL-1 impacts are anticipated to be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program. With the inclusion of MM-CUL-1 impacts are anticipated to be less than significant.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be new or additional impacts to Cultural Resources under the No-Project Alternative.

Mitigation Measures

CUL-1: Detect and avoid archaeological sites during the program.

Given that no prehistoric or historic-period archaeological resources have been recorded in the Proposed Program locations and all project activities are expected to have a less-than-significant impact on prehistoric and historic archaeological resources, tribal cultural resource, or disturbance of human remains, the *Harbor District Protocol for Inadvertent Archaeological Discoveries for Ground Disturbing Project Permits, Leases, and Franchises* (Humboldt Bay Harbor District 2015), are expected to suffice as mitigation measures for this program. The Standard Operating Procedures (SOP) for the district are, in full:

A. SOP for Inadvertent Archaeological Discovery (General)

Ground-disturbing activities will be immediately stopped if potentially significant historic or archaeological materials are discovered. Examples include, but are not limited to, concentrations of historic artifacts (e.g., bottles, ceramics) or prehistoric artifacts (chipped chert or obsidian, arrow points, groundstone mortars and pestles), culturally altered ash-stained midden soils associated with pre-contact Native American habitation sites, concentrations of fire-altered rock and/or burned or charred organic materials, and historic structure remains such as stone-lined building foundations, wells or privy pits. Ground-disturbing project activities may continue in other areas that are outside the discovery locale.

An “exclusion zone” where unauthorized equipment and personnel are not permitted will be established (e.g., taped off) around the discovery area plus a reasonable buffer zone by the Contractor Foreman or authorized representative, or party who made the discovery and initiated these SOP.

The discovery locale will be secured (e.g., 24-hour surveillance) as directed by the Harbor District if considered prudent to avoid further disturbances.

The Contractor Foreman or authorized representative, or party who made the discovery and initiated these SOP, will be responsible for immediately contacting by telephone the parties listed below to report the find:

- The Harbor District’s authorized POC

- The Applicant's (District's permittee, lease, or franchise holder) authorized point of contact (POC), and its General Contractor's POC, if applicable

Upon learning about a discovery, the Harbor District's POC will be responsible for immediately contacting by telephone the POCs listed below to initiate the consultation process for its treatment and disposition:

THPOs with Blue Lake Rancheria, Bear River Band and Wiyot Tribe; and Other applicable agencies involved in Project permitting (e.g., USACE, US Fish & Wildlife Service, California Department of Fish & Wildlife, etc.).

Ground-disturbing project work at the find locality will be suspended temporarily while Harbor District, the three THPOs, consulting archaeologist and other applicable parties consult about appropriate treatment and disposition of the find. Ideally, a Treatment Plan will be developed within three working days of discovery notification. Where the project can be modified to avoid disturbing the find (e.g., through project redesign), this may be the preferred option. Should Native American remains be encountered, the provisions of State laws will apply (see below). The Treatment Plan will reference appropriate laws and include provisions for analyses, reporting, and final disposition of data recovery documentation and any collected artifacts or other archaeological constituents. Ideally, the field phase of the Treatment Plan may be accomplished within 5 days after its approval; however, circumstances may require longer periods for data recovery.

The Harbor District's officers, employees and agents, including contractors, permittees, holders of leases or franchises, and applicable property owners will be obligated to protect significant cultural resource discoveries and may be subject to prosecution if applicable State or Federal laws are violated. In no event will unauthorized persons collect artifacts.

Any and all inadvertent discoveries will be considered strictly confidential, with information about their location and nature being disclosed only to those with a need to know. The Harbor District's authorized representative will be responsible for coordinating with any requests by or contacts to the media about a discovery.

These SOPs will be communicated to the field work force (including contractors, employees, officers and agents) of those entities that obtain a permit, lease or franchise from the Harbor District, and such communications may be made and documented at weekly tailgate safety briefings.

Ground-disturbing work at a discovery locale may not be resumed until authorized in writing by the Harbor District.

In cases where a known or suspected Native American burial or human remains are uncovered:

- The following contacts will be notified immediately: Humboldt County Coroner (707-445-7242) and the property owner of the discovery site.
- The SOP for Inadvertent Discovery of Native American Remains and Grave Goods (B below) will be followed.

B. SOP for Inadvertent Discovery of Native American Remains and Grave Goods.

In the event that known or suspected Native American remains are encountered, the above procedures of SOP paragraph A for Inadvertent Archaeological Discovery (General) will be followed, as well as:

If human remains are encountered, they will be treated with dignity and respect. Discovery of Native American remains is a very sensitive issue and serious concern of affiliated Native Americans. Information about such a discovery will be held in confidence by all project personnel on a need-to-know basis. The rights of Native Americans to practice ceremonial observances on sites, in labs and around artifacts will be upheld.

Violators of Section 7050.5 of the California Health and Safety Code may be subject to prosecution to the full extent of applicable law (felony offense).

In addition, the provisions of California law (Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the California Public Resources Code) will be followed:

- The Coroner has two working days to examine the remains after being notified of the discovery. If the remains are Native American, the Coroner has 24 hours to notify the Native American Heritage Commission (NAHC) in Sacramento at (916) 653-4082.
- The NAHC is responsible for identifying and immediately notifying the Most Likely Descendant (MLD) of the deceased Native American (Note: NAHC policy holds that the Native American Monitor will not be designated the MLD).
- Within 48 hours of their notification by the NAHC, the MLD will be granted permission by the property owner of the discovery locale to inspect the discovery site if they so choose.
- Within 48 hours of their notification by the NAHC, the MLD may recommend to the owner of the property (discovery site) the means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The recommendation may include the scientific removal and non-destructive or destructive analysis of human remains and items associated with Native American burials. Only those osteological analyses (if any) recommended by the MLD may be considered and carried out.

Whenever the NAHC is unable to identify a MLD, or the MLD identified fails to make a recommendation, or the property owner rejects the recommendation of the MLD and mediation between the parties by NAHC fails to provide measures acceptable to the property owner, he/she will cause the re-burial of the human remains and associated grave offerings with appropriate dignity on the property in a location not subject to further subsurface disturbance.

C. SOP for Documenting Inadvertent Archaeological Discoveries

The Contractor Foreman or authorized representative, or party who made the discovery and initiated these SOP, will make written notes available to the Harbor District describing: the circumstances, date, time, location, and nature of the discovery; date and time each POC was informed about the discovery; and when and how security measures were implemented.

The Harbor District POC will prepare or authorize the preparation of a summary report which will include: the time and nature of the discovery; who and when parties were notified; outcome of consultations with appropriate agencies and Native American representatives; how, when and by whom the approved Treatment Plan was carried out; and final disposition of any collected archaeological specimens.

The Contractor Foreman or authorized representative will record how the discovery downtime affected the immediate and near-term contracted work schedule, for purposes of negotiating contract changes where applicable.

If applicable, Monitoring Archaeologists and Tribal Representatives will maintain daily fieldnotes, and on completion, submit a written report to the Harbor District and the three Wiyot area THPOs.

Treatment Plans and corresponding Data Recovery Reports will be authored by professionals who meet the Federal criteria for Principal Investigator Archaeologist and reference the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 FR 44734-44737).

Final disposition of all collected archaeological materials will be documented in the final Data Recovery Report and its disposition decided in consultation with Tribal representatives.

Final Data Recovery Reports along with updated confidential, standard California site record forms (DPR 523 series) will be filed at the Northwest Information Center of the California Historical Resources Information System and the Harbor District, with report copies provided to the three Wiyot area THPOs.

Confidential information concerning the discovery location, treatment and final disposition of Native American remains will be prepared by the THPOs and forwarded to the Sacred Sites Inventory maintained by the NAHC.

CUL-2: Notification to Tribal Heritage Preservation Officers.

All activities taken as part of the Proposed Program will be sent to the Wiyot Tribe, Blue Lake Rancheria Tribe and Bear River Band of the Rohnerville Rancheria Tribe's Tribal Heritage Preservation Officers for review and comment prior to implementation.

3.6 Geology and Soils

This section discusses the affected environment relevant to geology, seismicity, and soils in the Proposed Program area. For the purposes of the affected environment and the subsequent impact analysis with respect to geology, seismicity, and soils, the Proposed Program area includes the 25 dredging sites in Humboldt Bay; the three sites where dredged sediments may be dewatered and temporarily stockpiled (located at Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard); and the 76 sites where dredged sediments may be beneficially used (as described in Chapter 2, *Project Description*, and Appendix A).

3.6.1 Environmental Setting

3.6.1.1 Geology

The Samoa Lagoons and Redwood Marine Terminal II material processing sites are underlain by Quaternary dune sand. The Fields Landing Boat Yard and all of the dredging and beneficial reuse sites are underlain by Quaternary alluvium (California Division of Mines and Geology 1962).

3.6.1.2 Fault Rupture

A hazard of surface fault rupture exists in Humboldt County along the San Andreas Fault and possibly along the Little Salmon and Mad River faults. In the vicinity of the program area, the active

Little Salmon fault zone extends into the eastern edge of beneficial use site SB-1, generally along the eastern side of Highway 101. No active faults extend across the other project elements (CGS 2020).

3.6.1.3 Seismic Shaking

Numerous faults in the Humboldt Bay region, including faults in the Gorda and North American plates, the Mendocino and San Andreas fault systems, and the Cascadia Subduction Zone, could result in strong seismic shaking in the program area (County of Humboldt 2017).

As shown on a map published by CGS (2003), the relative intensity of earthquake-induced ground shaking and damage in the Proposed Program area from anticipated future earthquakes is at the highest end of the possible range. Specifically, the relative intensity of earthquake-induced ground shaking for future anticipated earthquakes, calculated as the level of ground motion that has a 2 percent chance of being exceeded in 50 years, is high to very high in the Proposed Program area (Branum et al. 2016).

3.6.1.4 Liquefaction and Landsliding

Liquefaction is a process whereby strong ground shaking, such as that from seismic activity, causes saturated soils and sediments to temporarily lose strength and to behave as a viscous fluid. Soil materials that are particularly prone to liquefaction are those that are unconsolidated, silty, or sandy and existing within 50 feet of the ground surface and saturated by groundwater. Liquefaction can cause excessive ground deformations, failures, and temporary loss of soil bearing capacity, resulting in damage to structures and levees. Ground failures can take the forms of lateral spreading, excessive differential or total compaction or settlement, and slope failure.

The relative slope stability and liquefaction potential in the Program area have been mapped by the County of Humboldt (2016). The mapping shows that all of the sediment processing sites and all of the beneficial reuse sites are “Relatively Stable” with respect to slope stability (e.g., landsliding). The “Relatively Stable” category is the most stable of the four categories used on the map.

All of the dredging sites, all of the beneficial-use sites, and the Samoa Lagoons and Fields Landing Boatyard sediment processing sites are in an “Area of Potential Liquefaction.” The Redwood Marine Terminal II sediment processing site is not subject to liquefaction (County of Humboldt 2016).

3.6.1.5 Soils

Surface soils (i.e., the upper 5–6 feet) in western Humboldt County, including the sediment processing sites and the beneficial-use sites, have been mapped by the USDA Natural Resources Conservation Service (Soil Survey Staff 2020) as underlain by a number of soil map units. The map units generally consist of clayey to coarse-loamy soils on low floodplains, tidal flats, and tidal marshes. Some of the soils consist of coarse-loamy dredge spoils and other fill materials. Many of the soils have a shallow water table or are subject to frequent flooding. The soils are mainly mineral (i.e., low organic matter content) soils, but some of the map units contain high organic matter content (i.e., mucky) mineral soils. The soils generally are moderately well drained to very poorly drained. Because the slopes are level to very gentle, the hazard of water erosion is slight. Some of the soils would be considered expansive, as defined in Table 18-1-B of the Uniform Building Code.

Diked former tidal marshes constitute the majority of the lands adjacent to existing Humboldt Bay salt marshes. Some of the diked tidal marsh soils have subsided 1 to 3 feet below their pre-

agricultural conversion elevations as a result of aerobic oxidation and compaction of the organic matter (Aldaron Laird and Trinity Associates 2019; Humboldt Bay.org 2016). If tidal influence were to be reintroduced to these areas and added sea level rise, they would convert to mudflats rather than vegetated salt marshes. Restoring wetlands on diked tidal marsh soils would require large sediment inputs (Humboldt Bay.org 2016).

3.6.2 Regulatory Setting

3.6.2.1 Federal

U.S. Geological Survey National Seismic Hazard Maps

The U. S. Geological Survey (USGS) provides probabilistic seismic hazard maps for the 48 conterminous states (U.S. Geological Survey 2018). These maps depict contour plots of seismically induced peak ground acceleration (PGA) and spectral accelerations at selected frequencies for various ground-motion return periods. The USGS National Seismic Hazard Maps are updated periodically and have been adopted by many building and highway codes as the minimum design requirements.

Clean Water Act

The Clean Water Act (CWA) is discussed in detail in the Hydrology and Water Resources section. However, because CWA Section 402 is directly relevant to soil erosion and soil disturbance, additional information is provided here.

The CWA (33 USC § 1251 et seq.) establishes the institutional structure for the U.S. Environmental Protection Agency (USEPA) to regulate point and nonpoint discharges of pollutants into the waters of the United States, establish water quality standards, and implement pollution control programs. The CWA authorizes USEPA to delegate many permitting, administrative, and enforcement aspects of the law to state governments. In California, the State Water Resources Control Board (State Water Board) has been designated by USEPA to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated the specific responsibilities for the development and enforcement actions to the regional water quality control boards (Regional Water Boards). Humboldt Bay is located within Region 1, the jurisdictional area of the North Coast Regional Water Quality Control Board (North Coast Water Board).

Section 402: Permits for Discharge to Surface Waters

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, which is administered by the Regional Water Boards.

Under Section 402, dischargers whose projects would disturb at least 1 acre of soil or whose projects disturb less than 1 acre, but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ). Construction activity subject to this permit includes clearing, grading and other ground disturbances such as soil stockpiling and excavation,, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development of a site-specific Storm Water Pollution Prevention Plan (SWPPP) by a Qualified SWPPP Developer (QSD). The SWPPP must identify an effective combination of soil erosion and sediment control measures, as well as non-stormwater best management practices (BMPs). The Construction General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters. The North Coast Water Board administers the NPDES stormwater permit program in Humboldt County. Individual material processing sites and beneficial use project sites potentially would require coverage under the Construction General Permit and therefore implementation of BMPs to manage stormwater runoff and to control accelerated soil erosion for construction-related activities, depending on the area of ground disturbance and nature of the activity at these locations.

The SWPPP would describe measures to manage water generated from land-based dewatering activities (e.g., from trenches and other excavations) if such work is required. Disposal of water from land-based dewatering requires coverage under the SWRCB North Coast Region Waste Discharge Requirements (WDR) Program.

3.6.2.2 State

Liquefaction and Landslide Hazard Maps (Seismic Hazards Mapping Act)

The Seismic Hazards Mapping Act of 1990 (California PRC §§ 2690–2699.6) was passed following the 1989 Loma Prieta earthquake to reduce threats to public health and safety by identifying and mapping known seismic hazard zones in California. The act directs CGS to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of the maps is to assist cities and counties in fulfilling their responsibilities for protecting public health and safety. The Act requires site-specific geotechnical investigations be conducted identifying the seismic hazard and formulating mitigation measures prior to permitting most developments designed for human occupancy within areas prone to liquefaction and earthquake-induced landslides (also known as a Zone of Required Investigation).

Because the Proposed Program does not entail construction of habitable structures, the Act is not discussed further in this document.

Alquist-Priolo Earthquake Fault Zones

The Alquist-Priolo (A-P) Earthquake Fault Zoning Act, passed in 1972, required the establishment of earthquake fault zones (known as Special Studies Zones prior to January 1, 1994) along known active faults in California.

Similar to the Seismic Hazards Mapping Act, its main purposes are to identify known active faults in California and to prevent the construction of buildings used for human occupancy on the surface trace of active faults. For the purpose of this act, a fault is considered active if it displays evidence of surface displacement during Holocene time (approximately during the last 11,000 years).

Because the Proposed Program does not entail construction of habitable structures, the Act is not discussed further in this document.

3.6.2.3 Local

County of Humboldt Section 331-12 Grading, Excavation, Erosion, and Sedimentation Control Ordinance

The purpose of this ordinance is to safeguard life, limb, property, and the public welfare, including the protection of water resources and their related habitats by regulating grading and related activities on private and public property, to control and reduce erosion, to reduce sediment delivered to drainages and streams, and to protect fishery habitat and other biological resources by providing best erosion control and sediment management practices (County of Humboldt n.d.).

Processing of dredged sediments and application of fill material at the sediment processing sites and beneficial reuse sites, respectively, may require compliance with the ordinance.

County of Humboldt Division 3, Building Regulations, Chapter 6 – Geologic Hazards

The purpose of this ordinance is to ensure that risks to life and property in moderate to high geologic hazard areas are minimized, to ensure the stability and integrity of structures, and to avoid creation of or significantly increase erosion and geologic instability. The ordinance applies to projects and activities that fall within the County's land use and development jurisdiction (County of Humboldt 2002).

However, the dredging, sediment transport, handling, and beneficial use activities of the Proposed Program are not included among the types of projects or activities listed in the "Geologic Hazards Land Use Matrix" contained in the ordinance; therefore, this regulation is not applicable to the Proposed Program.

3.6.3 Impacts Analysis

3.6.3.1 Methods for Analysis

Consistent with Section 15126.2 and Appendix G of the CEQA Guidelines, this section evaluates the effects related to geology (including seismicity) and soils that could result from the Proposed Program and alternatives. The description of the environmental setting above is based on published, publicly available mapping and reports. Information sources used include, but are not limited to geologic maps, seismic shaking hazard maps, slope stability/liquefaction hazard maps, and soil survey reports from the USGS, USDA Natural Resources Conservation Service, CGS, County of Humboldt, and private consulting firms.

Potential geologic and soil impacts resulting from implementation of the Proposed Program, Alternatives 1, 2, and 3, and the No-Project Alternative were qualitatively assessed and based on professional judgement. No onsite investigations were conducted to describe the affected environment or to determine potential environmental effects, nor was any modeling conducted in support of the analysis. The impact analysis considers typical construction and operational activities that would be undertaken for implementation of the Proposed Program and alternatives, as described in Chapter 2, *Project Description*.

3.6.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below.

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42)
  b. Strong seismic ground shaking
  c. Seismic-related ground failure, including liquefaction
  d. Landslides
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

3.6.3.3 Impacts and Mitigation Measures

Impact GEO-1: Would the Proposed Program Expose People or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving:

Geo-1(a). Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42)?

Geo-1(b). Strong seismic ground shaking?

Geo-1(c). Seismic-related ground failure, including liquefaction?

Geo-1(d). Landslides?

Proposed Program

Dredging

Dredging would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, or landslides.

Liquefaction and subsequent sudden settlement of bottom sediments that are being dredged during a strong seismic event could cause bay waters to rapidly flow toward the liquefied area from adjoining non-liquefied areas, causing the dredging tug and barge to become unstable as a result of the resulting water movement/wave action. Although unlikely, such instability could cause injury to or death of the personnel on the vessel. However, it is unlikely both that liquefaction would occur at the time of a dredging operation and that the wave action caused by the liquefaction would be any greater than what would typically occur under normal weather conditions. Further, the barges would be at-anchor or would be moored to pilings, which would provide some resistance to liquefaction-induced water movement/wave action. Therefore, the impact would be less than significant.

Dredged Material Processing

Processing Sites

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard via pipeline or barge.

The material held in temporary dewatering basins and stockpile areas would be subject to seismically induced strong ground shaking. If the basins and stockpile areas were not constructed properly (i.e., with adequate setbacks from the retention structures [e.g., k-rail] and with appropriate heights and side slopes), ground shaking could cause the material to be loosened and subsequently released beyond the retention structure, potentially resulting in a loss of property or resulting in an uncontrolled release of the material to receiving waters.

Additionally, during strong seismic events, the material held in temporary dewatering basins and stockpile areas would be subject to the effects of liquefaction, either of the underlying soil material, or in the case of material in dewatering basins, of the material itself (assuming that it was saturated at the time and consists of sandy/silty material[8]). Unless the basins are constructed properly (i.e., with an adequate retention structure, the liquefied material could be subject to lateral spreading toward the perimeter of the stored material and then released beyond the limits of the basins, potentially causing loss of property or potentially resulting in an uncontrolled release of the material to receiving waters. Therefore, the impact would be significant. However, implementation of GEO-1 would reduce the impact to a less-than-significant level.

Transport Pipelines

Temporary transport pipelines may need to be constructed to convey the dredged sediments to the processing sites or beneficial-use sites. The pipelines would be subject to strong seismic ground shaking. The resulting possible failure of the pipeline as a result of ground shaking while it was being used to convey slurry material could cause a loss of property via deposition of the material onto land or result in an uncontrolled release of the material to receiving waters. However, given the infrequency of earthquakes and the relative duration of slurry material pumping, it is unlikely that ground shaking sufficiently strong to cause failure of the pipeline or liquefaction would occur during the timeframe of a given slurry pumping operation. Therefore, the impact would be less than significant.

[8] The composition of the dredged sediment is mostly fine silty-clay material, with some sand (Aldaron Laird and Trinity Associates 2019).

Beneficial Use of Dredged Material

Waterfront Sites

As discussed in Chapter 2 of this PEIR, dredged sediment could be used at 16 sites to increase the surface elevation of the waterfront property to prevent tidal inundation by 1.0 meter of sea level rise. Dredged sediment could also be used to fill low-lying areas and block pathways for inundation of waterfront property and transportation and utility infrastructure. Assuming that the material would be placed as engineered fill (i.e., material that is moisture-conditioned and compacted in lifts to a specified relative density), the use of the dredged sediments in this way would not increase the level of exposure of people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Therefore, there would be no impact.

Beach Replenishment

Dredged sediments used in beach replenishment would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Therefore, there would be no impact.

Diked Shoreline Structures and Diked Former Tidelands

Dredged sediments used at diked shoreline structures would be utilized in a similar way as at waterfront sites, such as by repairing eroded dike sections and raising crest elevations. Accordingly, the use of the material as described would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Therefore, there would be no impact.

Dredged sediments placed in diked former tidelands would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Therefore, there would be no impact.

Living Shorelines and Salt Marsh Habitat

Dredged sediments used for restoring living shorelines and salt marsh habitat would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Therefore, there would be no impact.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to the level that people or structures would be exposed to the potential risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, and landslides.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those

described above for the Proposed Program with respect to the level that people or structures would be exposed to the potential risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, and landslides.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to the level that people or structures would be exposed to the potential risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, and landslides.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be no increase in the level that people or structures would be exposed to the potential risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, and landslides under the No-Project Alternative.

Impact GEO-2: Would the Proposed Program Result in Substantial Soil Erosion or the Loss of Topsoil?

Proposed Program

Dredging

Dredging would not cause an increase in the rate of soil erosion or in the amount of topsoil lost. Therefore, there would be no impact.

Dredged Sediments Processing

<u>Processing Sites</u>

The Redwood Marine Terminal II and Fields Landing Boatyard processing sites are paved industrial areas where the basins would be constructed. There is no native topsoil present, and there would be no substantial soil disturbance which could otherwise cause accelerated soil erosion. Therefore, there would be no impact at these sites.

The Samoa Lagoons site is an established, self-contained materials-processing facility that is not actively used. Although there is no native topsoil present, dredged sediment would need to be removed, and some soil disturbance in adjoining areas could occur, to prepare the area to receive new dredged material, which would ultimately be moved to a beneficial reuse site. Although there would be no native topsoil lost as a result of this work, significant areas of vegetation would be removed and soil disturbed, such that accelerated soil erosion could occur. The impact would be significant. However, implementation of Mitigation Measure GEO-2 and GEO-3 would reduce the impact to a less-than-significant level at the Samoa Lagoons and other sites that are used.

Transport Pipelines

Construction/installation of the transport pipelines could involve vegetation removal and soil disturbance over limited areas, which could cause minor increases in the rate of soil erosion. Because the pipelines would be temporary, no significant loss of topsoil would occur. If the vegetative cover were disturbed during placement of the transport pipelines, it is expected that it would quickly regenerate following removal of the pipelines, such that any increases in erosion rates would be short-lived. Therefore, the impact would be less than significant.

Beneficial Use of Dredged Sediments

Waterfront Sites

Earthwork to fill low-lying areas and block pathways for inundation of waterfront property and transportation and utility infrastructure would involve excavation of existing soil and application and compaction of the applied dredged sediments. Such disturbed areas would be subject to accelerated erosion rates unless erosion control BMPs were implemented. The raised areas would be comparatively more prone to increased erosion rates because the slope length would be longer than presently exists at these sites. Therefore, the impact would be significant. However, implementation of Mitigation Measure GEO-2 and GEO-3 would reduce the impact to a less-than-significant level.

Where dikes are reinforced by placement of dredged sediment on the landward side of dikes using dredged sediments, the dredged sediments would overcover native soils at least in places, resulting in the permanent loss of limited areas of native topsoil. The impact would be less than significant.

Beach Replenishment

Dredged material used to replenish beaches presumably would not be stabilized with BMPs because it would be acknowledged that the sediments would be subject to incremental and episodic, natural entrainment and redeposition over time. The use of the material in this manner is assumed to not be the intent of this impact mechanism (i.e., "Result in substantial soil erosion or the loss of topsoil"). Therefore, there would be no impact.

Diked Shoreline Structures and Diked Former Tidelands

Dredged material used to repair diked shoreline structures would be subject to effects similar to that at waterfront sites.

Dredged material used to compensate for subsidence of diked former tidelands would not be stabilized with BMPs because it would be acknowledged that the sediments would be subject to incremental and episodic entrainment and redeposition over time. The use of the material in this manner is assumed to not be the intent of the soil erosion aspect of this impact mechanism. Therefore, there would be no impact.

Large areas of native topsoil in the diked former tidelands would be lost as a result of being permanently overcovered by the dredged material. However, because the areas that would be overcovered with dredged material would be inundated by rising sea levels and therefore result in a loss of topsoil over time even without the project, there would no impact.

Living Shorelines and Salt Marsh Habitat

Dredged material used to establish living shorelines and restore salt marsh habitat would be subject to similar erosion and deposition process as in beach replenishment and diked former tidelands sites. The sediments generally would not be stabilized with BMPs because it would be acknowledged that the sediments would be subject to incremental and episodic scour, tidal channel formation, and redeposition over time. The use of the material in this manner is assumed to not be the intent of the soil erosion aspect of this impact mechanism. Therefore, there would be no impact.

Native topsoil in tidal marsh areas would be lost as a result of being permanently overcovered by the dredged material. However, because the areas that would be overcovered with dredged material would be inundated by rising sea levels and therefore result in a loss of topsoil over time even without the project, there would be no impact.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to potential substantial soil erosion or the loss of topsoil.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to potential substantial soil erosion or the loss of topsoil.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program with respect to potential substantial soil erosion or the loss of topsoil.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be no change in the rate of soil erosion or in the amount of topsoil lost under the No-Project Alternative.

Impact GEO-3—Would the Proposed Program Be Located on a Geologic Unit or Soil that is Unstable, or that Would Become Unstable as a Result of the Project, and Potentially Result in On- or Offsite Landslide, Lateral Spreading, Subsidence, Liquefaction, or Collapse?

Proposed Program

Dredging

Although dredging would be conducted over areas that are subject to liquefaction, dredging would not result in an increase in liquefaction hazard and therefore would not result in an on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

Dredged Material Processing

Processing Sites

As described in Environmental Setting, Redwood Marine Terminal II is not in an area subject to liquefaction; however, the Fields Landing Boatyard processing site is. This site is underlain by an impervious layer and therefore no significant water from the dredged material would percolate into the ground at this site such that there would not be an increase in groundwater from the material as it dries out. Because there would be no contributions to groundwater from the facility, there would be no increase in the potential for seismically induced liquefaction to occur. Therefore, there would be no increase in the potential for on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse to occur at the Fields Landing Boatyard processing site. There would be no impact at this site.

The Samoa Lagoons facility, which is also in an area that is subject to liquefaction, does not have an impermeable layer. Therefore, percolating water from the applied dredged material as it dewaters would tend to "charge" the underlying groundwater, which if in significant quantities, could cause the water table to rise closer to the surface compared to the existing condition, which could increase the potential for liquefaction. However, the applied dredged material would be approximately 4-ft thick. Assuming that roughly one-half of the applied material (applied as a slurry) would consist of water (as opposed to solids) and none of the water would be removed by decanting, up to 2 ft of water would percolate into the ground over time. This amount of water is not expected to substantially raise the water table compared to the existing condition, such that there would not be a substantial increase in the risk of liquefaction as a result of the project. The impact would be less than significant.

Transport Pipelines

Although the transport pipelines would be located in an area that is subject to liquefaction, the use of the pipelines to transport slurry would not cause these areas to become unstable. Therefore, the pipelines would not cause an increase in an on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

Beneficial Use of Dredged Material

Waterfront Sites

In most cases, assuming that the material would be placed as engineered fill, the use of dredged material at the waterfront sites to raise the elevation of such areas would have little bearing on the stability of the sites with respect to landslide, lateral spreading, subsidence, liquefaction, or collapse. The impact would be less than significant.

Beach Replenishment

Dredged sediments used in beach replenishment would not have a bearing on the stability of the sites with respect to landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

Diked Shoreline Structures and Diked Former Tidelands

Where the dredged material is used to strengthen earthen dikes, there would be an increase in the stability of the side slopes of the dikes, such that they would less subject to slumping and sloughing. Therefore, there would be a beneficial impact.

Dredged material used at the diked former tideland sites would not have a bearing on the stability of the sites with respect to landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

Living Shorelines and Salt Marsh Habitat

Dredged sediments used for restoring living shorelines and salt marsh habitat would not have a bearing on the stability of the sites with respect to landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to the hazard on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to the hazard of on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g.,

beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to the hazard of on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be no increase in the hazard of on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.

Impact GEO-4—Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

Proposed Program

Dredging

Dredging would not entail construction of structures or other property and would not pose a risk to life as associated with effects of expansive soil. Therefore, there would be no impact.

Dredged Sediments Processing

Processing Sites

The processing sites would not entail construction of structures or other property and would not pose a risk to life as associated with effects of expansive soil. Where present at the processing facilities, expansive soil underlying the retention structure [e.g., k-rail] could be subject to heaving as it moistens and settlement as it dries; however, the amount of vertical soil movement that could occur is not expected to cause failure of the structure. The impact would be less than significant.

Transport Pipelines

The transport pipelines would not entail construction of permanent structures or other property and would not pose a risk to life as associated with effects of expansive soil. Therefore, there would be no impact.

Beneficial Use of Dredged Sediments

Waterfront Sites

Application of dredged sediment to waterfront sites would not entail construction of structures or other property on the applied dredged material as an activity under the Proposed Program, and there would be no risk to life or property as associated with effects of expansive soil. Therefore, there would be no impact.

Beach Replenishment

The beach replenishment sites would not entail construction of structures or other property on the applied dredged material and there would be no risk to life or property as associated with effects of expansive soil. Therefore, there would be no impact.

Diked Shoreline Structures and Diked Former Tidelands

The diked shoreline structures and diked former tidelands would not entail construction of structures or other property on the applied dredged material and there would be no risk to life or property as associated with effects of expansive soil. Therefore, there would be no impact.

Living Shorelines and Salt Marsh Habitat

The living shorelines and salt marsh habitat would not entail construction of structures or other property on the applied dredged material and there would be no risk to life or property as associated with effects of expansive soil. Therefore, there would be no impact.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to potential effects caused by expansive soil.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would be the same as those described above for the Proposed Program with respect to effects caused by expansive soil.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program with respect to potential effects caused by expansive soil.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations (e.g., dewatering, stockpiling) would not take place. No new or additional construction (e.g., dewatering basins) and operational (e.g., dredging, sediment transport) activities would occur. There would be no change in potential effects caused by expansive soil under the No-Project Alternative.

Impact GEO-5: Would the Proposed Program Have Soils Incapable of Adequately Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems where Sewers are not Available for the Disposal of Wastewater?

Proposed Program

All Dredging, Dredged Materials Processing, and Beneficial Use Sites

The Proposed Program would not involve the use of septic tanks or alternative wastewater disposal systems, for any of the proposed subset of activities, therefore, there would be no impact.

Mitigation Measures

GEO-1: Protect material held in dewatering basins and stockpile areas at Redwood Marine Terminal II and Fields Landing Boatyard from the effects of seismically induced strong ground shaking and liquefaction.

The dewatering basins and dredged material stockpiles at the Redwood Marine Terminal II and Fields Landing Boatyard and other sites should be designed and constructed to ensure that earthquake ground shaking does not cause the material to become unstable or otherwise released beyond the retention structure. Design plans for the facilities would specify maximum material stockpile heights, maximum sideslope ratios, material setbacks from retention structures, and retention structure type. Such measures should also provide for ground movements and settlement caused by liquefaction at these sites.

GEO-2: Engineer transport pipelines to withstand the effects of seismically induced strong ground shaking and liquefaction.

The transport pipelines should be of a composition and design such that they can withstand the effects of the maximum expected earthquake in the vicinity such that there is no significant uncontrolled release of slurry material. The pipelines would be designed to withstand the effects of seismically induced liquefaction, including differential settlement under sections of the pipeline, such that that there is no significant uncontrolled release of slurry material. Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

GEO-3: Gain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to control accelerated erosion at waterfront sites.

Coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) is likely to be required for all material processing sites, waterfront, and diked shoreline structures sites that individually (but not collectively) would involve one acre or more of soil disturbance, such as excavation of native material, overcovering with dredged material, and stockpiling. Coverage under the Construction General Permit should be acquired unless the work would qualify for a low rainfall erosivity waiver or unless otherwise not required by the State Water Board. Additionally, because the Proposed Program contains activities that are not typical construction activities as described in the General Permit, the State Water Board should be consulted to determine which project activities would be regulated under the General Permit.

As required by the General Permit, Permit Registration Documents (including, but not limited to an SWPPP, risk level calculations, and post-construction water balance calculations) would be submitted to the State Water Board to gain coverage. The SWPPP(s) would require implementation of erosion and sediment control and non-stormwater BMPs and would require periodic inspections and reporting to the State Water Board. Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

3.7 Hazardous Materials and Public Health

3.7.1 Environmental Setting

This section discusses the affected environment relevant to Hazardous Materials and Public Health in the study area. For the purposes of the affected environment and the subsequent impact analysis for Hazardous Materials and Public Health, the study area includes the 25 dredging sites in north and south Humboldt Bay; three sites where sediment may be dewatered and temporarily stockpiled, located at Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard; and 76 sites where sediment may be beneficially used (as described in Section 2.0, Project Description, and Appendix A).

3.7.1.1 Hazardous Materials

Hazardous Materials and Land Use

Land use within the study area consists of public land, agriculture, and residential, commercial, and industrial uses. Due to the nature of their use, residential, and public lands typically do not pose significant hazardous material impacts. Hazardous materials are not typically handled in significant amounts and materials typically used for cleaning, maintenance, etc. are not materials classified as acutely hazardous. Agricultural, industrial, and commercial land uses have a higher likelihood of hazardous materials impacts.

Agriculture

Lands surrounding Humboldt Bay have been historically used for agriculture. In addition, agricultural activities continue to be a big part of the economy of the area. According to the HCGP's Land Use Element

> According to the 2002 U.S Department of Agriculture Census, approximately 27 percent of Humboldt County land (634,000 acres) is in agricultural use. While this total includes large ranches that have a significant amount of timber production contributing to their operations, it fairly represents the overall significance of agriculture to Humboldt County.

It is likely that agricultural chemicals have been applied throughout these areas and, as such, pesticides/herbicides, along with their associated metal constituents, could be present in surficial soils at residual concentrations. Agricultural chemicals in use today are applied in diluted concentrations and, when used properly, degrade relatively quickly; however, older pesticides can linger in the soil for several years.

Contamination Potentially Associated with Agricultural Activities

As mentioned in section 3.8, *Hydrology and Water Resources,* Humboldt bay is included on the 303(d) list as impaired for dioxin toxic equivalents (from industrial point sources, waste storage/storage tank leaks, and unknown sources), and polychlorinated biphenyls (PCBs) from unknown sources. PCBs are persistent chemical compounds and thus do not readily break down in the environment, and bioaccumulate in the tissue of living organisms (e.g., fish, birds, humans). PCBs generally bind to organic matter and settle in sediment or remain suspended with particulates due to low solubility in water. Dioxins are a family of chemically related compounds that, like PCBs, are persistent environmental pollutants. Dioxins have a low solubility in water and therefore adsorb to sediments.

General Industrial Uses

Industrial land use can encompass a wide range of business operations that have the potential to create hazardous materials impacts. Industrial facilities store hazardous materials in underground storage tanks (USTs) and/or aboveground storage tanks, and in designated storage locations. Age and improper maintenance of storage tanks are common causes of soil and groundwater contamination. Improper handling and storage of hazardous material containers can lead to hazardous material incidents.

General Commercial Uses

Commercial locations can include vehicle repair sites, gasoline fueling stations, and dry-cleaning facilities. Like industrial facilities, some commercial sites store hazardous materials in storage tanks and in designated areas within the facility. Hazardous materials spills and leaks in vehicle repair and fueling locations can lead to hydrocarbon-affected soil and groundwater. Improper storage and use of hazardous materials in dry cleaning facilities can lead to chlorofluorocarbon contaminated soil and groundwater.

3.7.1.2 Schools

Several school districts surround Humboldt Bay, including the Peninsula Union, Arcata, Jacoby Creek, Freshwater, Garfield, Eureka City, South Bay Union, and Loleta districts, with the majority of schools concentrated in the city of Eureka.

3.7.1.3 Airports

Samoa Field is located on the Samoa peninsula at the western edge of Humboldt Bay, south of the communities of Samoa and Fairhaven. Murray Field is located east of Eureka and just southwest of the community of Brainard. The California Redwood Coast–Humboldt County Airport is located approximately 7 miles northwest of Arcata in the community of McKinleyville.

3.7.1.4 Emergency Response

The Humboldt County OES is the primary coordination agency for emergencies and disasters affecting residents, public infrastructure, and government operations in the County. The Humboldt Operational Area includes the entirety of the County and its cities, towns, and special districts, in coordination with independent tribes. The Sheriff is designated Director of Emergency Services for the Operational Area by local ordinance. The County OES coordinates and participates in emergency

planning, response, and recovery under the direction of the Sheriff and in collaboration with local, state, and federal partners

3.7.1.5 Wildland Fires

According to the HCGP's Safety Element, wildfire hazards in the county have been analyzed using the methodology of CAL FIRE's Fire and Resource Assessment Program (FRAP) which takes into account fuels, terrain, weather, and other relevant factors. The potential for destructive fires in Humboldt County ranges from moderate to very high in severity classification. CAL FIRE's severity classifications for State Responsibility Areas within Humboldt County reflects a moderate to high rating on the western portions of the county where the fuel potential is high, but the climate is damp. The very high ratings are generally in the drier eastern portions of the county or in very steep terrain.

The CAL FIRE 2007 Fire Hazard Severity Zones in SRA Humboldt County depicts the area immediately surrounding Humboldt Bay as not being within a fire hazard zone with the exception of an area in the South Bay south of Fields Landing, and the area near Southport Landing, both considered a moderate fire hazard. However, as mentioned in Section **Error! Reference source not found.**3.13.8, *Wildfire Hazards*, the discussion of Wildfire Hazards was omitted from the document and would not be analyzed further in this section.

3.7.2 Regulatory Setting

3.7.2.1 Federal

Federal Toxic Substances Control Act/Resource Conservation and Recovery Act/Hazardous and Solid Waste Act

The federal Toxic Substances Control Act (1976) and the Resource Conservation and Recovery Act of 1976 (RCRA) established a U.S. Environmental Protection Agency-administered program to regulate the generation, transport, treatment, storage, and disposal of hazardous waste. The RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle to grave" system of regulating hazardous wastes.

Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as "Superfund," was enacted by Congress on December 11, 1980. This law (42 U.S.C. 103) provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites, provides for liability of persons responsible for releases of hazardous waste at these sites, and establishes a trust fund to provide for cleanup when no responsible party can be identified. CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP (Title 40 CFR Part 300) provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The NCP also established the National Priorities List. CERCLA was amended by the Superfund Amendments and Reauthorization Act on October 17, 1986.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration's (OSHA) mission is to ensure the safety and health of American workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. OSHA establishes and enforces protective standards and reaches out to employers and employees through technical assistance and consultation programs. OSHA standards are listed in 29 CFR 1910.

Toxic Substances Control Act

The Toxic Substances Control Act came into law on October 11, 1976. The Toxic Substances Control Act authorized USEPA to secure information on all new and existing chemical substances, as well as to control any of the substances that were determined to cause unreasonable risk to public health or the environment.

Department of Transportation Hazardous Materials Regulations (49 CFR 100–185)

U.S. Department of Transportation Hazardous Materials regulations cover all aspects of hazardous materials packaging, handling, and transportation. Some of the topics covered include Parts 107 (Hazard Materials Program), 130 (Oil Spill Prevention and Response), 172 (Emergency Response), 173 (Packaging Requirements), 174 (Rail Transportation), 176 (Vessel Transportation), 177 (Highway Transportation), 178 (Packaging Specifications), and 180 (Packaging Maintenance).

Section 401 of the Clean Water Act (CWA): Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into WoUS must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Individual projects under the Proposed Program would require a Section 401 Water Quality Certification from the North Coast Water Board. The North Coast Water Board must certify that beneficial use of the dredged material would not violate state water quality standards and other applicable requirements.

3.7.2.2 State

California Environmental Protection Agency

The California Environmental Protection Agency (Cal/EPA) was created in 1991. It unified California's environmental authority in a single cabinet-level agency and brought the California Air Resources Board, State Water Board, Regional Water Quality Control Board, CalRecycle, Department of Toxic Substances Control (DTSC), Office of Environmental Health Hazard Assessment, and Department of Pesticide Regulation under one agency. These agencies were placed under the Cal/EPA "umbrella" for the protection of human health and the environment to ensure the coordinated deployment of state resources. Their mission is to restore, protect, and enhance the environment and ensure public health, environmental quality, and economic vitality.

Department of Toxic Substances Control

DTSC, a department of Cal/EPA, is the primary agency in California for regulating hazardous waste, cleaning up existing contamination, and finding ways to reduce the amount of hazardous waste produced in California. DTSC regulates hazardous waste primarily under the authority of the federal RCRA and the California Health and Safety Code (primarily Division 20, Chapters 6.5 through 10.6, and Title 22, Division 4.5). Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

- **USC 65962.5** (commonly referred to as the *Cortese List*) includes DTSC-listed hazardous waste facilities and sites, Department of Health Services lists of contaminated drinking water wells, sites listed by the State Water Board as having UST leaks or a discharge of hazardous wastes or materials into the water or groundwater, and lists from local regulatory agencies of sites with a known migration of hazardous waste/material.

Hazardous Waste Control Act (§ 25100 et seq.)

DTSC is responsible for enforcing the Hazardous Waste Control Act (California Health and Safety Code § 25100 et seq.), which creates the framework under which hazardous wastes are managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA cradle-to-grave waste management system in California. It also provides for the designation of California-only hazardous waste and development of standards that are equal to or, in some cases, more stringent than federal requirements.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9) provides authority to the Certified Unified Program Agency. The Certified Unified Program Agency for the project area is the Contra Costa Health Services (Contra Costa Health Services 2018).

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of hazardous materials programs including HazMat Business Plan Program, California Accidental Release Prevention Program, UST Program, AST Program, Hazardous Waste Generator Program, and Incident Response.

CCR, Title 8 – Industrial Relations

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The California Division of Occupational Safety and Health (Cal OSHA) and the federal OSHA are the agencies responsible for assuring worker safety in the workplace. Cal OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices. These standards would apply to construction activities.

California Labor Code (Division 5, Parts 1, 6, 7, and 7.5)

The California Labor Code is a collection of regulations that include regulation of the workplace to ensure appropriate training on the use and handling of hazardous materials and operation of

equipment and machines that use, store, transport, or dispose of hazardous materials. Division 5, Part 1, Chapter 2.5, ensures that employees who are in charge of handling hazardous materials are appropriately trained and informed with respect to the materials they handle. Division 5, Part 7, ensures that employees who work with volatile flammable liquids are outfitted with appropriate safety gear and clothing.

3.7.2.3 Local

Humboldt County General Plan Safety Element

Goal SG-1. Minimize Loss. Communities designed and built to minimize the potential for loss of life and property resulting from natural and human-made hazards.

- **Policy S-P33. Hazardous Waste**. Eliminate the use of toxic materials within Humboldt County, where feasible, and require the reduction, recycling, and reuse of such materials, to the greatest extent possible, where complete elimination of their use is not feasible. Require new development which may generate significant quantities of hazardous wastes to be consistent with all the goals and policies of the Hazardous Waste Management Plan.
- **Policy S-S14. Airport Land Use Compatibility Plan**. Development within the jurisdiction of Airport Land Use Compatibility Plans (ALUCP) will conform to the policies and standards of the ALUCP.
- **Policy S-S18. Humboldt County Operational Area Office of Emergency Services (OES)**. Local emergency management and response operations will be consistent with Humboldt County Operational Area Emergency Operations Plan and Humboldt County Ordinance 2203.

Humboldt Bay Management Plan – Harbor Element Planning Policies

Dredging and Waterway Maintenance

- **HWM-2:** Dredging may be authorized to meet Plan purposes[9].
- **HWM-3:** Re-deposition of dredged materials within Humboldt Bay may be authorized to meet Plan purposes.

Toxic Materials Management

- **HTM-1:** Enhance public outreach and educational programs addressing the impacts of toxic materials to Humboldt Bay and surrounding lands and assist in educational efforts to prevent toxic spills.

3.7.3 Impacts Analysis

3.7.3.1 Methodology

This section describes the methods for analyzing the impacts of implementing the Proposed Program and the Proposed Program alternatives. Criteria from Appendix G of the State CEQA Guidelines were used to determine whether the Humboldt Bay Sediment Management program would have a significant impact in relation to hazards and hazardous materials.

[9] The *Humboldt Bay Management Plan* represents the region's first ecosystem-based management approach intended to improve the management of Humboldt Bay.

Potential hazardous materials impacts resulting from implementation of the Proposed Program, Alternatives 1, 2, and 3, and the No-Project Alternative were qualitatively assessed and based on professional judgement. Existing data was used in preparation of this section; thus no new onsite investigations were conducted to describe the affected environment or to determine potential environmental effects, nor was any modeling conducted in support of the analysis.

3.7.3.2 Thresholds of Significance

Significance thresholds are used to determine whether the Proposed Program may have a significant environmental effect under CEQA, which requires state and local government agencies to identify the significant environmental effects of proposed actions.

The State CEQA Guidelines define a significant effect on the environment as: "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Proposed Program including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (State CEQA Guidelines § 15382).

The State CEQA Guidelines do not describe specific significance thresholds. However, Appendix G of the State CEQA Guidelines lists a variety of potentially significant effects, which are often used as thresholds or guidance in developing thresholds for determining impact significance. Accordingly, for the purposes of this PEIR, a project would normally have a significant hazardous material impact, under CEQA, if it would do any the following.

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment
- Be located within an airport land use plan area or, where such a plan has not been adopted, be within 2 miles of a public airport or public use airport, and result in a safety hazard or excessive noise for people residing or working in the project area
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan

Note that the Proposed Program would not provide individual project approvals or entitlements for any private or public development or infrastructure project. Further CEQA documentation may be required for future projects.

3.7.3.3 Impacts and Mitigation Measures

Impact HAZ-1: Would the Proposed Program Create a Significant Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials?

Proposed Program

Dredging

Construction associated with dredging activities within LMSs would involve the use of construction equipment such as an excavator, crane, cutter head suction dredge and pumps and thus, would involve routine transport, use, and disposal of hazardous materials such as solvents, oils, and fuel. Such transport, use, and disposal must comply with applicable federal and state regulations, such as the regulations discussed under Section 3.7.2, *Regulatory Setting*. Although small amounts of solvents, oils, and fuel would be transported, used, and disposed of during construction, these materials are typically used in construction projects and would not represent the transport, use, and disposal of acutely hazardous materials. In addition, implementation of Hydrology and Water Resources Mitigation Measure HWR-2, *Prepare and Implement Spill Prevention and Management Plan* (see Section 3.8.3.3, *Impacts and Mitigation Measures*), would further reduce the potential of accidental hazardous materials releases during dredging activities.

As result of historical land uses surrounding Humboldt Bay, it is possible that sediment to be dredged as part of the Proposed Program could be contaminated (additional details provided below under Impact HAZ-2). All dredged material would be transported offsite for appropriate disposal or beneficial use. The transportation and disposal of contaminated soils would be subject to applicable federal, state, and local regulations.

With the implementation of local, state, and federal regulations, in addition to implementation of HWR-2 the potential for releases associated with routine use, transport or disposal of hazardous materials would be reduced to less than significant.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard and delivery would typically occur via pipeline or barge. Similar to the dredging discussion above, these activities would also involve typical construction equipment and routine transport, use, and disposal of hazardous materials such as solvents, oils, and fuel. Thus, the analysis above for dredging activities would also apply to the dredged material processing.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Humboldt Bay Sediment Management program can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. Similar to both the dredging discussion and dredged material processing above, these activities would also involve the use of typical construction equipment and the routine transport, use, and disposal of

hazardous materials such as solvents, oils, and fuel. Thus, the analysis above for dredging activities would apply to the beneficial uses of dredged material.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to routine transport, use, or disposal of hazardous materials. With the implementation of local, state, and federal regulations, in addition to implementation of HWR-2 the potential for releases associated with routine use, transport or disposal of hazardous materials would be reduced to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to routine transport, use, or disposal of hazardous materials. With the implementation of local, state, and federal regulations, in addition to implementation of HWR-2 the potential for releases associated with routine use, transport, or disposal of hazardous materials would be reduced to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to routine transport, use, or disposal of hazardous materials. With the implementation of local, state, and federal regulations, in addition to implementation of HWR-2 the potential for releases associated with routine use, transport or disposal of hazardous materials would be reduced to less than significant.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, there would be no change in the amount of hazardous materials transported, used, or disposed of and no impacts would occur.

Impact HAZ-2: Would the Proposed Program Create a Significant Hazard to the Public or the Environment through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment?

Proposed Program

Dredging

Construction associated with dredging activities within LMSs would involve the use of construction equipment and thus, would involve the use of hazardous materials such as solvents, oils, and fuel. As mentioned under Impact HAZ-1, hazardous materials handling must comply with applicable federal and state regulations and although small amounts of solvents, oils, and fuel would be handled during construction, these materials are typically used in construction projects and would not involve the transport, use, and disposal of acutely hazardous materials. In addition, implementation of HWR-2 (see Section 3.8, *Hydrology and Water Resources)* would further reduce the potential of accidental hazardous materials releases during dredging activities.

As part of the Proposed Program, dredging may occur at 25 locations, with 20 of the 25 dredging sites in north Humboldt Bay and five sites in south Humboldt Bay. In addition, a review of the State Water Board's Geotracker and Department of Toxic Substances Envirostor online resources identified multiple Leaking Underground Storage Tank (LUST) sites, Cleanup Program Sites, Military Cleanup Sites, and DTSC Cleanup sites surrounding both north and south bays (with the majority of sites concentrated near the communities of Eureka, Arcata, Samoa, and Fairhaven). The aforementioned sites included open status cases with releases to soil and/or groundwater. In addition, there are agricultural sites adjacent to the bay with a history of pesticide use. As a result, it is possible releases associated with these sites may have affected Humboldt Bay water and sediment, including sediment to be dredged as part of the Proposed Program.

Dredging activities within Humboldt Bay are permitted by the USACE, North Coast RWQCB, CCC, and the Harbor District. Approval for agency permits required to conduct dredging in the bay is contingent on the physical and chemical characterization of the dredge material to determine whether reuse is an option. Thus, a Sampling and Analysis Plan (SAP) would also be developed as part of the Humboldt Bay Sediment Management program. Prior to implementation, the SAP would require oversight agency approval (from the USACE, North Coast RWQCB, CCC, and Harbor District). Results of the sediment analysis are then used by regulatory agencies to determine and permit appropriate placement sites for the sediment resulting from each dredging event.

With the implementation of local, state, and federal regulations, HWR-2, and project specific SAPs, potential impacts associated with foreseeable upset and accident conditions related to affected sediment would be less than significant.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to an identified upland dewatering and storage site such as Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard, and delivery would typically occur via pipeline or barge. In addition to stockpiling dredged materials at processing sites, activities would also include the dewatering of the material with decanted water returned to Humboldt Bay, the Pacific Ocean and/or percolated into the ground. As discussed under Dredging above, it is possible that dredged material could be affected by contaminated sites surrounding

Humboldt Bay. Section 3.8.1.2, *Chemical Characterization of Sediment* discusses the known contamination issues of various LMSs that have previously been sampled. Any materials determined to be contaminated during sediment analyses prior to dredging events would not be permitted for beneficial use. In addition, effluent from dredged material dewatering basins is considered a dredged material discharge under Section 404 and is also subject to water quality certification under Section 401. Individual projects under the Proposed Program would require a Section 404 permit. USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

With the implementation of a program-specific SAP that analyzes the physical and chemical properties of the sediment prior to a dredging event and informs the regulatory permits necessary for the operation of an upland dewatering and processing site, potential impacts associated with dredged material processing would be less than significant.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Humboldt Bay Sediment Management project can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. It is possible that dredged material could be affected by contaminated sites surrounding Humboldt Bay. However, material to be dredged would be analyzed for suitability under a project-specific SAP prior to dredging activities. Sampling protocols for contaminants such as PCBs typically utilize Incremental Sampling Methodology (ISM), which is a type of composite sampling that has significant advantages over discrete sampling and traditional composite sampling. ISM is specifically designed to address heterogeneous contamination in a sample area by increasing sample representativeness and reducing data variability. USEPA recommends it as a valid and effective method for determining concentrations of contaminants in heterogeneous sediments with a high degree of confidence. Material not deemed chemically or physically suitable would not be used at a beneficial use site. With the implementation of a project-specific SAP that analyzes the physical and chemical properties of the sediment prior to a dredging event and informs the regulatory permits necessary for the placement of sediment at a beneficial use site, potential impacts associated with beneficial use would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to upset and accident conditions involving the release of hazardous materials into the environment.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to upset and accident conditions involving the release of hazardous materials into the environment.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to upset and accident conditions involving the release of hazardous materials into the environment.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, there would be no change in current risk with respect to upset and accident conditions involving the release of hazardous materials into the environment.

Impact HAZ-3: Would the Proposed Program Emit Hazardous Emissions or Involve Handling Hazardous or Acutely Hazardous Materials, Substances, or Waste within 0.25 Mile of an Existing or Proposed School?

Proposed Program

Dredging

Several school sites surround Humboldt Bay. However, there are no sites located within 0.25 mile of any LMS. The closest school to an LMS is the Peninsula Union Elementary School located at 909 Vance Avenue in the community of Samoa. No impact would occur.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard and delivery would typically occur via pipeline or barge. None of the processing sites are located within 0.25 mile of a school site. No impacts would occur.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Proposed Project can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. It is possible that dredged material could be affected by contaminated sites surrounding Humboldt Bay. However, material to be dredged would be analyzed for suitability for beneficial use under a project-specific SAP prior to disturbance. Non-suitable sediment would not be used, minimizing the potential of handling contaminated media near a school during Proposed Program implementation. With the implementation of a project-specific SAP that analyzes the physical and chemical properties of the sediment prior to a dredging event and informs the regulatory permits necessary for the placement of sediment at a beneficial use site, potential impacts associated with beneficial use would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to emissions of, or handling of hazardous or acutely hazardous materials near a school.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to emissions of, or handling of hazardous or acutely hazardous materials near a school.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to emissions of, or handling of hazardous or acutely hazardous materials near a school.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, there would be no change in current risk with respect to emissions of, or handling of hazardous or acutely hazardous materials near a school.

Impact HAZ-4: Would the Proposed Program Be located on a site that is Included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code Section 65962.5 and, as a Result, Create a Significant Hazard to the Public or the Environment?

Proposed Program

Dredging

Dredging activities within LMSs would either be conducted from a working barge or a mobile dredge and within the waters of Humboldt Bay. As such, it is unlikely that any of the LMSs are located within a Cortese site. Cortese sites are more commonly found amongst commercial or industrial sites (landside) with a history of hazardous materials handling, storage, and releases. There are several of these sites in the areas immediately surrounding the bay. Potential impacts of contaminated sites adjacent to Humboldt Bay and LMSs are discussed under Impact HAZ-2. Due to not being located within a Cortese site, dredging activities associated with the Proposed Program would not result in impacts related to a Cortese list site.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard, and delivery would typically occur via pipeline or barge. In addition to stockpiling dredged materials at processing sites, activities would also include the dewatering of the material with decanted water returned to Humboldt Bay, the Pacific Ocean and/or percolated into the ground.

Both the Redwood Marine Terminal II and Fields Landing Boatyard are located within the footprint of Cleanup Program sites[10] that are open and active with history of releases to soil and groundwater. However, stockpiling and dewatering of dredged material would not result in disturbance of contaminated media associated with these sites. Additionally, it is expected that percolation of decanted water would not be an option used in contaminated areas. Temporary dewatering basins, constructed with impermeable liners, would be built on existing impervious surfaces at both locations. Thus, dredged material processing activities associated with the Proposed Program would not result in impacts related to being located within a Cortese list site.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Humboldt Bay Sediment Management project can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. It is possible that portions of beneficial-use sites can exist on a Cortese list site. In particular, beneficial sites adjacent or surrounding commercial and industrial development such as COE-1, COE-3, COE-4, COE-6, COE-7, CE-8, Salt Marsh-4, Salt Marsh 24, MC sites, etc. may be located partially within Cortese list site. However, the movement of dredged sediment for incorporation into a beneficial use site would add suitable dredged material to the site and is not expected to remove or significantly manipulate pre-existing onsite media. Thus, beneficial use activities associated with the Proposed Program would not result in impacts related to being located within a Cortese list site.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the construction activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to being located within a Cortese list site.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program's

[10] Cleanup Program Sites are varied and include, but are not limited to pesticide and fertilizer facilities, rail yards, ports, equipment supply facilities, metals facilities, industrial manufacturing and maintenance sites, dry cleaners, bulk transfer facilities, refineries, mine sites, landfills, RCRA/CERCLA cleanups, and some brownfields. Unauthorized releases detected at Cleanup Program Sites are highly variable and include, but are not limited to hydrocarbon solvents, pesticides, perchlorate, nitrate, heavy metals, and petroleum constituents, to name a few.

dredging activities and would be the same as those described above for the Proposed Program with respect to being located within a Cortese list site.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program's dredging activities and would be the same as those described above for the Proposed Program with respect to being located within a Cortese list site.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, the Proposed Program would not result in impacts related to being located within a Cortese list site.

Impact HAZ-5: Would the Proposed Program Be Located within an Airport Land Use Plan Area or, Where Such a Plan Has Not Been Adopted, Be Within 2 Miles of a Public Airport or Public Use Airport, and Result in a Safety Hazard or Excessive Noise for People Residing or Working in the Project Area?

Proposed Program

Dredging

As mentioned in Section 3.7.1, *Environmental Setting*, Samoa Field[11] is located on the Samoa Peninsula of Humboldt Bay, whereas Murray Field is located east of Eureka and 1.7 mile from the nearest LMS. Construction associated with dredging activities within LMSs would involve the use of an excavator or crane or cutterhead suction dredge. Dredging performed using an excavator and/or crane would typically be conducted from a working barge. Excavated material would be deposited in a sealed dump scow located adjacent to the barge. Cutterhead suction dredging involves a mobile dredge. It involves loosening dredged material and moving it via dredge pumps. Sediments dredged by this method are hydraulically transported via pipeline as a slurry. As such, activities to be conducted as part of the Humboldt Bay Sediment Management program do not include the construction of skyward structures or involve features expected to result in any aviation safety hazards. In addition, none of the 25 potential dredging sites are located in an airport safety compatibility zone. Thus, dredging activities associated with the Proposed Program would not result in significant impacts associated with being within an airport land use plan area or within 2 miles of a public airport or public use airport, and result in a safety hazard or excessive noise for people residing or working in the project area

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing

[11] Samoa Field serves primarily recreational and personal business purposes. No aviation services are available, and no Airport Land Use Compatibility Plan (ALUCP) is associated with the airport.

Boatyard and delivery would typically occur via pipeline or barge. Similar to the dredging discussion above, these activities do not include the construction of skyward structures or involve features expected to result in any aviation safety hazards. Additionally, none of the processing sites are within 2 miles of Murray Field. Thus, the analysis above for dredging activities would apply to the dredged material processing.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Humboldt Bay Sediment Management project can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. Salt Marsh locations 4 through 8 are located within 2 miles of Murray Field. However, similar to both the dredging discussion and dredged material processing above, these activities do not include the construction of skyward structures or involve features expected to result in any aviation safety hazards. Thus, the analysis above for dredging activities would apply to the beneficial uses of dredged material.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to being within an airport land use plan area or near a public airport.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to being within an airport land use plan area or near a public airport.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to being within an airport land use plan area or near a public airport.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, there would be no impacts related to being within an airport land use plan area or near a public airport.

Impact HAZ-6: Would the Proposed Program Impair Implementation of or Physically Interfere with an Adopted Emergency Response Plan or Emergency Evacuation Plan?

Proposed Program

Dredging

As previously mentioned, construction associated with dredging activities within LMSs would involve the use of construction equipment including excavator or crane, or cutterhead suction dredge. Dredging activities would either be conducted from a working barge or a mobile dredge within the waters of Humboldt Bay.

Humboldt County OES through the implementation of various plans such as the Humboldt County EOP, the Local Hazard Mitigation Plan, etc. has as a mission to preserve life and property in times of a major emergency. Dredging activities associated with the Proposed Program are small in scope, would be conducted within the waters of Humboldt Bay and would only occur temporarily. Thus, these activities are not expected to interfere with the implementation of the aforementioned plans and would also not interfere with County wide evacuation (as this generally is done through major roads and highways on land). Also, in the event of an emergency, emergency response vessels (including Coast Guard and fireboat vessels stationed at Woodley Island Marina) in the bay would have unrestricted movement as they would be relocated to slips away from the dredging equipment.

The Proposed Program would not interfere with the implementation of area emergency plans and construction equipment would not interfere with free movement of emergency response vessels, thus, dredging activities associated with the Proposed Program would not result in significant impacts associated with interfering with an adopted emergency response plan or emergency evacuation plan.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard and delivery would typically occur via pipeline or barge. As such, transportation of the material along surrounding arterials would not occur and thus, would not interfere with the implementation of any emergency plan and would also not interfere with County wide evacuation.

Beneficial Use of Dredged Material

Beneficial uses of dredged sediment as part of the Humboldt Bay Sediment Management program can include construction fill material, waterfront protection from sea level rise, beach replenishment, increased resiliency of diked shoreline structures, raising of former tidelands now used for agriculture, building living shorelines, and restoring historic salt marsh habitat. As with the dredging activities previously described, the vast majority of these activities would happen within Humboldt Bay or immediately adjacent. Thus, they are not expected to interfere with the implementation of any emergency plan and would also not interfere with County wide evacuation as they would not occupy major roads and highways in the surrounding areas.

For sites that are not within the Bay or immediately adjacent, transportation along surrounding arterials would be required. Although this is the case, the increase in truck traffic would not be significant as activities would be intermittent and temporary. Roads used as haul routes during

activities would use traffic controls such as flagmen and signs as needed. Also, the proposed activity does not include any characteristics (e.g., permanent road closures, long-term blocking of road access) that would physically impair or otherwise interfere with emergency response or evacuation in the project vicinity. The project would not interfere with the implementation of area emergency and evacuation plans and would provide traffic control as needed; thus potential impacts associated with beneficial uses of dredged sediment in these sites would be less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program (under dredging) and would be the same as those described above for the Proposed Program with respect to interfering with the implementation of an emergency plan and/or evacuation plan.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program (under dredging) and would be the same as those described above for the Proposed Program with respect to interfering with the implementation of an emergency plan and/or evacuation plan.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program (under dredging) and would be the same as those described above for the Proposed Program with respect to interfering with the implementation of an emergency plan and/or evacuation plan.

No-Project Alternative

Under the No-Project Alternative, current dredging operations would remain in effect. The Proposed Program would not be implemented and changes in dredging operations would not take place. No new or additional construction and operational activities would occur. Thus, there would be no impacts associated with interfering with the implementation of an emergency plan and/or evacuation plan.

3.8 Hydrology and Water Resources

3.8.1 Environmental Setting

This section discusses the affected environment relevant to hydrology and water quality in the study area. For the purposes of the affected environment and the subsequent impact analysis for hydrology and water resources, the study area includes the 25 dredging sites in north and south Humboldt Bay; three sites where sediment may be dewatered and temporarily stockpiled, located at

Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard; and 76 sites where sediment may be beneficially used (as described in Chapter 2, *Project Description*, and Appendix A).

3.8.1.1 Surface Water

All 25 proposed dredging locations at LMSs (described in Chapter 2) are in Humboldt Bay. Humboldt Bay is the largest estuary in California north of San Francisco and consists of three regions (from north to south): Arcata Bay, Entrance Bay, and South Bay. Humboldt Bay is approximately 14 miles long and of variable width ranging from approximately 0.5 mile in Entrance Bay to approximately 4 miles across the widest part of Arcata Bay (Harbor District 2006). Entrance Bay connects to the Pacific Ocean via Entrance Channel. Humboldt Bay is separated from the Pacific Ocean by a sand spit incised by two armored rubble-mound jetties. These fabricated jetties, constructed by USACE, which are approximately 2,000 ft apart, define the entrance channel to Humboldt Harbor, which requires regular dredging to maintain safe navigation. Humboldt Bay is relatively shallow and approximately 70 percent of the bay is comprised of tidal mud flats (located predominately in Arcata and South bays) that are exposed at low tide (State Coastal Conservancy and Coastal Ecosystems Institute of Northern California 2015).

Humboldt Bay is within the Eureka Plain Hydrologic Unit (HU), which also encompasses the four primary watersheds that drain into the bay: Jacoby Creek (draining 17 square miles), Freshwater Creek (draining 31 square miles), Salmon Creek (draining 17 square miles), and Elk River (draining 29 square miles) (North Coast RWQCB 2017; Humboldt County 2017). The Proposed Program area is entirely within the Eureka Plain HU.

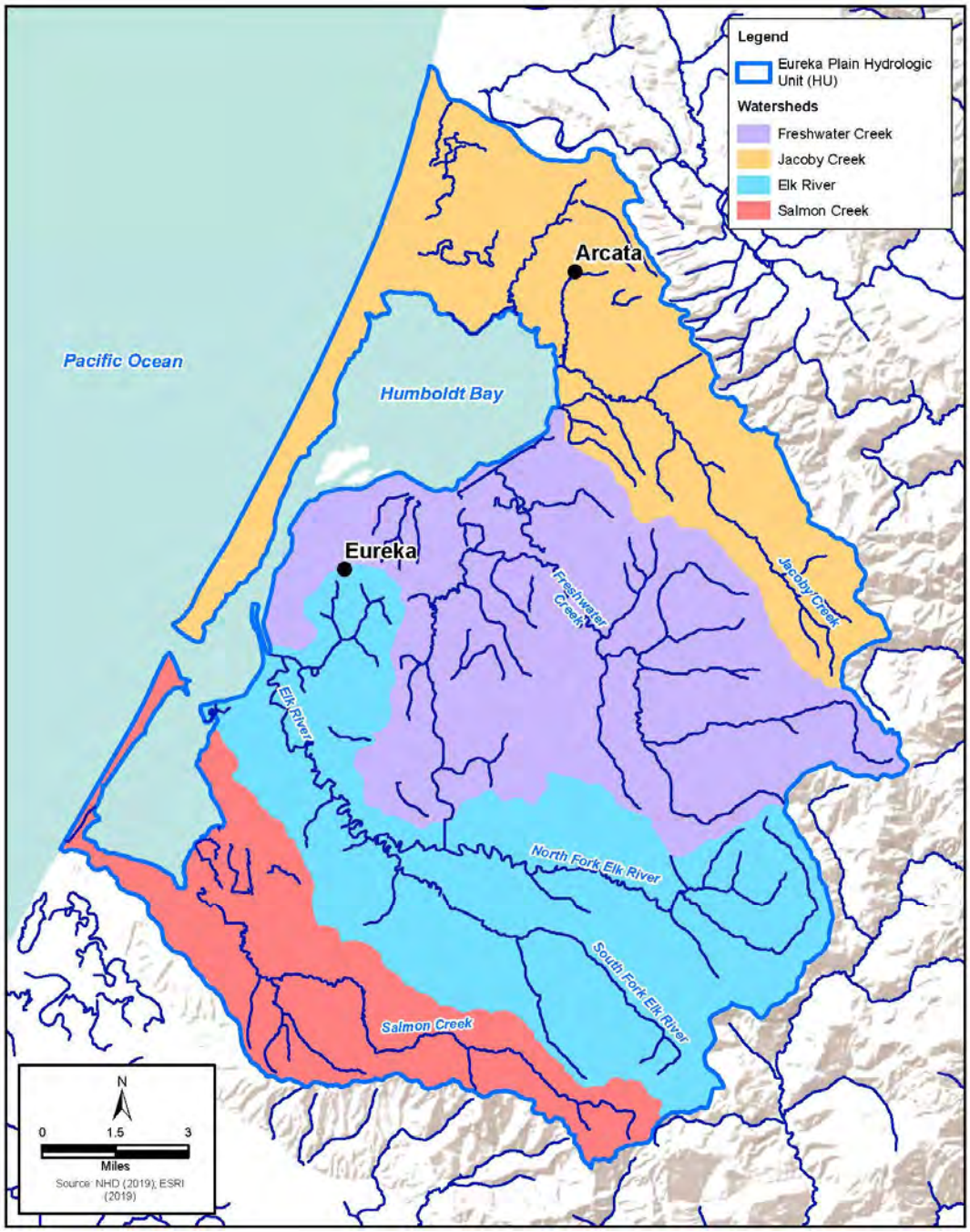


Figure 3.8-1. Humboldt Bay Watershed

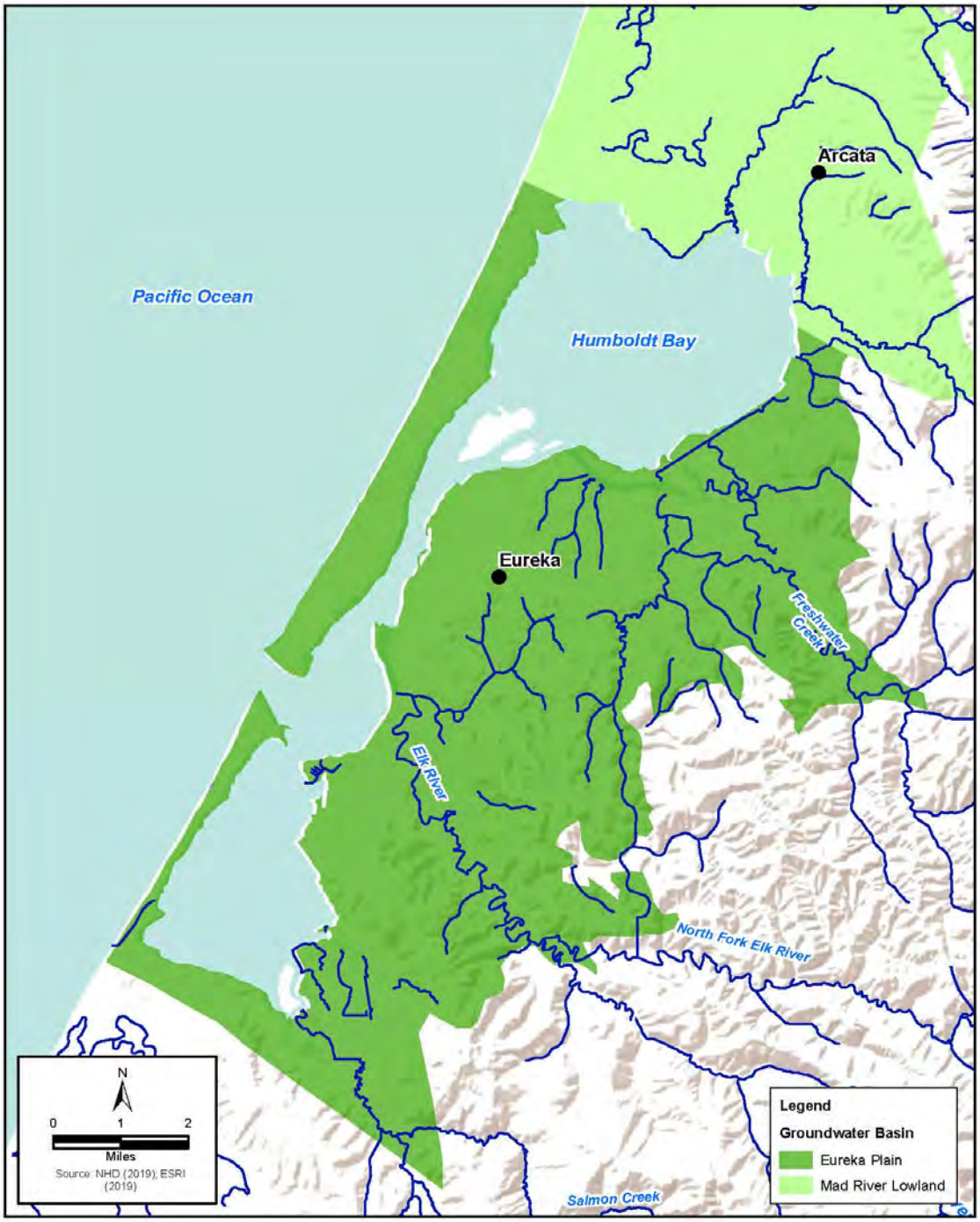


Figure 3.8-2. Humboldt Bay Groundwater Basins

Freshwater inflow to Humboldt Bay is hydrologically dominated by the tidal exchange with the Pacific Ocean (Harbor District 2006). Tides in the bay are mixed semidiurnal, and display tidal amplification that is most pronounced to the north with an increase of up to 1 ft; the mean tide

range is approximately 5 ft, and the diurnal range is approximately 7 ft (State Coastal Conservancy and Coastal Ecosystems Institute of Northern California 2015; USACE 2017).

Although the water quality in Humboldt Bay is generally considered good and is determined largely by the quality of water entering the bay from the nearshore Pacific (Harbor District 2006), the bay is included on the 303(d) list (discussed in Section 3.8.2, *Regulatory Setting*) as impaired for dioxin toxic equivalents (from industrial point sources, waste storage/storage tank leaks, and unknown sources), and PCBs although source(s) of the PCBs is/are unknown (State Water Board 2017; see Table 3.8-1). The listing of Humboldt Bay for PCBs is based on shellfish tissue samples from the bay that exceeded the evaluation guideline of 3.9 parts per billion (ppb). PCBs generally enter air, water, and soil during their manufacture, use and disposal. Although no longer produced in the United States, PCBs are persistent chemical compounds and thus do not readily break down in the environment, and bioaccumulate in the tissue of living organisms (e.g., fish, birds, humans). In surface water, PCBs generally adsorb (bind) to organic matter and settle in sediment or remain suspended with particulates because these compounds are not readily soluble in water (Agency for Toxic Substances and Disease Registry 2000). Dioxins (also polychlorinated dibenzodioxins) are a family of chemically related compounds that, like PCBs, are persistent environmental pollutants. Dioxins are relatively ubiquitous in the environment, have a low solubility in water, and therefore adsorb to sediments, and are bioaccumulative (USEPA 1999). Dioxins are a byproduct of combustion and various industrial processes, including chemical manufacturing, chlorine bleaching of paper pulp, and smelting (World Health Organization 2010).

The primary land use in the Eureka Plain HU is timber production, which, along with agricultural uses in the non-forested areas of the Humboldt Bay watersheds, results in erosion and thus contributes to sediment in watershed streams and ultimately to Humboldt Bay, particularly in winter months. Most of the sediment in the bay; however, is from the nearshore Pacific Ocean (Harbor District 2007). When suspended, silt and clay in sediment cause surface water turbidity[12]. In Humboldt Bay, the nearshore turbidity tends to be higher than turbidity in the water column in the deeper channels (USACE 2012).

As summarized in Table 3.8-1, Elk River (lower and upper) and Freshwater Creek are 303(d)-listed as impaired for sedimentation/siltation and Jacoby Creek watershed is listed for sediment. The Lower Elk River is also included on the 303(d) list for indicator bacteria (State Water Board 2017). A total maximum daily load (TMDL)(see Section 3.8.2, *Regulatory Setting*) for sediment has been established for the Upper Elk River watershed to achieve sediment-related water quality standards.

[12] Turbidity is the reduction of water clarity due to the presence of suspended particles and is commonly used as an indicator for the general condition of water clarity. Turbidity in surface water is comprised of naturally occurring and/or introduced organic matter and inorganic minerals, such as silt, clay, industrial waste, sewage, and algae.

Table 3.8-1. 303(d)-Listed Water Bodies in the Eureka Plain Hydrologic Unit

Water Body	Pollutant	Potential Sources	TMDL Scheduled Completion Date
Jacoby Creek watershed	• Sediment	• Unknown[a]	2019
Freshwater Creek	• Sedimentation/ Siltation	• Flow alteration/regulation/ modification • Removal of riparian vegetation	2017
Elk River – Upper and Upper Little South Fork	• Sedimentation/Siltation	• Flow alteration/regulation/ modification • Removal of riparian vegetation	2014
Elk River – Lower	• Indicator Bacteria • Sedimentation/Siltation	• Unknown[a] • Flow alteration/regulation/ modification • Removal of riparian vegetation	2025 2014
Martin Slough	• Indicator Bacteria	• Unknown[a]	2025
Gannon Slough	• Indicator Bacteria	• Unknown[a]	2026
Jolly Giant Creek	• Indicator Bacteria	• Unknown[a]	2025
Humboldt Bay	• PCBs • Dioxin Toxic Equivalents	• Unknown[a] • Industrial point sources • Waste storage/storage tank leaks (aboveground) • Unknown[a]	2025

Source: State Water Board 2017
[a] For the 303(d) list, the potential source of the pollutant is listed as "unknown" by default unless a source analysis has been performed or some other supporting information.
TMDL = toxic maximum daily equivalent; PCBs = polychlorinated biphenyls

In addition to sediment discharge, agricultural land uses including confined animal facilities, grazing, and commercial-scale flower and bulb farms, contribute discharges to runoff such as nutrients, bacteria, and pesticides (North Coast RWQCB 2018). Bacteria-laden runoff is the primary agricultural-related discharge in the Humboldt Bay watersheds (North Coast RWQCB 2018). Urban runoff to the bay from past as well as current land uses, including households, small businesses, and wood-product factories, also contributes pollutants in stormwater runoff. Further, publicly owned treatment works of the cities of Eureka and Arcata also discharge to Humboldt Bay. Water pollutants from ships and watercraft, such as petroleum products, and anti-fouling biocidal compounds (i.e., organotin compounds such as tributyltin) in hull paints and coatings also contribute to the pollutant load in Humboldt Bay (Harbor District 2006).

As described in Section 3.8.2, *Regulatory Setting*, water quality objectives for surface waters, including Humboldt Bay, and groundwater, are established in the *Water Quality Control Plan for the North Coast Region* (Basin Plan) to protect beneficial uses of waters in the North Coast Region (North Coast RWQCB 2018). The designated existing and potential beneficial uses for Humboldt Bay and its primary tributaries are identified in Table 3.8-2. Specific to Humboldt Bay, the Basin Plan has established numeric pH objectives (maximum and minimum) and dissolved oxygen (DO) objectives for Humboldt Bay. The maximum pH in the bay should not exceed 8.5, and the minimum pH should not be depressed "below natural background levels", and DO concentrations must conform to a daily

minimum objective of 6 milligrams per liter (mg/L) (North Coast RWQCB 2018). Although not specific to Humboldt Bay, the Basin Plan identifies narrative objectives for suspended sediment and turbidity to protect the beneficial uses of all waters in the North Coast region—the suspended sediment load and discharge rate should not be altered in such a manner as to cause a nuisance or adversely affect beneficial uses, and turbidity should not be increased more than 20 percent above naturally occurring background levels. In the case of turbidity, allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges on the issuance of discharge permits or waiver thereof.

Table 3.8-2. Designated Beneficial Uses of Waters of the Eureka Plain Hydrologic Unit

Water Body	MUN	AGR	IND	PRO	GWR	FRSH	NAV	POW	REC-1	REC-2	COMM	COLD	WILD	RARE	MAR	MIGR	SPWN	SHELL	EST[a]	AQUA	CUL
Jacoby Creek	E	E	E	P	E	E	E	P	E	E	E	E	E	E	—	E	E	—	E	P	E
Freshwater Creek	E	E	E	P	E	E	E	P	E	E	E	E	E	E	—	E	E	—	E	E	E
Elk River	E	E	E	P	E	E	E	P	E	E	E	E	E	E	—	E	E	—	E	P	—
Salmon Creek	E	E	E	P	E	E	E	P	E	E	E	E	E	E	—	E	E	—	E	P	E
Humboldt Bay	E	E	E	P	—	E	E	P	E	E	E	E	E	E	E	E	E	E	E	E	E

Source: North Coast RWQCB 2018

[a] EST use applies only to the estuarine portion of the waterbody.

E = existing beneficial use; P = potential beneficial use; "— " = does not apply.

AGR = Agricultural Supply; AQUA = Aquaculture; COLD = Cold Freshwater Habitat; COMM = Commercial and Sport Fishing; CUL = Native American Culture; EST = Estuarine Habitat; IND = Industrial Service Supply; MAR = Marine Habitat; MIGR = Migration of Aquatic Organisms; MUN = Municipal and Domestic Supply; PRO = Industrial Process Supply; RARE = Rare, Threatened, or Endangered Species; REC-1 = Water Contact Recreation; REC-2 = Non-Contact Water Recreation; SHELL = Shellfish Harvesting; SPWN = Spawning, Reproduction, and/or Early Development; WILD = Wildlife Habitat

3.8.1.2 Chemical Characterization of Sediment

Past and present land uses around Humboldt Bay have contributed to detectable sediment contamination by environmentally persistent chemical compounds. For example, dioxin-contaminated pentachlorophenol (a pesticide and wood preservative now banned in the U.S.), was used at several lumber-processing mills in the Humboldt Bay region and has been detected in sediment at multiple locations. Similarly, the use of tributyltin as a biocide in anti-fouling paint on ship and boat hulls, as well as on docks, to discourage the marine organisms such as barnacles and tubeworms, has also resulted sediment contamination in Humboldt Bay. As described in this section, over the years, sediment from several LMSs throughout Humboldt Bay has been analyzed for various contaminants including, metals, dioxins and furans, organochlorine pesticides and chlorinated herbicides, PCBs, and other environmentally persistent contaminants that adsorb to sediment. Overall, results from these sampling studies have shown that the presence of these contaminants is widespread, and that the sediment chemical profile of tested sites is generally similar. Accordingly, it is reasonable to assume that any future sediment sampling and analysis would yield generally similar results.

Eureka Waterfront Sites and Woodley Island Marina

In early 2005, sediment core samples from 11 Eureka waterfront sites[13] and multiple locations at Woodley Island Marina were collected and analyzed for various physical properties as well as for the concentrations of multiple chemical compounds. Representative samples were collected at the proposed dredge project depths for each site. The analysis included testing for grain size, percent solids, total mercury, total organic carbon (TOC), total petroleum hydrocarbons (TPH), total volatile solids (TVS), metals, semi-volatile organics, PCBs, and speciated butyltins in sediment. The results from the 2005 testing were compared to the testing results conducted 1996 in order to determine changes in the quality of the sediment over time. The comparison of results (2005 v. 1996) indicated that mercury concentrations have decreased over time, and that metal and TVS concentrations have decreased at all sampling locations except at F Street Dock, where no change was noted. TPH concentrations decreased at four of the five comparison sites. In addition, at all sampling sites except Commercial Dock, concentrations of most semi-volatile organic compounds had decreased since 1996. PCBs were only detected at Coast Seafoods Dock, as well as at Landing Dock, where the PCB Arochlor 1260 was found at increased levels relative to 1996; Coast Seafoods Dock was not sampled/tested in 1996. Speciated butyltins were detected at I Street Dock (not sampled/tested in 1996), the Small Boat Basin, and Coast Seafoods Dock. For Woodley Island Marina, the comparison between 2005 and 1996 chemical results indicated that concentrations of most sampled compounds had either remained the same or decreased over time. However, increases in the concentrations of TPHs and most semivolatile compounds (e.g., fluoranthene) at multiple locations in the marina relative to 1996 testing were noted (Northern Hydrology & Engineering 2015).

In late 2005, sediment samples from the same 11 Eureka waterfront sites and Woodley Island Marina were tested for dioxin/furans[14] and pentachlorophenol. Three of the waterfront sites, Coast Seafoods Dock, Fisherman's Terminal, and F Street Dock were also tested for PCBs. Although detectable, dioxin and furan levels at the Eureka waterfront sites and Woodley Island Marina were considered "low" (CCC 2006), and dioxin levels were within typical background dioxin levels in the U.S. and Europe (Northern Hydrology & Engineering 2015). PCBs were detected only at Coast Seafoods Dock at levels substantially lower than the upper limit for total PCBs in dredge spoils (i.e., 89 ppb v. upper limit of 3,100 ppb). Pentachlorophenol was detected at Woodley Island Marina, Small Boat Basin, and I Street Dock at concentrations lower than the reporting limit (Northern Hydrology & Engineering 2015).

A more recent chemical analysis was done (August 2016) on sediment samples from the Eureka Small Boat Basin and Commercial Street Dock (proposed dredge sites NB-1 and NB-2, respectively; see Table 2.2-1). Testing results of these samples, specifically for constituents of concern including dioxins/furans, pentachlorophenol, PCBs, and PAHs, were compared to results of historical samples collected in these areas in 1996 and 2005. The comparison determined that concentrations of most of these constituents had either decreased or remained the same since 1996 sampling. Test results

[13] Eureka waterfront sampling sites included: Dock 'B'; Small Boat Basin; Commercial Street Dock; Fisherman's Terminal/Landing Dock; F Street Floating Dock; I Street Dock; J Stree Dock; Adorni Dock; Bonnie Gool Guest Dock; Samoa Bridge Launch Ramp; and Coast Seafoods Dock.

[14] Polychlorinated dibenzofurans (furans) are environmentally persistent, bioaccumulative compounds that have a low water solubility. Furans are byproducts of industrial processes, including chlorine bleaching of paper pulp. (World Health Organization 2010). Local point-sources of dioxin/furans in Humboldt Bay encountered in bay sediments include past pulp mill air discharges and runoff-entrained wood preservative chemicals from timber products processing facilities.

for metals indicated concentrations were consistent over time and within the range of naturally occurring concentrations (SHN Consulting Engineers & Geologists 2017).

Fisherman's Channel and King Salmon Residential Canals

In 2013, a chemical and physical analysis of sediment at Fisherman's Channel and the King Salmon residential canals (proposed dredging site SB-1; see Table 2.2-1) was performed for proposed maintenance dredging in 2014 by PG&E and residents of King Salmon. King Salmon residential canals facilitate small boat docking on King Salmon residents' properties and these canals are not dredged regularly (Wagschal pers. comm.) The sediment sampling results were summarized and discussed in the *Report of Findings Sediment Sampling and Analysis Fisherman's Channel* (GHD 2013). The analysis was performed to evaluate the suitability of the proposed dredge sediments for disposal at the Humboldt Bay Harbor Recreation and Conservation District Upland Dredge Disposal Site (Harbor District UDDS) and the PG&E Humboldt Bay Power Plant (HBPP) Intake Canal. Conclusions from the chemical analysis were that based on the concentrations reported for the collected samples from Fisherman's Channel, the dredged material was below the thresholds for disposal at the Harbor District UDDS. However, concentrations of certain chemicals (TPHs as motor oil and select polycyclic aromatic hydrocarbons [PAHs][15]) in the samples from King Salmon residential canals were above the Harbor District UDDS maximum limits. Similarly, concentrations of certain PAHs in samples from Fisherman's Channel and King Salmon residential canals were above levels at PG&E's HBPP Intake site (GHD 2013).

Additional sediment sampling and analysis was performed between September 21 and September 28, 2015, to implement the Incremental Sampling Methodology (ISM), at the request of the North Coast RWQCB. The 2015 Report of Findings (GHD 2015) presents lab results and statistical analysis of the ISM sampling program. Sediment characterization results from Fisherman's Channel were compared to White Slough ISM baseline as well as to regulatory criteria. White Slough is a low elevation tidal marsh in southern Humboldt Bay. This report concluded that the proposed Fisherman's Channel dredge sediments were suitable for beneficial use at the White Slough Restoration Area. Metals (barium, cadmium, and cobalt), pentachlorophenol, and several select PAHs were found to be slightly higher than White Slough ISM baseline. However, cobalt was the only constituent where concentrations in Fisherman's Channel were higher than both White Slough concentrations and the applicable water quality standard. The report also indicated that based on leachability analysis for metals and PAHs, except for arsenic and certain PAHs, these constituents would not be expected to leach from sediment and result in exceedances of Water Quality Objectives for Bays and Estuaries (GHD 2015).

Sediment testing was performed in December 2018 at Chevron's Eureka Marine Terminal dock. Sediment concentrations of various metals, PAHs, organochlorine pesticides (e.g., aldrin, chlordane), chlorinated herbicides (e.g., pentachlorophenol and dichlorophenoxyacetic acid [2,4-D]), dioxins/furans, PCBs, and organotin compounds were analyzed. The chemical analysis indicated that although several chemicals (including PAHs, TPHs, most metals tested, and dioxins/furans) were detected in sediment samples, concentrations were similar to background levels within Humboldt Bay. It is of note that no chlorinated herbicides, organochlorine pesticides, PCBs, or organotins were detected (Pacific Affiliates 2019).

[15] PAHs are insoluble in water and are formed by the incomplete combustion of fossil fuels (Agency for Toxic Substances and Disease Registry 1995).

3.8.1.3 Tsunami and Flood Hazards

Humboldt Bay is located on the western edge of the North America Plate near the southern end of the Cascadia subduction zone (CSZ) (Patton and Dengler n.d.). Earthquakes generated by rupture on the CSZ have generated tsunami. Potential tsunami inundation mapping covering the project area has been prepared by the State of California and County of Humboldt (2009a, 2009b). The maps show the combined area that could be inundated by extreme seismic events for a given region. The maps show that, with the exception of part of the Samoa Lagoons material processing site, all of the dredging sites, material processing sites, and beneficial-use sites are in a tsunami inundation area.

Most of the study area is within a 100-year flood zone (Humboldt County 2015). Tidal lands around Humboldt Bay would potentially be subject to inundation in the event of levee failure (Harbor District 2006).

3.8.1.4 Groundwater

The study area overlies portions of both the Eureka Plain groundwater basin and the Mad River groundwater basin/Mad River Lowland groundwater subbasin. Recharge to the alluvium in the Eureka Plain groundwater basin is from precipitation as well as from seepage from Freshwater Creek, and Elk and Eel rivers (California Department of Water Resources 2004a). Groundwater recharge in the Mad River Lowland subbasin is from percolation from the Mad River and small tributary creeks in the foothills to the east of Arcata as well as from deep percolation to floodplain deposits from precipitation and applied water (California Department of Water Resources 2004b).

Groundwater quality in the Eureka Plain groundwater basin is considered generally acceptable for most uses (Humboldt County 2017). Groundwater impairments in the Eureka Plain groundwater basin include localized areas of boron, iron, manganese, and phosphorus (California Department of Water Resources 2004a). Impairments to groundwater in the Mad River Lowland subbasin include iron, and localized areas of manganese, fluoride, and phosphorus; seawater intrusion has occurred in shallow aquifers near the ocean and Humboldt Bay (California Department of Water Resources 2004b).

3.8.2 Regulatory Setting

3.8.2.1 Federal

Clean Water Act (CWA)

The federal CWA (33 U.S.C. § 1251 et seq.) establishes the institutional structure for USEPA to regulate point and nonpoint discharges of pollutants into the WoUS, establish water quality standards, and implement pollution control programs, such as setting wastewater standards for industry. The CWA authorizes USEPA to delegate many permitting, administrative, and enforcement aspects of the law to state governments. In California, the State Water Board has been designated by USEPA to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated the specific responsibilities for the development and enforcement actions to the Regional Water Boards. Humboldt Bay is located within Region 1, the jurisdictional area of the North Coast Water Board.

Section 303: Impaired Waters

CWA Section 303(d) requires states to identify waters that are not attaining water quality standards (303(d) list) and include a priority ranking of such waters. The priority ranking considers the severity of the pollution and the uses to be made of such waters. The State Water Board and Regional Water Boards address water quality impairments that are caused by multiple dischargers and other sources of pollution by developing TMDLs, which set water quality objectives or targets and allocate allowable loads for sources of pollution. A TMDL represents the maximum load (usually expressed as a rate, e.g., grams methylmercury per year) of a pollutant that a water body can assimilate and not result in impairments. A TMDL describes the reductions needed to meet water quality objectives and allocates those reductions among the sources in the watershed. To meet federal and state requirements, TMDLs must include the following elements: description of the problem; numerical water quality target; analysis of current loads; load reductions needed to eliminate impairments and plan/program of implementation to achieve the needed load reductions; and monitoring to document program progress.

Section 401: Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into WoUS must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Individual projects under the Proposed Program would require a Section 401 Water Quality Certification from the North Coast Water Board. The North Coast Water Board must certify that beneficial use of the dredged material would not violate state water quality standards and other applicable requirements.

Section 402: Permits for Discharge to Surface Waters

CWA Section 402 regulates discharges to surface waters through the NPDES program, which is administered by the Regional Water Boards. An NPDES permit sets specific discharge limits for point sources discharging pollutants into WoUS and establishes monitoring and reporting requirements, as well as special conditions. Typically, NPDES permits are issued for a 5-year period by the Regional Water Boards.

Dischargers whose projects disturb at least 1 acre of soil or whose projects disturb less than 1 acre, but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ). Construction activity subject to this permit includes clearing, grading and ground disturbances such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. Disposal of water from dewatering activities to surface waters require coverage under a NPDES permit.

The Construction General Permit requires the development of a site-specific SWPPP by a certified Qualified SWPPP Developer. The SWPPP must identify an effective combination of soil erosion and sediment controls, as well as non-stormwater BMPs. The Construction General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters. The North Coast Water Board administers the NPDES stormwater permit

program in Humboldt County. Individual projects under the Proposed Program would potentially require an SWPPP and the development of BMPs to manage stormwater runoff for construction-related activities for beneficial use projects, depending on the area of ground disturbance at the proposed locations.

Section 404: Permits for Fill Placement in Waters and Wetlands

Section 404 of the CWA requires that a permit be obtained from USACE for the discharge of dredged or fill material into navigable WoUS, their tributaries, and associated wetlands. USACE is responsible for regulating non-Federal dredging and dredged material discharge activities through the 404-permit program. Activities regulated by Section 404 permits include dredging, bridge construction, flood control actions, and some fishing operations. Section 404 permits may be issued for only the least environmentally damaging practical alternative (i.e., authorization of a proposed discharge is prohibited if there is a practical alternative that would have fewer adverse effects and lacks other significant adverse consequences). Issuance of a 404 permit may require physical and chemical testing of dredged material prior to disposal or use for beneficial purposes. Effluent from dredged material dewatering basins is considered a dredged material discharge under Section 404 and is also subject to water quality certification under Section 401. Individual projects under the Proposed Program would require a Section 404 permit. USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

Coastal Zone Management Act of 1972

The CZMA, administered by the National Oceanic and Atmospheric Administration, provides for the management for coastal resources in the U.S. through a state and federal partnership. The CZMA allows states to develop a coastal management program, which establishes the requirements for activities conducted on coastal lands.

3.8.2.2 State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code §§ 13000 et seq.) establishes the basis for water quality regulation within California. The State Water Board administers the CWA through the Porter-Cologne Act, pursuant to which the State Water Board oversees nine Regional Water Boards that regulate the quality of waters within their regions. Pursuant to the Porter-Cologne Act, each of the nine Regional Water Boards must adopt a regional water quality control plan (also referred to as a "basin plan"), which must identify beneficial uses for the waters within the region, water quality objectives to protect those beneficial uses, and a program of implementation to achieve the water quality objectives. The Proposed Program is within the jurisdictional area of the North Coast Water Board, which establishes water quality standards for receiving waters through the Basin Plan. The Basin Plan includes numeric and narrative water quality objectives for several key water quality constituents, including pH, DO, water temperature, trace metals, turbidity, suspended sediment, and oils and grease.

In California, discharges of waste that are not NPDES "discharges of pollutants" require the issuance of WDRs unless otherwise waived. Discharges of waste that are not subject to NPDES permits typically include runoff from nonpoint sources, such as agricultural and timber harvest activities

and associated waste discharges, to land or to groundwater. Disposal of water from dewatering activities to land requires coverage under General Waste Discharge Requirements.

WDRs prescribe requirements, such as limitations on temperature, toxicity, or pollutant levels, as to the nature of any discharge (Water Code § 13260[a]). WDRs may also specify conditions where no discharge would be permitted and may also include monitoring and reporting requirements.

The Porter-Cologne Act requires that a "report of waste discharge" be compiled for any discharge of waste, including discharges of dredged or fill material, that could affect the quality of the waters of the state with the appropriate Regional Water Board. On receipt of a report of waste discharge, the Regional Water Board may then issue WDRs designed to ensure compliance with applicable water quality objectives and other requirements of the basin plan. In California, the Porter-Cologne Act requires that any discharge that could affect the quality of waters of the state, including waters not under federal jurisdiction, be permitted through WDRs. 401 certifications issued by the Regional Water Boards also serve as WDRs under State Water Board Water Quality Order 2003-0017-DWQ.

As discussed in Section 3.8.1, *Environmental Setting*, and identified in Table 3.8-1, Jacoby Creek, Freshwater Creek and the Elk River watershed are sediment-impaired waterbodies. A sediment TMDL has been established for the upper Elk River, and the North Coast Water Board is in the process of establishing a TMDL for sediment in the Freshwater Creek watershed. A sediment TMDL is also required for Jacoby Creek (State Water Board 2017). TMDLs are also required, although not yet established, for indicator bacteria for the lower mainstem Elk River, Gannon Slough, and Martin Slough, and for PCBs and dioxin toxic equivalents for Humboldt Bay (State Water Board 2017).

River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 (Rivers and Harbors Act) addresses activities that involve the construction of dams, bridges, dikes, etc., across any navigable water (33 CFR § 329.4), or placing obstructions to navigation outside established federal lines and excavating from or depositing material in such waters. Section 10 of the Rivers and Harbors Act (33 U.S.C. § 403) prohibits the unauthorized obstruction or alteration of any navigable water of the U.S.; structures or work outside the limits defined for navigable WoUS require a Section 10 permit if the structure or work affects the course, location, or conditions of a water body. This applies to any dredging or disposal of dredged materials. Individual projects under the Proposed Program would require a Section 10 permit from USACE.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) (Water Code § 10720 et seq.), effective January 1, 2015, requires that "groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses" and that sustainable groundwater management "is best achieved locally through the development, implementation, and updating of plans and programs based on the best available science." SGMA tasks local agencies in basins designated as high and medium priority to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge in order to avoid undesirable results. SGMA requires local agencies in high- and medium-priority basins to form groundwater sustainability agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt groundwater sustainability plans (GSPs). The Eureka Plain groundwater basin and the Mad River groundwater basin/Mad River Lowland groundwater subbasin have both been designated as low-priority groundwater basins.

California Coastal Act

The California Coastal Act established policies to protect marine resources, coastal waters, estuaries, wetlands, water quality, and environmentally sensitive habitat areas. The policies of the California Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the CCC and local governments. The CCC manages development along the California Coast except for San Francisco Bay. The CCC requires that each coastal jurisdiction prepare an LCP, including a coastal land use plan. The LCP is developed by each municipality for their jurisdiction that falls within the coastal zone. The LCP also includes zoning ordinances and zoning district maps, and, where required by the coastal land use plan, other applicable implementation measures (see Section 3.9, *Land Use and Planning*, for descriptions of the relevant LCPs in the plan area).

Article 4 of the California Coastal Act requires that marine resources be maintained, enhanced, and where feasible, restored. The act also requires that the quality of coastal waters, streams, wetlands, estuaries, and lakes be maintained and, where feasible, restored through minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface waterflow, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams. The act further requires that the marine environment be protected against the spillage of crude oil, gas, petroleum products, and hazardous substances, and that diking, filling, or dredging (including maintenance of existing navigational channels, vessel berthing and mooring areas, and boat launching ramps) of open coastal waters, wetlands, estuaries, and lakes be permitted in accordance with other applicable provisions under the California Coastal Act, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects.

Coastal Development Permits (CDPs) are required for any development within the Coastal Zone. "Development" is broadly defined and includes dredging and discharge or disposal of any dredged material. Exemptions to the requirement to obtain a CDP include "maintenance dredging of existing navigation channels or moving dredged material from navigation channels to a disposal area outside of the Coastal Zone, pursuant to a permit from USACE" (PRC § 30610c).

3.8.2.3 Local

City and County General Plans

The general plans for Humboldt County (County of Humboldt 2005) and the cities of Arcata (City of Arcata 2008) and Eureka (City of Eureka 2018) contain goals and policies for the management of surface water and groundwater resources.

Humboldt Bay Management Plan

In addition, the *Humboldt Bay Management Plan* (Harbor District 2007) identifies goals and policies addressing the maintenance of channels and marinas in Humboldt Bay, including maintenance dredging and use of dredged materials.

Humboldt Bay Area Plan (HBAP)

The HBAP (Humboldt County 2014), a component of Humboldt County's LCP, establishes policies that govern the use of approximately 21,500 acres of land in the unincorporated area around

Humboldt Bay and over 20 miles of Pacific coastline. The HBAP identifies land uses and standards by which development (including discharge or disposal of dredged material) would be evaluated within the Coastal Zone.

3.8.3 Impacts Analysis

3.8.3.1 Methodology

The evaluation of potential hydrology and water-quality impacts is based on professional standards and a review of existing information for Humboldt Bay, the surrounding watersheds and groundwater basins, as well as existing sediment characterization information for pertinent Proposed Program dredging sites, as described and cited in Section 3.8.1, *Environmental Setting*. Potential impacts resulting from implementation of the Proposed Program, Alternatives 1, 2, and 3, and the No-Project Alternative were qualitatively assessed based on the environmental characteristics of the study area and the magnitude, intensity, and duration of activities related to dredging, processing, and placement of dredged material.

3.8.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below.

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin
- Substantially alter the existing drainage pattern, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - Result in substantial erosion or siltation on- or offsite
    - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite
    - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

3.8.3.3 Impacts and Mitigation Measures

Impact HWR-1: Would the Proposed Project Violate any Water Quality Standards or Waste Discharge Requirements or Otherwise Substantially Degrade Surface or Groundwater Quality?

Proposed Program

Dredging

Dredging would directly result in the temporary, short-term resuspension of sediment in the water column, which would temporarily increase turbidity. The magnitude and duration of turbidity resulting from sediment resuspension during and immediately following completion of dredging at any site would be dependent on the site hydrodynamic conditions, duration of dredging, the amount of material dredged at any one time (see Table 2.2-1), the dredging method, and the sediment composition. At dredging sites where sediment is comprised predominately of silt and clay, as opposed to sand, turbid conditions would be expected to last longer because fine sediments remain suspended longer than coarse sediments. Dredging with a cutterhead dredge would minimize sediment resuspension relative to dredging with a clamshell bucket in part because cutterhead dredges operate by suction (USACE 2015). The cutting action and the turbulence created by cutter rotation would resuspend some of the sediment being dredged, but less material than a clamshell bucket. Loss of dredged material from the top and sides of a clamshell bucket as it is pulled through the water, spillage from the bucket when it breaks the water's surface, accidental spillage of material during barge loading, and intentional overflow in an attempt to increase the barge's effective load are the primary sources of turbidity with excavator/clamshell bucket dredging, aside from the actual bottom dredging action (USACE 2015). The bucket size and type (open or enclosed) would also affect the concentration of resuspended sediment in the water column. Regardless of the dredging method employed, water quality effects related to turbidity would be short term, temporary and diminish with distance from dredging activities.

Dredging would potentially result in the indirect reduction of DO in the water column. The resuspension of anoxic organic matter in sediment results in a temporary increase in chemical and biological oxygen demand in the water column; DO demand is a function of the amount of suspended sediment in the water column, the oxygen demand of the sediment, and the duration of sediment resuspension (USACE 2015). Because dredging operations would result in sediment resuspension, there would be localized, temporary and short-term reductions in DO concentrations in the water column. Because this reduction would be, in part, related to the amount of suspended sediment, the magnitude of localized DO reduction would be smaller when cutterhead suction dredging is implemented. Regardless, given the relatively localized, temporary, and short-term potential DO reductions at dredging sites, substantial degradation of water quality would not be expected as ambient DO conditions generally recur shortly after a dredging event (USACE 2015). Resuspension of sediment during dredging does not cause substantial short- or long-term changes in water temperature, salinity, or pH (USACE and San Francisco RWQCB 2015).

The suspension of sediment due to dredging operations could result in the release of existing chemical contaminants (e.g., PCBs, PAHs, metals) from sediment to the water column. However, given that most contaminants in sediment are adsorbed to organic matter and are not readily released during short-term resuspension due to low water solubility, the potential for a substantial increase in chemical contaminants in the water column relative to existing conditions is not likely.

Poorly maintained dredging equipment could result in the introduction of chemicals to surface water (e.g., hydraulic fluid and fuel leakage). If hazardous chemicals such as oil, fuel and hydraulic fluid leaked from the dredging equipment while in use, water quality could be affected. Further, when dredged material is pumped directly from the dredging site to either the processing or beneficial use site, as would occur when suction dredging is used, leakage or failure of the pipeline would result in dredged slurry being released to surface water. Similarly, when clamshell bucket dredging is used, dredged material may need to be reslurried and pumped via pipelines to the processing or beneficial-use sites, and pipeline leakage or failure could also occur during this process.

Dredged Material Processing

Dredged material from LMSs that cannot be delivered directly to a beneficial use site from a dredging site would be delivered to Samoa Lagoons, Redwood Marine Terminal II, or Fields Landing Boatyard via pipeline.

At Redwood Marine Terminal II and Fields Landing Boatyard, although temporary dewatering basins and stockpile areas would be constructed on existing paved surfaces, ground-disturbing activities related to berm construction, and construction of other dewatering basin features (e.g., temporary pipelines to existing storm drain(s)) would occur. These activities could result in sediment-laden runoff to nearby surface waters. In addition, to the extent that any grading or vegetation removal would be necessary for slurry pipelines from the dredge to the dewatering basin, or from the processing site to a beneficial use site, there would be the potential for increased erosion, turbid runoff during rain events, and consequential sedimentation and turbidity in nearby surface waters. Similarly, if not fully contained, stockpiled dredged material could introduce sediment to nearby surface water in stormwater runoff. In addition, if the liners of the dewatering basins are not secured, there would potentially be uncontrolled discharge of dredge slurry, which could result in erosion and runoff to surface waters. Although there are dewatering basins at the Samoa Lagoons site, they are not currently operational. To make them operational, at minimum, vegetation would need to be cleared and existing onsite dredged sediment would need to be excavated. Potential water-quality impacts could occur related to these site preparation activities. These short-term water-quality impacts could include localized increases in suspended sediment and turbidity in nearby surface water due to site runoff, and surface water and groundwater impacts due to the inadvertent release of fuel, oil, etc. from heavy equipment used in site preparation.

The use of heavy equipment, such as excavators to move dewatered sediment from the basins to stockpile areas or dump trucks to transport stockpiled sediment to beneficial use areas could result in spills and leakage of oil, fuel, and related petroleum contaminants used in the fueling and operation of such equipment. In addition, spills or leakage of the fuel or lubricant required by pumps used for pumping dredged material via pipeline to dredged material processing sites or to beneficial-use sites could also occur. These potential leaks or spills, if not contained, could impact surface water and groundwater quality.

Removal of temporary dewatering basins and stockpile areas could introduce sediment to nearby surface water in stormwater runoff if any remnant dewatered or stockpiled dredged material remains onsite.

Discharge of decant water back into Humboldt Bay following dewatering of dredged material could potentially impact water quality. In addition, temporary water-quality impacts could result from

elevated turbidity at discharge locations during discharge of the decant water or as a result of scour due to high-velocity discharge.

If decant water is discharged via ground percolation, or if dewatering basin liners are not secured (at Redwood Marine Terminal II and Fields Landing Boatyard), or basins are unlined as at Samoa Lagoons site, chemical contaminants in decant water could migrate to underlying groundwater and potentially impact groundwater quality and beneficial uses. Site-specific variables that may influence whether groundwater quality is adversely affected by potential infiltration of decant water from dredged sediment include depth to groundwater, soil infiltration rate, hydraulic conductivity, and existing groundwater quality. In addition, the types and concentration of contaminants in decant water would also influence the groundwater contamination potential. For example, salts (e.g., chloride) are not appreciably retained by soils and thus have a high potential for infiltrating to groundwater, whereas heavy metals (e.g., mercury and lead) and petroleum hydrocarbons adsorb to solids such as sediment and soils and thus would be less likely to infiltrate to groundwater from the ground's surface (Weiss et al. 2008). However, it should be noted that migration of salts to groundwater would not necessarily represent contamination of that groundwater if the groundwater had already been infiltrated by brackish water.

Beneficial Use of Dredged Material

Waterfront Sites

Dredged material could be placed at 16 waterfront sites (Appendix A) to increase protection from tidal inundation related to sea level rise. Most sites (13) would receive sediment slurry piped from dredging areas in Humboldt Bay marinas.

Potential water-quality impacts could occur related to site preparation (e.g., excavation, grading) and placement of dredged material. These short-term, localized impacts could include increases in suspended sediment and turbidity due to site runoff and/or leakage or failure of slurry pipelines (at 13 sites receiving slurry), degradation of groundwater quality due to leachate from dredged material, and the inadvertent release of fuel, oil, etc. from heavy equipment used on site or on dredging vessels. As discussed in Appendix A, at sites receiving slurry, BMPs to manage slurry runoff, i.e., setting up temporary sediment containment structures (e.g., silt fencing), may be necessary to avoid water-quality impacts (suspended sediment and turbidity) related to the introduction of slurry to nearby surface water.

Beach Replenishment

Five beach replenishment sites along Humboldt Bay have been identified for placement of dredged material under the Proposed Program (see Appendix A). These sites are in areas of high wave energy and experience erosion in the winter from storm waves. Potential water-quality impacts could occur related to site preparation (e.g., excavation and grading) and placement of dredged material. These short-term water-quality impacts could include localized increases in suspended sediment and turbidity in nearby surface water due to site runoff and storm waves, surface water and groundwater impacts due to the inadvertent release of fuel, oil, etc. from heavy equipment used in site preparation and placement of dredged material, and the release of chemical contaminates from dredged material leachate.

Diked Shoreline Structures and Diked Former Tidelands

Dredged material could be used at 23 locations to rebuild eroded dike segments, increase low (less than 10 ft) dike crest elevations, and increase the elevation of dikes at former tidelands in Humboldt Bay (see Appendix A). Short-term, localized water-quality impacts related to ground-disturbing activities from construction and dredged material placement would occur and would be due primarily to suspended sediment and turbidity. Given the immediate proximity of these potential beneficial-use sites to surface water, the magnitude of suspended sediment and turbidity could be relatively substantial. Chemical contaminates in leachate from dredged material could impact surface water quality depending on placement location and/or groundwater quality if substantial quantities of dredged material are placed over or adjacent to an aquifer. Groundwater in the diked former tidelands is relatively close to the surface and therefore may be more vulnerable to impacts from any contaminants in leachate than in agricultural areas where dikes would be restored.

Living Shorelines and Salt Marsh Habitat

Under the Proposed Program, there are four potential living shoreline sites;16 salt marsh restoration sites, which could help protect vulnerable built shoreline structures and low-lying areas from wave-induced erosion or overtopping; and 11 salt marsh restoration sites where use of dredged sediments could occur to provide habitat, independent of protecting shoreline infrastructure (see Appendix A). Potential surface and groundwater impacts would be similar to those described for diked shorelines and former tidelands given the immediate proximity of these sites to surface water. Also, like some waterfront beneficial-use sites, dredged material slurry would be used at two living shoreline sites, as well as at some salt marsh sites where the slurry could be broadcast by sprayers or discharged from a pipeline that is moved to enable sediment dispersal, as described in Appendix A. At sites where slurry is used, temporary sediment containment structures (water-filled cofferdams, composite sheet piling, silt fencing or some combination of these structures) may be necessary to reduce the movement of the sediment slurry. The implementation of this BMP would help avoid water-quality impacts (suspended sediment and turbidity) related to the introduction of slurry to nearby surface water.

When properly sited and designed, wetland habitat restoration can result in long-term benefits to water quality by increasing sediment retention, filtration of water contaminants, and shoreline stabilization.

Impact Summary

Although most of the potential water-quality impacts related to dredging, dredged material processing, and beneficial use of dredged material would be temporary and relatively localized, given the magnitude of dredging and dredged material placement at some of the beneficial-use sites, this impact is considered significant. However, project compliance with applicable federal, state, and local regulations governing surface and groundwater quality would help avoid or minimize potential impacts on water quality. In addition, suspended sediment and turbidity impacts during dredging would be minimized by implementation of HWR-1 Water-quality impacts from the inadvertent release of fuel, oil, or other chemicals related to the use of heavy equipment at dredged material processing sites or beneficial-use sites would be avoided or minimized by implementation of HWR-2. Implementation of HWR-3 would avoid or minimize water-quality impacts related to slurry pipeline leakage or failure, and accidental releases of related pumping fuels and lubricants. Site-specific erosion and sediment control measures for dredged material processing sites and beneficial-use sites would be implemented under HWR-4 to help reduce water-quality impacts due

to runoff and sedimentation. Under HWR-5, implementation of BMPs during operation of dredged material processing sites would avoid or minimize potential water-quality impacts related to uncontrolled discharge of dredge slurry, stockpiling dredged material, and the discharge of effluent from dewatering basins. Lastly, implementation of HWR-6 would avoid or minimize potential impacts on groundwater quality at dredged material processing sites and beneficial-use sites. Implementation of HWR-1 through HWR-6 would reduce this impact to less than significant.

Alternative 1 – Suction Dredging Only

Under Alternative 1 sediment at LMSs would be removed by suction dredging and dredged material would be transported to processing sites or directly to beneficial-use sites. The nature of water-quality impacts from dredging under Alternative 1 would be the same as described for the Proposed Program. However, because the method of dredging proposed under Alternative 1 would be suction dredging, the magnitude of water quality effects related to increases in resuspension of sediment, turbidity, and decreases in DO would be less than under the Proposed Program where both clamshell and suction dredging could be used, and under Alternative 2, because substantial losses of sediment from the clamshell bucket can occur during normal operation. Water-quality impacts related to dredged material processing, and beneficial use would be the same as described the Proposed Program. This impact is considered significant. Compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6 (as described for the Proposed Program) would reduce this impact to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Under Alternative 2, sediment at LMSs would be removed by clamshell bucket dredging and dredged material would be transported to processing sites or directly to beneficial-use sites. The nature of water-quality impacts due to clamshell bucket dredging under Alternative 2 would be the same as described for the Proposed Program. However, because the method of dredging used under Alternative 2 would be clamshell bucket dredging, the magnitude of water quality effects related to increases in resuspension of sediment and turbidity as well decreases in DO would be greater than under the Proposed Program where suction dredging is implemented, and under Alternative 1, because substantial losses of sediment from the clamshell bucket can occur during normal operation. Water-quality impacts related to dredged material processing and beneficial use would be as described for the Proposed Program. This impact is considered significant. Project compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6 (as described for the Proposed Program) would reduce this impact to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under Alternative 3, sediment at LMSs would be removed by suction or clamshell bucket dredging and dredged material would be delivered directly to beneficial-use sites. Accordingly, any potential water-quality impacts from dredged material processing, as described for the Proposed Program, would not occur. Water-quality impacts related to dredging and placement at beneficial-use sites under Alternative 3 would be as described for the Proposed Program. At sites where slurry is used, temporary sediment containment structures (water-filled cofferdams, composite sheet piling, silt fencing or some combination of these structures) may be necessary to reduce the movement of the sediment slurry. The implementation of this BMP would help avoid water-quality impacts

(suspended sediment and turbidity) related to the introduction of slurry to nearby surface water. This impact is considered significant. Project compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6 (as described for the Proposed Program) would reduce this impact to less than significant.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Permit-related mitigation and or BMPs to protect water quality would continue to be implemented. Because there would be no dewatering, stockpiling or beneficial use of dredged material, water-quality impacts related to these activities would not occur. This impact is less than significant.

Impact HWR-2: Would the Proposed Program Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge such that Sustainable Groundwater Management of the Basin is Impeded?

Proposed Program

The Proposed Program would not require the use of groundwater or any groundwater pumping, and dredging would not interfere with groundwater recharge. Further, because the proposed temporary dewatering basins and stockpile areas at Redwood Marine Terminal II and Fields Landing Boatyard, and existing dewatering basins at Samoa Lagoons, would not introduce new impervious areas, these program features would not interfere with groundwater recharge.

Dredged material at LMSs consists of approximately 85 percent silt and clays and 15 percent sand and therefore it is expected to have somewhat low permeability, which could affect onsite rainwater infiltration and subsequent groundwater recharge. However, given the small total area that could be occupied by placement of dredged material at beneficial-use sites relative to other potential areas and sources of recharge in the study area, placement of dredged material would not result in a substantial reduction in groundwater recharge. Accordingly, this impact is less than significant.

Alternative 1 – Suction Dredging Only

Potential effects on groundwater supplies and groundwater recharge under Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Potential effects on groundwater supplies and groundwater recharge under Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Potential effects on groundwater supplies and groundwater recharge under Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Because there would be no dewatering, stockpiling, or

beneficial use of dredged material, potential impacts on groundwater supplies and groundwater recharge related to these activities would not occur. Therefore, there would be no impact.

Impact HWR-3: Would the Potential Program Substantially Alter Existing Drainage Patterns Resulting in Substantial Erosion, Siltation, or Flooding, Exceed the Capacity of Existing or Planned Stormwater Drainage Systems, or Result in Substantial Polluted Runoff?

Proposed Program

Dredging would not affect existing drainage patterns, affect stormwater drainage systems, or result in substantial polluted runoff.

Activities associated with the overland pipeline transport and placement of dredged material at dredged material processing sites and beneficial-use sites could affect site drainage patterns primarily through ground-disturbing activities. For example, to the extent that any excavation, grading, and/or vegetation removal would be necessary to accommodate overland slurry pipelines, erosion as well as temporary or permanent changes in stormwater generation or drainage and runoff patterns (i.e., direction, velocity, and volume) could occur. Similarly, grading and excavation activities that may be necessary as part of placement of dredged material at beneficial-use sites could result in rainfall- and stormwater-related soil erosion, runoff, and offsite sedimentation in surface water bodies. The pipeline discharge of slurried dredged material at beneficial-use sites could also result in substantial erosion and runoff, particularly if the flow is not dispersed.

Existing drainage patterns could also be altered at beneficial-use sites as a result of placement of dewatered dredged material such that onsite flooding could occur, particularly at sites where elevations are changed as a result of dredged material placement, or where there are existing drainage features (e.g., drainage ditches at salt marshes).

Because of the potential magnitude of ground-disturbance activities (including direct discharge of sediment) that may be required for beneficial use of dredged material at the beneficial-use sites, the potential for altering existing drainage patterns such that erosion and/or onsite flooding may occur is considered a significant impact. For site activities that involve disturbance/grading of greater than one acre, an SWPPP would be required by the North Coast Water Board, which would include erosion control measures. Where an SWPPP is not required, erosion and sediment control measures would be implemented under HWR-4. In addition, prior to placement of dredged material at a beneficial use site, site-specific drainage needs, and design features would be considered and implemented, as needed, under HWR-7, to prevent substantial adverse alterations of site drainage patterns. Implementation of these mitigation measures would reduce this impact to less than significant.

Alternative 1 – Suction Dredging Only

Dredging would not affect existing drainage patterns, affect stormwater drainage systems or result in substantial polluted runoff. Because beneficial use of dredged material, including the placement of that material, would be the same as under the Proposed Program, this impact under Alternative 1 is the same as under the Proposed Program. This impact would be significant. Project compliance with applicable federal, state, and local regulations governing surface and groundwater quality would help avoid or minimize this impact. For site activities that involve disturbance/grading of greater than one acre, an SWPPP would be required by the North Coast Water Board. Where an SWPPP is

not required, implementation of erosion and sediment control measures under HWR-4 would avoid or minimize impacts on water quality related to erosion and sedimentation. In addition, prior to placement of dredged material at a beneficial use site, site-specific drainage needs, and design features would be considered and implemented, as needed, under HWR-7, to prevent substantial adverse alterations of site drainage patterns. Implementation of these mitigation measures would reduce this impact to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Dredging would not affect existing drainage patterns, affect stormwater drainage systems or result in substantial polluted runoff. Because beneficial use of dredged material, including the placement of that material, would be the same as under the Proposed Program, this impact under Alternative 2 is the same as under the Proposed Program. This impact would be significant. Project compliance with applicable federal, state, and local regulations governing surface and groundwater quality would help avoid or minimize this impact. For site activities that involve disturbance/grading of greater than one acre, an SWPPP would be required by the North Coast Water Board. Where an SWPPP is not required, implementation of erosion and sediment control measures under HWR-4 would avoid or minimize impacts on water quality related to erosion and sedimentation. In addition, prior to placement of dredged material at a beneficial use site, site-specific drainage needs, and design features would be considered and implemented, as needed, under HWR-7, to prevent substantial adverse alterations of site drainage patterns. Implementation of these mitigation measures would reduce this impact to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Dredging would not affect existing drainage patterns, affect stormwater drainage systems, or result in substantial polluted runoff. Although Alternative 3 would not implement dewatering through the use of dewatering basins, dredged material would be dewatered at beneficial-use sites. The method by which dredged material is placed at beneficial-use sites under this alternative would be site-specific. Accordingly, methods of dewatering would also generally be site-specific. For example, slurry may be applied in a thin layer using a sprinkler-type application at a rate that would avoid site runoff and facilitate dewatering primarily through evaporation, or upland dewatering cells may be constructed and decant water may be directed to the Bay through existing stormwater drainage systems, for example. Because beneficial use of dredged material, including the placement of that material, would be similar to that implemented under the Proposed Program, potential impacts on existing drainage patterns would be similar. In addition, onsite dewatering, depending on the method, could also contribute to alterations in existing drainage patterns. As such, this impact would be significant. Project compliance with applicable federal, state, and local regulations governing surface and groundwater quality would help avoid or minimize this impact. For site activities that involve disturbance/grading of greater than one acre, an SWPPP would be required by the North Coast Water Board. Where an SWPPP is not required, implementation of erosion and sediment control measures under HWR-4 would avoid or minimize impacts on water quality related to erosion and sedimentation. In addition, prior to placement of dredged material at a beneficial use site, site-specific drainage needs, and design features would be considered and implemented, as needed, under HWR-7, to prevent substantial adverse alterations of site drainage patterns. Implementation of these mitigation measures would reduce this impact to less than significant.

No-Project Alternative

Under the No-Project Alternative, dredging of LMSs would not affect existing drainage patterns, stormwater drainage systems or result in substantial polluted runoff. Because dredged material would likely continue to be disposed of in open water at HOODS rather than at beneficial-use sites on land, existing drainage patterns would not be affected. As such, there would be no impact.

Impact HWR-4: Would the Proposed Program Risk Release of Pollutants Due to Project Inundation in Flood Hazard, Tsunami, or Seiche Zones.

Proposed Program

In flood events in general, particularly major events including inundation resulting from tsunami, surface water and groundwater quality can be affected from the flood-induced releases of hazardous materials from vehicles and homes, for example. In addition, land flooding can flush existing pesticides and other soil contaminants into surface water and groundwater. As described in Section 3.8.1, *Environmental Setting*, the study area is located in a tsunami inundation zone as well as a flood hazard zone. In the event of flood inundation of the temporary dewatering basins, stockpiled dredged material, and/or beneficial-use sites where dredged material has been placed, chemical pollutants in dredged material or decant water (dewatering basins), and dredged material (i.e., sediment), could be released to floodwaters. However, any pollutants originating from the dredged material from Humboldt Bay that were released with inundation would not be above baseline levels found in Humboldt Bay sediment, which is likely where much of the release would return to when floodwaters receded. Therefore, this impact is considered less than significant.

Alternative 1 – Suction Dredging Only

The risk of release of pollutants due to project inundation under Alternative 1 would be as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

The risk of release of pollutants due to project inundation under Alternative 2 would be as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

The risk of release of pollutants due to project inundation under Alternative 3 would be as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, dredged material from LMSs would likely continue to be disposed of at HOODS. Accordingly, there would be no risk of release of pollutants due to inundation from tsunami, seiche, or other flood waters. There would be no impact.

Impact HWR-5: Would the Proposed Program Conflict with or Obstruct Implementation of a Water Quality Control Plan?

Proposed Program

As described under Impact HWR-1, there would be potentially significant impacts on water quality related to increases in suspended sediment, turbidity, reintroducing sediment-bound contaminants to surface water, reductions in DO, and inadvertent chemical spills or leaks to surface or groundwater. Although these water quality effects would be relatively limited spatially and temporally, dredging would likely cause turbidity levels to exceed the threshold specified in the Basin Plan, and other activities, such as placement of dredged material adjacent to surface waters, or discharge of dewatering basin effluent into Humboldt Bay, for example, have the potential to result in this exceedance as well. The Basin Plan objective for turbidity is fairly stringent; turbidity should not increase by more than 20 percent above naturally occurring background level (see Section 3.8.1, *Environmental Setting*). Accordingly, this impact is significant. As described for Impact HWR-1, compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6, would avoid or minimize potential impacts on water quality, which would reduce this impact to less than significant.

Alternative 1 – Suction Dredging Only

The potential to conflict with the Basin Plan under Alternative 1 would be as described for the Proposed Program. Dredging would likely cause turbidity levels to exceed the threshold specified in the Basin Plan, and other activities, such as placement of dredged material adjacent to surface waters, or discharge of dewatering basin effluent into Humboldt Bay, for example, have the potential to result in this exceedance as well. this impact is significant. As noted under Impact HWR-1, because the method of dredging proposed under Alternative 1 would be suction dredging, the magnitude of water quality effects related to increases in resuspension of sediment and turbidity would be less than under the Proposed Program where both clamshell and suction dredging could be used, and under Alternative 2, because suction dredging results in less turbidity than clamshell bucket dredging during normal operation. As described for Impact HWR-1, compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6, would avoid or minimize potential impacts on water quality, which would reduce this impact to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

The potential to conflict with the Basin Plan under Alternative 2 would be as described for the Proposed Program. Dredging would likely cause turbidity levels to exceed the threshold specified in the Basin Plan, and other activities, such as placement of dredged material adjacent to surface waters, or discharge of dewatering basin effluent into Humboldt Bay, for example, have the potential to result in this exceedance as well. this impact is significant. As noted under Impact HWR-1, because the method of dredging used under Alternative 2 would be clamshell bucket dredging, the magnitude of water quality effects related to increases in resuspension of sediment and turbidity would be greater than under the Proposed Program where suction dredging is implemented, and under Alternative 1, because substantial losses of sediment from the clamshell bucket can occur during normal. As described for Impact HWR-1, compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1

through HWR-6, would avoid or minimize potential impacts on water quality, which would reduce this impact to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

The potential to conflict with the Basin Plan under Alternative 3 would be as described for the Proposed Program. Dredging would likely cause turbidity levels to exceed the threshold specified in the Basin Plan, and other activities, such as placement of dredged material adjacent to surface waters, or discharge of dewatering basin effluent into Humboldt Bay, for example, have the potential to result in this exceedance as well. This impact is significant. As described for Impact HWR-1, compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 through HWR-6, would avoid or minimize potential impacts on water quality, which would reduce this impact to less than significant.

No-Project Alternative

Under the No-Project Alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. Permit-related mitigation and or BMPs to protect water quality would continue to be implemented. As such, the No-Project Alternative would not conflict with or obstruct Basin Plan implementation. There would be no impact.

Mitigation Measures

HWR-1: Minimize turbidity during maintenance dredging.

Monitor Turbidity within 500 ft of dredging to ensure water quality objectives are maintained during dredging and avoid and minimize turbidity exceedances greater than 20 percent above background levels. If turbidity during dredging exceeds 20 percent above background levels, dredging will be paused to allow turbidity to return to background levels.

In addition, when a clamshell bucket dredge is required for maintenance dredging, the contractor will use an enclosed bucket dredge to reduce losses of sediment from the clamshell bucket that would otherwise contribute to turbidity impacts.

HWR-2: Prepare and implement spill prevention and management plan.

Site-specific spill prevention and management plans will be prepared and implemented to prevent the discharge of hazardous or toxic materials such as diesel fuel, lubricants, solvents, and oil to surface waters. The following BMPs will be included in the plan(s):

- Fuel, oil, and other petroleum products will be stored only at designated sites.
- Fuel, lubricants, solvents, petroleum products, and other chemicals will be stored in nonleaking containers with secondary containment.
- Absorbent pads, pillows, socks, booms, or similar spill response materials will be maintained where fuel, lubricants, solvents, petroleum products, and other chemicals are used or stored. Oil-absorbent booms will be used when equipment is used in or immediately adjacent to waters.
- Equipment will be inspected and serviced prior to mobilization. Routine inspections will occur throughout the project and leaks will be repaired immediately when discovered.

- Vegetable-based or biodegradable hydraulic fluids will be used, if possible, in equipment operating over water or without secondary containment.
- Fueling of marine-based equipment will occur at designated safe locations either offsite or onsite. Spills will be cleaned up immediately using spill response equipment.
- Vehicles and other equipment will not be serviced or fueled in the field except under emergency conditions.
- Countermeasures to contain, clean up, and mitigate the effects of an oil spill that has affected navigable waters or adjoining shorelines.
- All stationary equipment will be staged in appropriate staging areas and positioned over drip pans.
- Personnel will be trained in emergency response and spill containment techniques and will also be made aware of the pollution control laws, rules, and regulations applicable to their work.
- In the event of a spill, immediately stop spill, contain spill from spreading further, collect and remove spilled materials if possible.
- Dispose any used absorbents materials at approved facilities.

HWR-3: Prepare and implement dredge slurry and hazardous materials spill contingency plan.

To avoid water-quality impacts related to slurry pipeline leakage or failure, and accidental releases of related pumping fuels and lubricants, a dredge slurry and hazardous materials contingency plan will be prepared and implemented. The plan will include:

- An estimate of a reasonable worst-case release of dredge slurry, and pumping-related fuels and lubricants into coastal waters or wetlands that could result from project operations
- A clear protocol for monitoring and minimizing the risks of the transmission of dredge spoils through environmentally sensitive areas during maintenance dredging operations, including criteria for identifying an unanticipated slurry release and proposed transmission pipeline sealants or other repair materials
- A response and clean-up plan in the event of a spill or accidental discharge of dredge slurry and/or pump fuels and lubricants
- A list of all clean-up equipment that will be maintained onsite
- Designation of the onsite person who will have responsibility for implementing the plan
- A contact list of all regulatory and public trustee agencies having authority over the development and/or the project site and its resources to be notified in the event of a spill or material release
- A list of all conduit and pumping materials, fluids, additives, and sealants that will be used or might be used in the transmission and pumping of the dredge spoils, together with Material Safety Data Sheets for each of these materials

HWR-4: Implement erosion and sediment control measures.

Site-specific erosion and sediment control measures will be implemented to control erosion and sedimentation effects associated with construction of dewatering basins, placement and removal of slurry pipelines, placement of dredged material at beneficial-use sites, including activities related to site preparation. These measures will include, as applicable, but not be limited to the following:

A. Erosion Control Measures

   i. Install physical erosion control stabilization features (hydroseeding with native seed mix, mulch, silt fencing, fiber rolls, sandbags, and erosion control blankets) to capture sediment and control both wind and water erosion.

   ii. Design grading to be compatible with adjacent areas and result in minimal disturbance of the terrain and natural land features and minimize erosion in disturbed areas to the extent feasible.

   iii. Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities.

   iv. Retain native trees and vegetation to the extent feasible to stabilize hillsides, retain moisture, and reduce erosion.

   v. Limit construction, clearing of native vegetation, and disturbance of soils to areas of proven stability.

   vi. Implement construction management and scheduling measures to avoid exposure to rainfall events, runoff, or flooding at construction sites to the extent feasible.

   vii. Conduct frequent site inspections (before and after significant storm events) to ensure that control measures are intact and working properly and to correct problems as needed.

   viii. Install drainage control features (e.g., berms and swales, slope drains) as necessary to avoid and minimize erosion.

   ix. Implement wind erosion control measures (e.g., application of hydraulic mulch or bonded fiber matrix).

B. Sediment Control Measures

   i. Use silt traps, wattles, straw bale barriers or similar measures to retain sediment transported by onsite runoff.

   ii. Collect and direct surface runoff at non-erosive velocities to the common drainage courses.

   iii. When ground disturbing activities are required adjacent surface water, wetlands, or aquatic habitat, the use of sediment and turbidity barriers, soil stabilization and revegetation of disturbed surfaces.

   iv. Deposit or store excavated materials away from drainage courses and cover if left in place for more than 5 days or storm events are forecast within 48 hours.

HWR-5: Implement Best Management Practices (BMPs) during operation of dredged material processing sites.

The following BMPs will be implemented during the operation of dewatering basins, discharge of decant water, and stockpiling of dredged material.

- Temporary dewatering basins will only be located on existing impervious surfaces.
- The perimeter of the impermeable liners of the temporary dewatering basins will be secured to minimize the potential for uncontrolled discharge of dredge slurry.
- Dewatered dredged material to be stockpiled will be stockpiled on an impervious surface, and properly protected to minimize sediment and pollutant transport from the site.
- At the discharge sites for effluent from dewatering basins, a liner and sandbags will be used to direct flow to the bay and waddles will be used for filtering out sediments.
- Prior to discharging effluent from dewatering basins, effluent will be filtered through baffles, pipe filter socks, and/or drop inlet filters.
- Turbidity will be monitored within 500 ft of discharge points to ensure that discharge water turbidity does not exceed bay water turbidity by more than 20 percent. Operations will be adjusted as necessary to ensure allowed turbidity levels are maintained. At a minimum, turbidity will be monitored (a) immediately before discharge begins; (b) every two hours during discharge; and (c) after any potential change to the discharge (e.g., addition of new dredged material to a dewatering unit or changed configuration of baffling).

HWR-6: Implement measures at dredged material processing sites and beneficial-use sites to protect groundwater quality.

To avoid potential impacts on groundwater quality due to infiltration of water from dredged sediment at the Samoa Lagoons site (where dewatering basins will not be lined), or at sites where water from dredged sediment will be allowed to infiltrate soil, the following measures will be implemented, as applicable.

- Perform a groundwater study to determine baseline conditions (depth to groundwater, infiltration rates, hydraulic conductivity, beneficial uses) including, as necessary, installation of groundwater sampling wells and piezometers
- Require analysis of decant water prior to discharge for infiltration and treatment to protect groundwater quality and groundwater beneficial uses

HWR-7: Design and implement dredged material beneficial use projects to avoid adverse alterations of onsite drainage.

Evaluate pre-project site-specific drainage requirements and design beneficial use project to prevent any substantial drainage disruption or alteration in runoff. During project design, the project proponent will conduct a hydraulic analysis of the beneficial use site to inform the design such that any potential adverse onsite drainage effects are avoided. Any necessary features to remediate project induced drainage problems will be constructed prior to project completion or as part of the project, depending on site-specific conditions.

3.9 Land Use and Planning

This section contains a discussion of the existing land use and planning setting for the Proposed Program and surrounding area and evaluates the potential impacts related to land use and planning of the Proposed Program. To provide the basis for this evaluation, the Environmental Setting section describes the existing land use and zoning for the Proposed Program area, and the Regulatory Framework section describes the regulatory background that applies to the Proposed Program. The Impact Analysis section establishes the thresholds of significance, evaluates potential land use and planning impacts, and identifies the significance of impacts. Where appropriate, mitigation measures are presented to reduce impacts on less-than-significant levels.

3.9.1 Environmental Setting

The Proposed Program area described in Chapter 2, *Project Description*, is located within the Humboldt County general planning area. Existing land use designations within Humboldt County include Agricultural Exclusive (AE), Industrial, Coastal Dependent (MC), Resource Dependent/Commercial Recreation (MR/CR), and Natural Resources (NR). In addition, dredging sites and beneficial-use sites would be located within the City of Eureka and beneficial-use sites would be located in the City of Arcata. Figure 3.9-1 shows the extent of the beneficial-use sites within the various jurisdictions. There are 78 beneficial-use sites which fall at least partially within the CCC's jurisdiction and 22 sites which do not extend into the CCC jurisdiction at all. Although the majority of the beneficial-use sites (78 percent) intersect with the CCC boundary; by acreage, the area of beneficial-use sites that fall within CCC jurisdiction is just 179 acres out of a total of 8,812 acres (2 percent). Of the sites that don't intersect with the CCC boundary at all, 13 of them are within the County's jurisdiction. Whereas the other half are within either Fairhaven (2), Arcata (2), Myrtletown (1) or Eureka (4). Of the 78 sites that do intersect with the CCC boundary, 47 are within Humboldt County or are a combination of County/City; whereas 20 are within Eureka and the remaining 11 are within either Fairhaven (4), Arcata (2), Myrtletown (2), and Pine Hills (3).

The existing land use in the Proposed Program area includes Coastal Dependent Industrial (CDI), Public/Quasi/Public (PQP), Natural Resource (NR), Water Conservation (WC), Water Development (WD) within the City of Eureka's jurisdiction, and Agriculture Exclusive (AE) within the City of Arcata. See Figure 3.9-2 for a map of the land use types within the Proposed Program area.

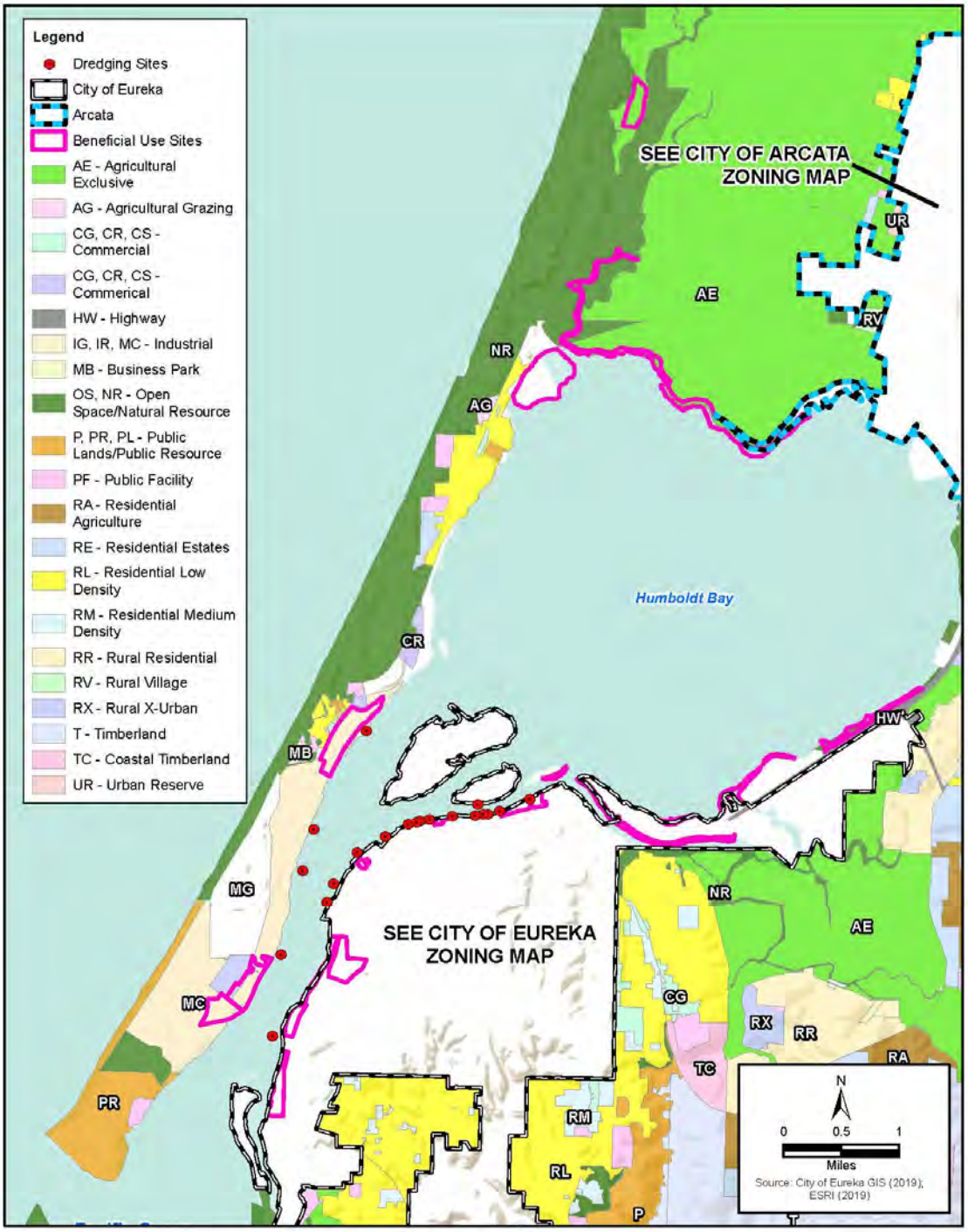


Figure 3.9-1. County of Humboldt Zoning – North Bay

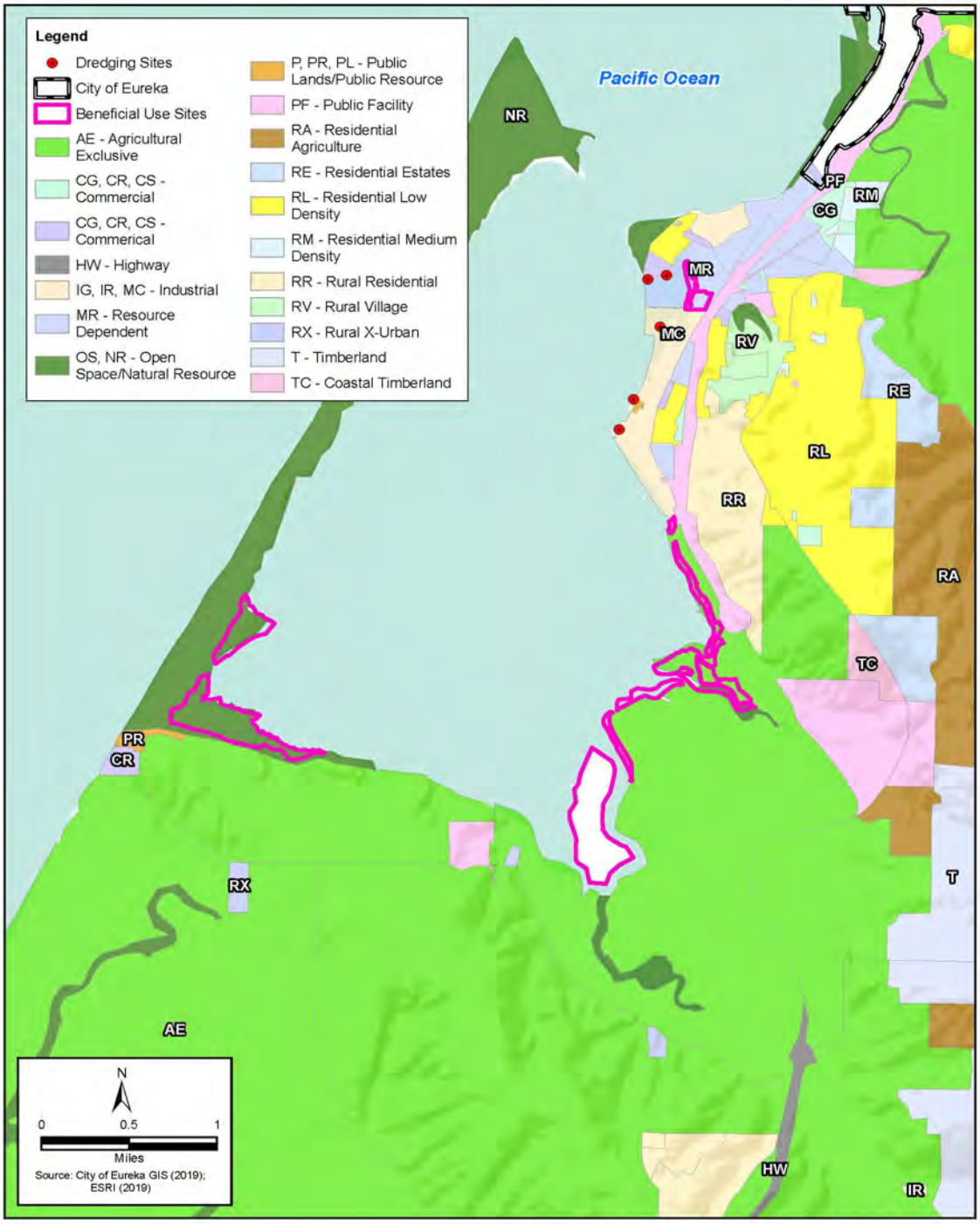


Figure 3.9-2. County of Humboldt Zoning – South Bay

3.9.1.1 Existing Protected Areas

A variety of local, state, and special district protected areas exist in the Plan Area, including the Humboldt Bay National Wildlife Refuge, the Arcata Marsh and Wildlife Sanctuary (City of Arcata), and the wildlife area on Woodley Island (Harbor District). These areas include some form of public or private habitat protection or otherwise designated open space. The Proposed Program is within the Primary Area of Concern and Sphere of Interest boundary components of the HBMP planning boundary, which guides planning, research and use around Humboldt Bay. In addition, the Humboldt Bay National Wildlife Refuge owns tidelands, including saltmarsh and mudflat, in Arcata Bay and in South Bay within the Proposed Program area. A cluster of salt marsh restoration (SMR) sites are proposed within the Humboldt Bay National Wildlife Refuge in the South Bay portion of the Proposed Program area. Eleven sediment sites have been identified within the Proposed Program area where SMR could occur to provide valuable habitat, independent of protecting vital shoreline infrastructure (Appendix A).

3.9.2 Regulatory Setting

The applicable local regulations that are relevant to an analysis of the Proposed Program's land use impacts are listed below (there are no federal land use regulations or plans that are directly applicable to the land use impact analysis).

3.9.2.1 State

State Planning and Zoning Laws

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning. Cities typically identify a "sphere of influence" in their general plans; these are areas outside the city corporate boundaries that comprise the probable future boundary and service area of the city. The general plan addresses a broad range of topics, including at a minimum land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. The State Zoning Law (California Government Code § 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific zone district, are required to be consistent with the general plan. Local general plan policies and zoning ordinances, as they relate to the Proposed Program, are summarized in the forthcoming sections.

California Coastal Act

The CCA was enacted to establish policies and guidelines that provide direction for the conservation and development of the California coastline. The CCC was established by voter initiative via Proposition 20 in partnership with coastal cities and counties in order to plan and regulate the use of land and water within the Coastal Zone (CCC 2020). The CCC requires that each coastal jurisdiction prepare an LCP, including a coastal land use plan. The LCP is developed by each municipality for their jurisdiction that falls within the coastal zone. The LCP also includes zoning ordinances and zoning district maps, and, where required by the coastal land use plan, other

applicable implementation measures. Once the LCP is reviewed and certified by the local government and the CCC as consistent with the Coastal Act's policies, the LCP becomes the guiding and regulatory document for development and resource conservation in the coastal zone. Humboldt County has adopted six coastal planning areas that function as LCPs.

Article 4 of the California Coastal Act requires that marine resources be maintained, enhanced, and where feasible, restored. The act also requires that special protection be given to areas and species of special biological or economic significance. It further requires that uses of marine environments be such that habitat function, biological productivity, healthy species populations, and fishing and recreational interests of coastal waters are maintained for long-term commercial, recreational, scientific, and educational purposes; and that marine resources are protected against the spillage of crude oil, gas, petroleum products, and hazardous substances.

3.9.2.2 Local

Humboldt County General Plan

The HCGP was adopted on October 23, 2017. The HCGP establishes land use designations to allow for the orderly development of lands within the County. The HCGP provides residential, commercial, industrial, open space, public lands and tribal lands, and resource production designations. In addition, the HCGP Appendix E includes six LCPs, in compliance with the CCC. The Land Use Element contains policies related to land use that are relevant to the Proposed Program.

Land Use Element

The HCGP Land Use Element contains goals, policies, and programs concerning land use; many of the issues and policies contained in other plan elements are linked in some degree to this element. The policies in the Land Use Element address countywide issues that are general in nature and may apply to numerous locations and land use designations within the planning area. The policies are grouped by topic and are preceded by a brief discussion of issues pertaining to the topic. The following is a summary of the policies included in the Land Use Element within specific subcategories that apply to the Proposed Program.

Public Lands

Policy PL-P1: Management Plans. Encourage applicable public land agencies to prepare management plans that:

- Ensure consistency with the General Plan; and
- Promote and protect adjacent private resource production lands; and
- Effectively utilize the multiple-use concept**;** and
- Emphasize the provision of low-cost recreational opportunities, provided such opportunities do not unfairly compete with private enterprise; and
- Place priority on development and maintenance of facilities over future acquisition; and
- Maximize local employment

Policy PL-P6: Planning Adjacent to Public Lands. Land use planning and discretionary review of permit and subdivision applications adjacent to public lands will consider impacts on public lands and consistency with applicable management plans.

Policy PL-P7: Public Access. Encourage the provision of the maximum amount of access to public lands and waterways, consistent with: A. Public safety; B. Consideration of nearby access alternatives; C. Rights of private property owners; D. Natural resource protection; E. Subdivision Map Act requirements for access to navigable waterways; and F. Special needs of handicap and elderly persons.

Land Use Designations

The HCGP Land Use Element contains the various land use designations and their permitted uses that are also displayed on the Plan's land use maps. The Proposed Program's applicable land use designations are listed below.

Industrial Designations

Industrial, General (MG): This designation (IG in inland areas; MG in coastal areas) provides for general industrial and manufacturing uses, typically in urban areas, convenient access to transportation systems and full range of urban services are available. This designation may be accommodated in rural areas where full urban services are not required for the intended use.

Industrial, Resource Related (IR): This designation provides areas for resource-related industrial processing such as timber, agriculture and mineral products processing in areas not typically served by urban services and therefore not suitable for a broader range of industrial uses.

Industrial, Coastal Dependent (MC): The purpose of this designation is to protect and reserve parcels on, or near, the sea for industrial uses dependent on, or related to, the harbor.

Open Space, Public Lands, and Tribal Land Designations

Natural Resources (NR): The purpose of this designation is to protect and enhance valuable coastal fish and wildlife habitats and provide for public and private use of their resources, including hunting, fishing, and other forms of recreation.

Open Space (OS): This designation provides for land which is essentially unimproved and devoted to open space use, including areas for conservation of natural resources and habitat values, for protection of public health and safety such as areas subject to flooding, steep or unstable slopes, and for compatible outdoor recreational uses such as accessways and trails and scenic enjoyment.

Public Facility (PF): The Public Facilities designation is utilized to classify land appropriate for use by a governmental agency or public agency, which has the purpose of serving the public health, safety, convenience, or welfare.

Public Lands (P): The Public Lands designation is used to classify land owned by or under the jurisdiction of the federal, state, county or any other district authority or public corporation, or agency thereof.

Resource Dependent (MR): The purpose of this designation is to protect coastal wetlands and to provide for the development of upland areas consistent with resource protection, and where feasible, resource enhancement.

Resource Production Land Use Designations

Agricultural Exclusive (AE): This designation applies to bottomland farms and lands that can be irrigated; also used in upland areas to retain agricultural character. Typical uses include dairy, row crops, orchards, specialty agriculture, and horticulture.

Humboldt Bay Management Plan

The HBMP was first developed in 1997 to provide an update and development of a common database for use by the Bay's landowners and agency land managers to guide planning, research and use around Humboldt Bay. The HBMP planning boundary consists of three components: the Primary Area of Concern, the Sphere of Interest, and the Humboldt Bay Watershed. The Proposed Program occurs within the Primary Area of Concern and Sphere of Interest boundary components. The HBMP also provides water use classification types, which include primary water use and combined water use designations. The primary water use designations are harbor and bay conservation. The combined water use designations are marine recreation and mariculture.

Section three of the HBMP is the policy document of the plan and sets forth the Harbor Element Planning Policies, Recreation Planning Policies, and Conservation Element Planning Policies. Policies from the Harbor Element and Conservation Element are most applicable to the Proposed Program; these policies are listed below.

Harbor Element Planning Policies

Shoreline Management

Goals

- Maintain shipping terminals, marinas, and related shoreside facilities within Humboldt Bay that support commercial shipping and other water dependent or coastal-dependent uses.
- Maintain shoreline protection measures that protect uplands from encroachment by the Bay while protecting the Bay from the effects of upland uses.

The following Shoreline Management policies from the Harbor Element are applicable to the Proposed Program.

- **HSM-3:** Develop appropriate, consistent shoreline protection guidelines for commercial, industrial, and residential development around Humboldt Bay.
- **HSM-4:** Require maintenance according to the District's adopted shoreline protection standards.
- **HSM-7:** Identify needs for potential shoreline improvements necessary to accommodate bay water surface elevation changes, including potential effects of climate change.
- **HSM-8:** Develop coordinated plan for addressing seismic effects, land stability, and tsunami response plan for Humboldt Bay.

Dredging and Waterway Maintenance

Goals

- Maintain Humboldt Bay's channels to be compatible with the requirements of commercial shipping and other water-dependent uses of the Bay.
- Conduct channel maintenance dredging that is compatible with maintaining environmental resource values in Humboldt Bay.

The following Dredging and Waterway Maintenance policies from the Harbor Element are applicable to the Proposed Program:

- **HWM-2:** Dredging may be authorized to meet Plan purposes.
- **HWM-3:** Re-deposition of dredged materials within Humboldt Bay may be authorized to meet Plan purposes.
- **HWM-4:** Placement of fill within Humboldt Bay may be authorized to meet Plan purposes.
- **HWM-5:** Potential dredged-material management options and alternative disposal methods will be identified in a Long-Term Management Strategy for Humboldt Bay.
- **HWM-6:** Sediment dynamics in Humboldt Bay will be identified and a sediment management approach for Humboldt Bay will be developed.
- **HWM-7:** Evaluate the extent of maintenance dredging required to meet the Management Plan's objectives.
- **HWM-8:** Evaluate channel maintenance alternatives for the community of King Salmon.

Conservation Element Planning Policies

Aquatic Species Management

Goals

- Manage Humboldt Bay and its habitats to maintain viable populations of native and desirable nonnative species.

The following Aquatic Species Management policies from the Harbor Element are applicable to the Proposed Program:

- **CAS-5:** Fill placement may be used for habitat enhancement purposes.
- **CAS-6:** Fill Placement may be used for cultural resource protection purposes.

Humboldt Bay Ecosystem Management Program Policies

Goals

- Provide standards for reviewing District projects and submittals for District approvals that protect the Bay's ecosystem components while authorizing appropriate uses.

The following Humboldt Bay Ecosystem Management Program policies from the Harbor Element are applicable to the Proposed Program.

- **CEP-2:** Dredging may be approved under specified conditions.
- **CEP-4:** Functional capacity of aquatic ecosystems must be maintained.
- **CEP-5:** Water quality protection is required.

Humboldt Bay Area Plan of the Humboldt County LCP

Humboldt County's LCPs in concert with Chapter One through Three of the Humboldt County Zoning Code, comprise the certified Humboldt County LCP. The LCP that is applicable to the Proposed Program is the HBAP. The HBAP contains policies, recommendations, and standards that are based on the Coastal Land Use Policies and Standards (CLUPS) that were approved by the Humboldt County Board of Supervisors on September 18, 1979 (Humboldt County 2014). The HBAP's *Natural*

Resources Protection Policies and Standards detail the provisions applicable to the diking, filling, and dredging components of the Proposed Program (Humboldt County 2014):

> The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes will be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and will be limited to the following:

- New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.
- Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.
- In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland; provided; however, that in no event will the size of the wetland area used for such boating facility, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities, be greater than 25 percent of the total wetland area to be restored.
- In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities.
- Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.
- Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.
- Restoration purposes.
- Nature study, aquaculture, or similar resource-dependent activities.

Beach and Dunes Management Plan

The Humboldt County LCP was amended in 1993 to incorporate the Beach and Dunes Management Plan, which was developed as a management plan to address all resource and recreational management issues within the mid-Humboldt County beach and dunes area from Table Bluff north to the Mad River. The management plan includes a range of management alternatives for the planning area to protect the natural and cultural resources, to enhance and restore degraded portions, and to provide opportunities for recreation, research, and other activities that are compatible with the maintenance of the integrity of the environment (Humboldt County 1993).

City of Arcata General Plan

The AGP was developed in 2000, amended in 2008, and establishes land use designations to allow for the orderly development and use of lands in the City. The AGP's Land Use and Resource Conservation and Management Elements contain goals and policies that are applicable to the Proposed Program.

Land Use Element

The AGP Land Use Element contains "goals, policies, and implementation measures for each land use category. These elements are intended to guide future land use decisions, preserve important

elements of the past, and maintain the present diversity of use and character" (City of Arcata 2008). The structure of the AGP Land Use element is designed with six major policies and more specific sub-policies that comprise each major policy. The major policies of the Land Use Element that are applicable to the Proposed Program are:

Policy LU-1: Overall Land Use Pattern: Land Use Plan Map

- **LU-1b**: Coastal land-use plan.
- **LU-1e:** Protection of natural resources and agricultural lands.

Policy LU-6: Agricultural and Natural Resource Lands

- **LU-6e:** Relationship with the Open Space and Resource Conservation and Management Elements.

Land Use Designations

The HCGP Land Use Element contains the various land use designations and their permitted uses that are also displayed on the Plan's land use maps. The Proposed Program's applicable land use designations are listed below:

Agriculture Exclusive (AE): This designation is intended to preserve land for agricultural production. The A-E designation is appropriate for lands with prime agricultural soils and wetlands that could be used as grazed agricultural lands. Structures associated with agricultural production, such as barns and farmhouses, are appropriate uses in A-E areas.

Natural Resource (NR): This designation is applied to public or private lands where protection of unique and/or sensitive natural resources, or managed production of resources, are the primary objectives. The resources element describes three subdistrict zones within the NR district which are designated: Wetland Stream Protection Zone (NR-WSPZ), Timber Production Zone (NR-TPZ), and Public Trust Zone (NR-PTZ). Examples of lands designated NR include the Community Forest (NR-TPZ), Janes Creek /McDaniel Slough Linear Park (NR-WSPZ), and the Arcata Marsh and Wildlife Sanctuary (NRPTZ). Recreation may be considered as a secondary use when there are no adverse impacts on the protected resources. This designation is also applicable to productive resource lands, such as timber-producing forested areas (NR-TPZ) and aquaculture in Arcata Bay (NR-PTZ). The land between Humboldt State University and the Community Forest is an example of productive forest lands designated (NRTPZ). The NR designation is not applied to small or "pocket" wetlands, that exist on parcels large enough to accommodate development without adversely affecting the wetlands. The designation is also not applied to wetlands used as grazed agricultural lands, or riparian areas in other zones. These resource areas are protected by applicable stream and wetlands standards.

The AGP Land Use Element explicitly states that coastal land-use designations will be designated by the City of Arcata's Local Coastal Program (ALCP).

> The western portion of the Arcata Bottoms, lands south of 7th and 8th Streets west of State Route 101, and lands south of Bayside and Old Arcata Roads east of State Route 101 are within the Coastal Zone, created by the California Coastal Act. The land use designations within the Coastal Zone are part of the City's Local Coastal Program (LCP) (City of Arcata 2008).

Resource Conservation and Management Element

The AGP Resource Conservation and Management Element contains goals and policies to conserve, enhance and manage the City's natural systems and features. The structure of the AGP Resource Conservation and Management Element is designed with fourteen guiding principles and nine policies to enact the guiding principles. The major policies of the Resource Conservation and Management Element that are applicable to the Proposed Program are:

RC-1c: Habitat value protection. Environmentally sensitive habitat areas (ESHA) will be protected against any significant disruption of their habitat values, and only uses dependent on and compatible with maintaining those resources will be allowed within ESHAs. Proposed development in areas adjacent to ESHAs will be sited and designed to prevent impacts which would significantly degrade such areas and must be compatible with the continuance of such habitat areas.

RC-3k: Wetland functional capacity maintenance requirement. Diking, filling, or dredging of a wetland or estuary will maintain or enhance the functional capacity of these resources. Functional capacity means the ability of the wetland or estuary to be physically and biologically self-sustaining and to maintain natural species diversity. In order to establish that the functional capacity is being maintained, all of the following must be demonstrated:

1. Presently-occurring plant and animal populations in the ecosystem will not be altered in a manner that would impair the long-term stability of the ecosystem (i.e., natural species diversity, abundance and composition are essentially unchanged as the result of the project).
2. A species that is rare or endangered will not be significantly adversely affected.
3. Consumptive (e.g., fishing, aquaculture, and hunting) or non-consumptive (e.g., water quality and research opportunity) values of the wetland or estuary ecosystem will not be significantly reduced.

RC-4d: Diking, dredging, filling, and shoreline structures. Diking, filling, or dredging of Bay waters, wetlands, and estuaries will be permitted where it has been demonstrated that the Public Trust resources and values are being protected, and mitigation measures have been provided, which minimize adverse environmental effects, for the following limited uses.

1. Incidental public service purposes including, but not limited to, burying cables and pipes, and maintaining existing dikes and public facilities.
2. Maintaining a channel adequate to serve the boat ramp at current levels of use.
3. Resource restoration purposes.
4. Nature study, aquaculture, or similar Public Trust resource dependent activities.
5. Agriculture as currently practiced within existing farmed wetlands, but not including the expansion thereof. In order to protect existing development, shoreline structures (such as dikes or tidegates) that may alter the natural shoreline, may be permitted only when they do not effect any federally listed species and no other feasible, less environmentally-damaging alternative is available, and only when not located within a wetland, unless the wetland will be the primary beneficiary of the structure.

The disposal of dredge spoils on existing wetlands will not be permitted unless such disposal is necessary for either a Public Trust resource restoration project or for the maintenance of existing agricultural operations in farmed wetlands. Fill will be allowed for aquaculture projects if it can be shown that it is necessary for the project, is required to be located within the wetland, and there is no other feasible, less environmentally damaging, alternative.

City of Arcata LCP

The AGP is a combined document meeting both the State General Plan requirements and serving as the Coastal Land Use Plan portion of the City's LCP.

City of Eureka General Plan

The EGP was adopted in October 2018, and establishes goals, policies, and programs to direct land use development decisions, manage resources, deliver public services, and provide infrastructure. The EGP contains goals and policies related to land use that are applicable to the Proposed Program. Relevant policies are as follows.

- **LU-4.1 Variety of Industrial Uses**. Provide sufficient land for a broad range of viable Industrial uses to attract new industries and retain and expand existing uses.
- **LU-4.2 Protect Industrial Lands**. Protect industrially designated lands from encroachment by incompatible uses and activities that could conflict with or limit industrial activities.
- **E-5.4 Dredging**. Continue to dredge and take other appropriate measures to maintain channel depths adequate to support a vibrant working waterfront and recreation uses along the bay. Dredging should maintain access to CDI zoned lands, docks, marinas, and boat ramps.
- **NR-3.1 Preserve Open Space**. Preserve unique and valuable areas within and around the city that provide visual and physical relief to the cityscape, as well as critical habitat, natural drainage, farming opportunities, timber extraction, passive recreation or outdoor education in their natural state to define and enhance the city's distinct character and heritage.
- **HS-1.2 Shoreline Protection**. Ensure that development on or near the shoreline of Elk River, Humboldt Bay, and Eureka Slough does not create, contribute significantly to, or is subject to, high risk of damage from shoreline erosion or geologic instability over the life span of the development.
- **SL-1.1 Maintain and Enlarge Shoreline Protective Structures**. Maintain and enlarge existing shoreline protective structures to protect development from sea-level rise related hazards, including storm events, wave run-up and coastal erosion.
- **SL-1.2 Design of Shoreline Protective Structures**. Require shoreline protective structures be designed for multiple urban purposes, connect to the public access system, ensure shore and structural stability, limit impacts on coastal resources, incorporate soft coastal protection, minimize aesthetic impacts and neither create nor contribute significantly to erosion, or cause geologic instability.
- **SL-1.5 Natural Shoreline Areas**. Encourage the preservation and habitat enhancement of natural shoreline areas as identified in the most recent shoreline mapping assessment.

Eureka General Plan Land Use Designations

The EGP contains the various land use designations and their permitted uses that are also displayed on the Plan's land use maps. The Proposed Program's applicable land use designations are listed below.

Industrial Designations

Coastal Dependent Industrial (CDI): Coastal-dependent and coastal-related manufacturing and processing, fishing, shipping, marine services, aquaculture, oil and gas facilities and other uses that must be located on or adjacent to Humboldt Bay in order to function. Intended to encourage activities related to the shipping and fishing industries and support those uses given priority by the

California Coastal Act of 1976. Retail and service uses that are incidental to the primary use, interim non-coastal uses, non-coastal-dependent uses, and non-coastal related uses may be allowed as provided by the applied zoning district. Offices and other non-coastal-dependent or non-coastal-related uses may be allowed on upper floors as provided by the applied zoning district.

Public/Quasi-Public Use

Public/Quasi/Public (PQP): Public and private institutional uses, government facilities and services, schools, courts, cemeteries, fairgrounds, airports, marinas and wharves, and major utility facilities, as well as parks, golf courses and other public recreational facilities. Intended to be applied to uses and facilities that are of a size and intensity that warrant an individual land use designation and/or to accommodate both active/programmable and passive/self-directed recreational facilities. Retail, service uses, and other uses determined to have a public benefit and that are incidental to the primary use may be allowed as provided by the applied zoning district.

Open Space, Public Lands, and Tribal Land Designations

Natural Resource (NR): Protection, enhancement, restoration, management, study, and passive recreational use of land-based habitats and natural areas. Intended to protect land that is primarily suitable for permanent habitat preservation, compatible resource related uses, nature study, and natural-resource related recreation. Public access, passive recreation, active recreation, and visitor-related facilities (such as restrooms, interpretive centers, trailheads, etc.) may be allowed as provided by the applied zoning district.

Water Conservation (WC): Protection, enhancement, restoration, management, and study of environmentally sensitive habitat within the estuarine waters of Humboldt Bay. Intended to protect waters that are primarily suitable for permanent habitat preservation, compatible resource related uses, nature study, and natural-resource-related recreation. Public access, passive recreation, active recreation, boat ramps, commercial fishing, aquaculture, commercial outdoor recreation, and other compatible uses may be allowed as provided by the applied zoning district.

Water Development (WD): Port, harbor, commercial fishing, recreation, and aquaculture related uses of the estuarine waters of Humboldt Bay. Intended to be carried out consistent with the City's resource protection policies. Coastal dependent industrial, incidental public services, recreational use, nature study, and other compatible uses may be allowed as provided by the applied zoning district.

City of Eureka Local Coastal Plan

Under the California Coastal Act, each local jurisdiction lying partly or wholly within the coastal zone is required to prepare an LCP. The City's LCP was originally prepared by CCC staff in 1981. In 1997, the City submitted a comprehensive LUP update. The CCC approved the amendment in 1998, and the amendments took effect in 1999 (City of Eureka 2012). The 1999 LCP remains the standard of review for coastal development permit issuance within the City's coastal zone. The City's LCP is comprised of an integrated General Plan/LUP for its coastal zone and inland areas, and a chapter within the City's Municipal Code that applies exclusively within the coastal zone but references the inland zoning regulations in Chapter 155. The LCP Land Use Plan provides a land use plan, policies and programs for those portions of the City within the Coastal Zone to ensure compliance with the requirements of the California Coastal Act. Topics addressed include Planning and Locating

Development, Public Access, and Recreation, Marine and Land Resources, Hazards and Shoreline Development, Scenic and Visual Resources, Agricultural Resources, and Public Works.

3.9.3 Impacts Analysis

3.9.3.1 Methodology

Zoning and land use maps were consulted to determine the present designations of the Humboldt Bay and Coastal zone and the relative Proposed Program study area and beneficial-use sites. Evaluation of potential land use impacts from implementation of the Proposed Program is based on a review of documents, including the current HCGP, and the Humboldt County Code; the Humboldt Bay Management Plan, HBAP of the Humboldt County, Beach and Dunes Management Plan, LCP, and the City of Eureka General Plan.

The following steps were used to assess potential impacts from the Proposed Program on existing land use in the study area.

- Maps were created to illustrate existing general plan land use in the study area.
- Existing land uses along the Proposed Program corridor were described.
- An assessment of the Proposed Program's impacts on land use was conducted.

3.9.3.2 Thresholds of Significance

Significance thresholds are used to determine whether the Proposed Program may have a significant environmental effect under CEQA, which requires state and local government agencies to identify the significant environmental effects of proposed actions.

The State CEQA Guidelines define a significant effect on the environment as: "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Proposed Program including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (State CEQA Guidelines § 15382).

The State CEQA Guidelines do not describe specific significance thresholds. However, Appendix G of the State CEQA Guidelines lists a variety of potentially significant effects, which are often used as thresholds or guidance in developing thresholds for determining impact significance. Accordingly, for the purposes of this PEIR, a project would normally have a significant land use impact, under CEQA, if it would:

- Physically divide an established community
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect

Note that the Proposed Program would not provide individual project approvals or entitlements for any private or public development or infrastructure project. Accordingly, the Proposed Program does not provide CEQA coverage for future individual sediment management projects, but serves as a programmatic CEQA document in accompaniment to future projects CEQA analyses.

3.9.3.3 Impacts and Mitigation Measures

Impact LUP-1: Would the Proposed Program Physically Divide an Established Community?

Proposed Program

Construction and Operation

The Proposed Program would include dredging, sediment transport and beneficial use activities such as restoring diked former tidelands to salt marsh, restoring eroded salt marsh, creating living shorelines, and sea level rise resiliency in Humboldt Bay. The Proposed Program would not result in development or expand into any adjacent communities. All dredging, transport, and placement activities would occur within suitable use sites such as vacant waterfront property, ocean beach surf zone areas, tidelands, shorelines, and salt marsh habitat. Therefore, the Proposed Program would not physically divide an established community, and no impacts would occur.

Alternative 1 – Suction Dredging Only

Under the Suction Dredging Only alternative, sediment removal at LMSs would be suction dredging only. Dredging, transport, and placement activities would not result in development or expand into any adjacent communities. Therefore, this alternative would not physically divide an established community, and no impacts would occur.

Alternative 2 – Clamshell Bucket Dredging Only

Under the Clamshell Bucket Dredging Only alternative, sediment removal at LMSs would be excavated using a clamshell bucket only. Dredging, transport, and placement activities would not result in development or expand into any adjacent communities. Therefore, this alternative would not physically divide an established community, and no impacts would occur.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under the Sediment Direct Delivered to Beneficial Use Sites Only alternative, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. Dredging, transport, and placement activities would not result in development or expand into any adjacent communities. Therefore, this alternative would not physically divide an established community, and no impacts would occur.

No-Project Alternative

Under the No Project alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. No additional dredging, transport or placement activities would occur outside of the LMSs other than what currently occurs thus, this alternative would not physically divide an established community, and no impacts would occur.

Impact LUP-2: Would the Proposed Program Cause a Significant Environmental Impact due to a Conflict with any Land Use Plan, Policy, or Regulation Adopted for the Purpose of Avoiding or Mitigating an Environmental Effect?

Proposed Program

Construction and Operation

The dredging, transport and placement activities would be consistent with applicable plan goals and policies. The Proposed Program area is zoned as follows (Figure 3.9-1 and Figure 3.9-2).

The Proposed Program area within unincorporated Humboldt County jurisdiction is zoned as Coastal Resource Dependent (C), Industrial/Coastal Dependent (MC), Agriculture Exclusive (AE), Natural Resources (NR), (Humboldt County Code §§ 313-18.1, 313-3.4, 313-7.1, and 313-5.4). A conditional use permit from Humboldt County may be required for dredging, sediment transport, and beneficial use activities occurring under the Proposed Program.

Areas of the Proposed Program within the City of Eureka's jurisdiction are zoned Natural Resources (NR); Service Commercial (CS), Waterfront Commercial (CW), Coastal Dependent Industrial (MC), Development Water (WD) (City of Eureka General Plan, Chapter 5 § 10.5.2907). A conditional use permit from the City of Eureka may be required for dredging and beneficial use activities occurring under the Proposed Program.

Areas of the Proposed Program area within the City of Arcata's jurisdiction are zoned AE (Arcata Zoning Code § 9.20.030).

The Proposed Program is consistent with existing zoning and the policies of land use plans that are applicable to the Proposed Program area, including the HCGP, Humboldt Bay Management Plan, City of Arcata General Plan, the City of Arcata LCP, the City of Eureka General Plan, and the City of Eureka LCP. Therefore, impacts related to consistency with an applicable land use plan, policy, or regulation adopted for the purposes of avoiding or mitigating an environmental effect would be less than significant.

Alternative 1 – Suction Dredging Only

Under the Suction Dredging Only alternative, sediment removal at LMSs would be by suction dredging only. Dredging, transport, and placement activities would be consistent with existing zoning and applicable policies of land use plans. Therefore, this alternative would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impacts would occur.

Alternative 2 – Clamshell Bucket Dredging Only

Under the Clamshell Bucket Dredging Only alternative, sediment removal at LMSs would be excavated using a clamshell bucket only. Dredging, transport, and placement activities would be consistent with existing zoning and applicable policies of land use plans. Therefore, this alternative would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impacts would occur.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under the Sediment Direct Delivered to Beneficial Use Sites Only alternative, sediment removal at LMSs would be excavated using either suction dredging or a clamshell bucket and would be transported directly to beneficial-use sites. Dredging, transport, and placement activities would be consistent with existing zoning and applicable policies of land use plans. Therefore, this alternative would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impacts would occur.

No-Project Alternative

Under the No Project alternative, LMSs would continue to be dredged and dredged material would likely continue to be disposed of at HOODS. No additional dredging, transport, or placement activities would occur outside of the LMSs other than what currently occurs and thus, this alternative would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impacts would occur.

3.10 Noise and Vibration

This section describes the regulatory and environmental setting for noise in the Proposed Program area. It also analyzes noise and vibration impacts that could result from implementing the Proposed Program or its alternatives, and provides mitigation measures for significant impacts, where appropriate. The noise study area includes all land within 0.5 mile of dredging sites, dredging processing sites, and beneficial-use sites.

3.10.1 Environmental Setting

3.10.1.1 Noise Sources in the Proposed Program Area

The Proposed Program area includes the cities of Eureka and Arcata, and unincorporated Humboldt County. Existing noise sources in The Proposed Program area include traffic from US-101 and local roads, and aircraft overflights from Humboldt County Airport, Murray Airport, and the Samoa airstrip. Equipment use from commercial and industrial facilities in the Proposed Program area are a source of ambient noise adjacent to those areas. Noise emissions from dredging contribute to ambient levels along the shoreline of Humboldt Bay. The Proposed Program area includes urban, suburban, and partially developed rural environments, with ambient sound levels typically within a range of 45 to 60 (dBA).

3.10.1.2 Surrounding Noise-Sensitive Land Uses

Sensitive land uses are generally defined as locations where people reside or where the presence of noise could adversely affect the use of the land. Sensitive land uses that would potentially be affected by noise from the Proposed Program include single- and multi-family residences, lodging and recreational uses within 500 ft of shoreline areas of Humboldt Bay, Arcata Bay, and beneficial-use sites.

3.10.2 Regulatory Setting

Applicable federal, state, and local noise regulations are described in this section.

3.10.2.1 Federal

Noise Control Act of 1972

The Noise Control Act of 1972 (Public Law 92 574) established a requirement for all federal agencies to administer their programs in a manner that promotes an environment that is free of noise that jeopardizes public health or welfare. The USEPA was given the following responsibilities.

- Providing information to the public regarding the identifiable effects of noise on public health and welfare.
- Publishing information on the levels of environmental noise to protect the public health and welfare with an adequate margin of safety.
- Coordinating federal research and activities related to noise control.
- Establishing federal noise emission standards for selected products distributed in interstate commerce.

Federal Transit Administration Construction Noise Standards

FTA has developed methods for evaluating construction noise levels, which are discussed in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). The manual does not contain standardized criteria for assessing construction noise impacts but provides guidelines for suggested noise limits for residential uses exposed to construction noise to describe levels that may result in a negative community reaction. These guidelines are summarized in Table 3.10-1.

Table 3.10-1. FTA Construction Noise Impact Guidelines

Land Use	8-hour L_{eq} (dBA), Day	8-hour L_{eq} (dBA), Night
Residential	80	70
Commercial	85	85
Industrial	90	90

Source: FTA 2018
dBA = A-weighted decibel; Leq = equivalent continuous sound level

Thresholds for construction noise may be set at the local level according to expected hours of equipment operation and the noise limits specified in the noise ordinances of the applicable jurisdictions.

3.10.2.2 State

California Department of Transportation Vibration Standards

Caltrans provides guidelines regarding vibration associated with construction and operation of transportation infrastructure. Table 3.10-2 provides the Caltrans vibration guidelines for potential damage to different types of structures.

Ground-borne vibration and noise can also disturb people. Numerous studies have been conducted to characterize the human response to vibration. In general, people are more sensitive to vibration during nighttime hours when sleeping than during daytime waking hours. Table 3.10-3 provides the Caltrans guidelines regarding vibration annoyance potential (expressed here as peak particle velocity [PPV]).

Table 3.10-2. Caltrans Vibration Guidelines for Potential Damage to Structures

	Maximum PPV (in/sec)	
Structure Type and Condition	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2013:Table 19.
Note: Transient sources create a single, isolated vibration event (e.g., blasting or the use of drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity

Table 3.10-3. Caltrans Guidelines for Vibration Annoyance Potential

	Maximum PPV (in/sec)	
Human Response	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2013:Table 20.
Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity

3.10.2.3 Local

Humboldt County

Humboldt County General Plan

The Noise Element of the County General Plan Update, adopted in 2017, contains policies related to the control of excessive noise and the compatibility of land uses with various noise environments. The Plan includes goals, policies, and standards to control noise from stationary and mobile sources and implement land use planning measures. Policies in the Noise Element relevant to the Proposed Program are as follows.

- **N-P1.** Minimize Noise from Stationary and Mobile Sources. Minimize stationary noise sources and noise emanating from temporary activities by applying appropriate standards for average and short-term noise levels during permit review and subsequent monitoring.
- **N-P4.** Protection from Excessive Noise. Protect persons from existing or future excessive levels of noise which interfere with sleep, communication, relaxation, health or legally permitted use of property.

The General Plan includes performance standards for short-term noise in standard N-S7. For residential use, maximum permissible short-term noise standards are indicated as 65 dBA during the hours of 6:00 a.m. to 10:00 p.m., and 60 dBA from 10:00 p.m. to 6:00 a.m. The short-term noise standards do not apply to use of heavy equipment and power tools used during construction of permitted structures when conforming to the terms of the approved permit.

City of Eureka

Eureka General Plan

The Eureka General Plan includes a Noise Element that includes policies for noise control in the city. Goal N-1 of the Noise Element of the General Plan is to promote "economic vitality while limiting residential and business exposure to harmful noise and vibrations." Policies related to this Proposed Program are stated in the General Plan as follows.

- **N-1-5.** New Stationary Noise Sources. Require new stationary noise sources to mitigate noise impacts on noise-sensitive uses in which exterior level noises exceed noise compatibility standards.
- **N-1.13.** Construction Noise. Minimize construction-related noise and vibration by limiting construction activities within 500 ft of noise-sensitive uses to between 7:00 a.m. to 7:00 p.m., unless further restricted through permitting.
- **N-1.14.** Vibration. Require an assessment of vibration-induced construction activities and development near highways and rail lines, in close proximity to historic buildings and archaeological sites, to ensure no damage occurs.

City of Arcata

Arcata Municipal Code

The Arcata Municipal Code includes noise standards in Section 9.30.050 of the Code. The standards include maximum allowable noise levels by category of land use.

Table 3.10-4. Maximum Allowable Noise Levels, Arcata Municipal Code

	Maximum Exterior Noise Level			Maximum Interior Noise Level		
Noise Level Descriptor	7 a.m.–7 p.m.	7 p.m.–10 p.m.	10 p.m.–7 a.m.	7 a.m.–7 p.m.	7 p.m.–10 p.m.	10 p.m.–7 a.m.
Dwellings, Transient Lodging, Hospitals, Extended Care, and Similar Uses						
Hourly Leq	55 dB	50 dB	45 dB	45 dB	40 dB	35 dB
Maximum	75 dB	75 dB	70 dB	65 dB	65 dB	60 dB
Facilities, Auditoriums, Theaters, Libraries, Schools, and Similar Uses						
Hourly Leq	55 dB	55 dB	n/a	40 dB	40 dB	n/a
Maximum	75 dB	75 dB	n/a	60 dB	60 dB	n/a

dB = decibel; Leq = equivalent sound level

The Code includes a standard to allow for construction during normal daylight hours. Allowable hours of construction are 8:00 a.m. to 7:00 p.m. Monday through Friday, and 9:00 a.m. to 7:00 p.m. on Saturday. No allowable construction hours are specified for Sundays or holidays. Construction work outside of these hours requires a permit from the City.

3.10.3 Impacts Analysis

3.10.3.1 Methodology

Construction and Dredging Noise

The assessment of potential construction and dredging noise levels was based on methodology developed by the FTA (2018). Noise levels produced by commonly used construction equipment are shown in Table 3.10-5. The construction noise level at a given receiver location depends on the type of construction activity and the distance and shielding between the activity and noise-sensitive receivers.

Table 3.10-5. Equipment Noise Emission Levels from Construction and Dredging Equipment

Equipment	Typical Noise Level (dBA), 50 ft from Source
Heavy Truck	84[1]
Excavator	85[1]
Bulldozer	85[1]
Pump	81[1]
Generator	81[1]
Mixer	80[1]
Grader	85[1]
Dredge, clamshell	84[2]
Dredge, hydraulic	79[3]
Barge	82[4]

Sources:
[1] Federal Transit Administration 2018.
[2] Geier & Geier Consulting 1997.
[3] ESA 2003.
[4] Based on measurement of tug boat, Geier & Geier Consulting 1997.
dBA = A-weighted decibel

Source levels used to calculate noise exposure are based on the Lmax of equipment emission levels developed by FTA. Usage factors for construction noise are used in the analysis to develop reasonable worst-case Leq noise exposure values. The Leq value accounts for the energy-average of noise over a specified interval (usually 1 hour), and usage factors represent the amount of time a type of equipment is used during a typical interval.

Potential noise levels from construction and dredging operations were evaluated by combining the noise levels of the two loudest pieces of equipment that would likely operate at the same time (for example, an excavator and a truck being operated simultaneously during construction of dewatering basins, or two clamshell dredges operating simultaneously in an area), and applying an appropriate usage factor (percent of time equipment is in operation) to each piece of equipment. Sound levels

from construction activities are calculated as a function of distance from the source(s), based on point-source attenuation over hard (i.e., acoustically reflective) ground.

Haul Truck Noise

Haul truck noise is assessed qualitatively based on the likelihood of a noticeable increase in traffic noise at sensitive land uses along potential Program haul routes for delivery of dredged material to beneficial-use sites.

Construction Vibration

Potential vibration impacts were evaluated using the construction modeling methods recommended by the U.S. Department of Transportation. Reasonable worst-case construction vibration levels based on equipment to be used were assessed using Caltrans Vibration Guidelines for Damage and Annoyance.

3.10.3.2 Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generate substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- Generate excessive groundborne vibration or groundborne noise levels
- Place Proposed Program-related activities in the vicinity of a private airstrip or an airport land use plan, or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in exposure of people residing or working in the project area to excessive noise levels

3.10.3.3 Impacts and Mitigation Measures

The analysis concludes that there would be no impacts related to the influence of noise from aircraft or airports for the Proposed Program or Alternatives. The three proposed sites for dredging materials processing are 2 or more miles away from the Samoa General Aviation airstrip. Murray Field is approximately 4 miles east of proposed processing sites in the Samoa and Fairhaven communities, and Humboldt County airport is about 10 miles to the north. The Proposed Program would not add residential use or other sensitive uses that would potentially be affected by aircraft noise. Therefore, there would be no impact, and the topic of impacts related to aircraft noise at public airports or private airstrips is not discussed further in this section.

Impact NV-1: Would the Proposed Program Generate Substantial Temporary or Permanent Increase in Ambient Noise Levels in the Vicinity of the Project in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of other Agencies?

Proposed Program

Construction (temporary)

Construction of Dredged Material Processing Sites

To characterize the overall noise level of the worst-case noise condition during construction of processing sites, the two loudest pieces of equipment were assumed to operate simultaneously at a perimeter location of a construction site, at a receiver distance of 50 ft. Heavy equipment is assumed to operate at full capacity up to 100 percent of the time on a given workday. Equivalent sound levels as a function of distance are shown in Table 3.10-6. Construction equipment sound levels would potentially exceed the Humboldt County standard of 65 dBA at a distance of 700 ft.

Table 3.10-6. Worst-Case Construction Equipment Sound Levels

Distance Between Source and Receiver (feet)	Maximum Sound Level (Lmax, dBA)
50	88
100	82
200	75
300	72
400	69
500	68
600	66
700	65
1000	62
1500	58

Calculations based on FTA 2018.
Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.
dBA = A-weighted decibel.

Placement of Material at Beneficial Use Sites

Equipment associated with placement of dredged materials would be similar to construction of processing sites. Worst case sound levels would potentially occur during simultaneous operation of an excavator and a heavy truck. Worst case sound levels for these activities are shown in Table 3.10-6.

The use of heavy equipment during construction and placement of material at beneficial-use sites would be required to comply with allowed hours of heavy equipment use in the applicable jurisdiction (construction is allowed in all jurisdictions between the hours of 8:00 a.m. and 7:00 p.m.). If work is required outside of these hours, an approved conditional permit from the applicable jurisdiction(s) will be required. Use of heavy equipment for each of these uses would be temporary, intermittent and cease once work is complete. For these reasons, this impact is considered to be less than significant. No mitigation is required.

Haul Trucks and Commuter Trips During Construction of Dredged Material Processing Sites

Construction of dredged material processing sites would require the use of haul trucks and heavy equipment deliveries to construction sites. Personnel would commute to the site from local roads. Construction would be temporary and would likely require less than 100 total round trips per day in a given location, which would not result in a noticeable increase in ambient sound levels. This impact is considered to be less than significant.

Permanent

Operation of Dredged Material Processing Sites

To characterize the overall sound level of processing sites during operation, up to two sediment pumps were assumed to operate simultaneously at a perimeter location of a processing site, at a receiver distance of 50 ft. Pumps are assumed to run continuously over a given period, up to a full workday. Sound levels as a function of distance are shown in Table 3.10-7.

Table 3.10-7. Pump Sound Levels at Dredged Material Processing Sites

Distance Between Source and Receiver (ft)	Equivalent Sound Level (Leq, dBA)
50	82
70	79
100	76
200	70
300	66
400	64
600	60
750	58
1000	56

Calculations based on FTA 2018.
Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.
dBA = A-weighted decibel; ft = foot; Leq = equivalent continuous sound level

Noise from pumps would potentially be noticeable at receivers located a distance of up to 400 ft away from the equipment while in operation. At the potential site of the Samoa Lagoons dewatering station, the nearest noise sensitive use is the Peninsula Union Elementary School, about 1,000 ft away. There are no apparent noise sensitive uses in the vicinity of the potential dewatering basin site at Redwood Marine Terminal II. The nearest residences to the potential site of Fields Landing dewatering basin are over 600 ft away from the shoreline area where pumps would operate, and sound levels from pumps are unlikely to exceed the residential noise compatibility standard of 60 dBA Ldn at this distance. The use of pumps would be temporary and only used when stockpiling sediment. For these reasons this impact is considered to be less than significant.

Operation of Dredges

Potential worst-case sound levels from dredging activities were evaluated by combining the sound levels of up to four sources (two barges and two dredges) operating in the same area at a given time. This analysis assumes that sound levels associated with removal of native sediments are equivalent to sound levels from maintenance dredging. Under the Proposed Program, both clamshell and

suction dredging methods would be used. Worst case sound levels of clamshell dredging and hydraulic (or suction) dredging are shown in Table 3.10-8.

Table 3.10-8. Worst-case Sound Levels from Clamshell and Suction Dredging

Distance Between Source and Receiver (ft)	Clamshell dredging, Equivalent Sound Level (Leq, dBA)	Suction dredging, Equivalent Sound Level (Leq, dBA)
50	87	82
70	84	79
120	79	74
200	75	70
300	71	66
400	69	64
500	67	62
700	64	59
1000	61	56

Calculations based on FTA 2018.
Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.
dBA = A-weighted decibel; ft = foot; Leq = equivalent continuous sound level

Under the Proposed Program, dredging would occur at the same LMSs as under existing conditions. As such, noise from dredging would be the same as existing conditions. Clamshell dredges would be a potentially noticeable source of noise at a distance of up to 700 ft, whereas suction dredge would be noticeable at a distance of up to 400 ft. Noise from dredging is intermittently noticeable at dredging sites located near residential/lodging uses (e.g. the RV park near sites SB-1 and SB-2) and recreational use along the shoreline (e.g. sites NB-7 through NB-11), including liveaboard vessels at marinas. Dredging noise at a given site is and would continue to be an intermittent effect. Similar to construction, dredging operations are required to comply with allowed hours of heavy equipment use in the applicable jurisdiction (construction is allowed in all jurisdictions between the hours of 8:00 a.m. and 7:00 p.m.). For these reasons, this impact is considered to be less than significant, and no mitigation is required.

<u>Haul Truck or Barge Deliveries of Dredged Material to Beneficial Use Sites</u>

Noise from haul trucks may be noticeable on local haul routes that connect from barge unloading areas to beneficial-use sites. However, haul truck deliveries would be temporary and would cease once the required amount of dredged material at a given beneficial use site has been achieved. Noise from haul trucks over the course of the Proposed Program implementation would affect different areas at different times, as material is delivered to different beneficial-use sites. Although the increase in noise from haul trucks may potentially be noticeable during hauling of building materials, the effect would be temporary, short-term relative to a given area, and only take place during daytime hours.

Barge deliveries of sediment would result in vessel noise on a temporary basis as material is transported to beneficial-use sites. Sediment unloading via pipeline from barges would have noise emissions similar to those shown in Table 3.10-8. This effect would be temporary, short-term relative to a given area, and occur during daytime work hours.

For these reasons, the temporary increase in noise from haul trucks would be less than significant.

Alternative 1 – Suction Dredging Only

Sound levels generated by Alternative 1 would be similar to those described above for the Proposed Program. Sound levels from dredging may potentially be slightly lower because all dredging would use suction methods, which are quieter than clamshell dredging. This impact is considered to be less than significant, and no mitigation is required.

Alternative 2 – Clamshell Bucket Dredging Only

Sound levels generated by Alternative 2 would be similar to those described above for the Proposed Program. Sound levels from dredging may potentially be slightly higher because all dredging would use suction methods, which are quieter than clamshell dredging. This impact is considered to be less than significant, and no mitigation is required.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Temporary construction activities under Alternative 3 would be limited to transporting sediments directly to beneficial-use sites by pipeline from barges or dredging sites. There would be no construction of sediment basins or dewatering operations. Dredging activities would be similar to the Proposed Program. This impact is considered to be less than significant, and no mitigation is required.

No-Project Alternative

Under the No-Project Alternative, dredging operations would continue using current methods, and the Proposed Program would not be implemented. No construction of dewatering basins or sediment transport activities would occur.

Impact NV-2: Would the Proposed Program Generate Excessive Groundborne Vibration or Groundborne Noise Levels?

Proposed Program and Alternatives

The use of heavy equipment during construction would generate ground borne vibration that could potentially be noticeable directly adjacent to operating equipment. At distances of 50 ft or more, vibration from heavy equipment would likely not be perceptible inside of structures. No use of impact equipment such as pile drivers or impact hammers is anticipated. This impact is considered to be less than significant, and no mitigation is required.

3.11 Biological Resources

This section describes the environmental and regulatory settings for biological resources in the Proposed Program Area and evaluates the potential impacts on biological resources that may occur as a result of program activities. Where appropriate, mitigation measures are presented to reduce potential impacts on less-than-significant levels.

3.11.1 Environmental Setting

Humboldt Bay biota is diverse and ecologically significant at scales ranging from local wild fisheries to hemispheric ecological patterns such as shorebird and waterfowl migration. The Humboldt Bay

area hosts over 400 plant species, 500 invertebrate species, 100 fish species, and 260 bird species, including those that rely on the bay as they travel the Pacific Flyway. Humboldt Bay is also important in the life cycles of commercially and recreationally important fish species including shellfish, crustaceans, and finfish. In addition to wild resources, Humboldt Bay supports a local mariculture industry which accounts for approximately 70 percent of all oysters grown for consumption in California.

The subtidal community is comprised of plant and animal species that are always inundated by water. In the Program Area, subtidal habitat encompasses approximately 14 percent each of North and South Bay, and 80 percent of Entrance Bay (Schlosser and Eicher 2012). Special status fish occurring in this community include tidewater goby (*Eucyclogobius newberryi)*, coastal cutthroat trout (*Oncorhynchus clarkii clarkia)*, coho salmon (*O. kisutch),* steelhead (*O. mykiss)*, Chinook salmon (*O. tshawytscha)*, longfin smelt (*Spirinchus thaleichthys)*, green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus)*. Commercially and recreationally important species that utilize subtidal areas include Dungeness crab (*Cancer magister*), Pacific herring (*Clupea pallasii*), rockfish (*Sebastes* spp.) and California halibut (*Paralichthys californicus*). Numerous bird and marine mammal species also utilize subtidal areas.

Intertidal communities occur in areas periodically exposed during lower tides and submerged during higher tides and are composed of flats, banks, and bars that are either bare substrate or covered by microbial mats or macroalgae. In the Program Area, intertidal habitat encompasses approximately 39 percent of North Bay, 41 percent of South Bay, and 10 percent of Entrance Bay where is it generally restricted to the margins of the deep water channels (Schlosser and Eicher 2012). The substrate of the intertidal areas is mainly mud (hence the common term 'mudflats' used to describe the habitat), although some areas of sand or sandy mud occur, as do some areas of dense shell accumulation. Mudflats in the bay are extensively channelized by tidewater flow. Species of algae that occur in these communities include red alga (*Polysiphonia* spp.), rockweed (*Fucus* spp.) and sea lettuce (*Ulva* spp.) with some channels also supporting eelgrass. During high tides, fish, including special-status species, and marine mammals may occur in intertidal areas and utilize them as foraging habitat. Various invertebrate species including Dungeness crab can also occur in intertidal areas during high and low tides. Additionally, mudflats are highly productive foraging habitat for many bird species and protect inland landforms from erosion by acting as a barrier to waves.

Extensive areas of common eelgrass (*Zostera marina)* habitat occur in the Program Area. Humboldt Bay accounts for over 30 percent of the total eelgrass habitat in California, and contains the largest population in the state at an estimated 4,700 acres (Schlossser and Eicher 2012; Merkel 2017). Eelgrass is a perennial aquatic flowering plant that occurs within protected and semi-protected environments within bays and estuaries and protected open coastal environments. It is widely distributed throughout the temperate regions of both the northern Pacific and Atlantic oceans, occurring along the west coast from northern Alaska and the Aleutian Peninsula to Baja California, Mexico (Sherman and DeBruyckere 2018). Eelgrass provides a multitude of ecosystem services including physical, chemical, and biological services, and is important as nursery and foraging habitat for numerous aquatic and terrestrial species. In Humboldt Bay, eelgrass generally grows in muddy to fine-sand substrates near the Mean Lower Low Water (MLLW) elevation. The maximum depths supporting eelgrass are substantially shallower in in North Bay (-1.3 m MLLW) relative to South Bay (-2.1 m MLLW), with the shallowest areas closest to sources of freshwater runoff such as Eureka Slough and Salmon Creek (Merkel 2017). Eelgrass is considered the most important contributor to primary productivity within Humboldt Bay (Merkel 2017).

The tidal marsh community of Humboldt Bay is composed of herbaceous vegetation that is periodically inundated by tidal waters and drained by a system of meandering slough channels. Tidal marsh is typically saline to brackish; however, the extent of tidal influence can extend further inland than saltwater intrusion, therefore these habitats can also support some freshwater species. Diking and filling of salt marsh around the bay in the late nineteenth and early twentieth centuries resulted in a loss of approximately 90 percent of historic tidal marsh (Pickart 2001). Much of the remaining tidal marsh in the Program Area is dominated by non-native *Spartina densiflora* (dense-flowered cordgrass or *Spartina*) which has the effect of displacing native vegetation and reducing the biodiversity of the tidal marsh community. Ongoing efforts around the bay are focused on the regional eradication of this non-native with the goal of restoration of native tidal marsh communities.

3.11.2 Species Potentially Affected

This PEIR focuses on plant and animal species that:

- Are likely to occur within or adjacent to Program Area sites and potentially be affected by program activities; and
- Are listed under FESA or CESA; or
- Are listed as a Species of Special Concern or Fully Protected Species by the State of California; or
- Are a plant species ranked by the California Native Plant Society as Rank 2 or rarer; or
- Are marine mammals (due to their protection under the Marine Mammal Protection Act [MMPA]).

These species are referred to as *special-status species*.

Based on the criteria listed above, a list of special-status species with the potential to occur in the Program Area was developed using CNDDB, CNPS, and USFWS queries. If a species' required habitat does not occur in or near the Program Area, and if the Program Area is outside the species' known distribution or elevation range, the species was considered not likely to occur.

3.11.2.1 Sensitive Natural Communities

Sensitive natural communities, as defined by CDFW, are natural communities with state rarity ranks of S1-S3, as follows.

- **S1** – Critically Imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state
- **S2** – Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state
- **S3** – Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state

Three CDFW sensitive natural communities occur within the Program Area: Northern Coastal Salt Marsh, Sitka Spruce Forest, and Northern Foredune Grassland (CNDDB 2020; CNPS 2020). Coastal

salt marshes are wetlands that occur near coastal areas and are influenced by the tide. The inundation of tidal water influences species composition based on the tolerance of those species to salinity and the amount of submergence. Sitka spruce is a native evergreen conifer occurring in coastal forests, bottomlands, upland steep slopes and seaward bluffs and ravines near the ocean (Sawyer et al. 2009). In the Program Area, Sitka spruce forest occurs along the upland potions of levees. Foredune grassland is a community in the foredune, or area that is the first rise in elevation above the beach. It is characterized by American dune grass (*Elymus mollis* ssp. *mollis*), a native grass, which is adapted to withstand the intense salt spray and sand deposition that occurs in this habitat. Lanphere Dunes is one of the few remaining areas where this community occurs (USFWS 2020).

In addition to the communities described above, the bay ecosystem hosts a number of other biologically sensitive habitats such as benthic habitat (including mudflats) and eelgrass beds. Nearshore and estuarine benthic habitats support a wide diversity of marine life by providing spawning, nursery, refuge, and foraging grounds for fish species. They play a critical role in the breakdown of organic matter through the actions of the scavengers, deposit-feeders and bacteria that occupy them. Benthic organisms are also important members of the lower food web, serving as food sources for higher-level consumers. Eelgrass is designated as Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for federally-managed fish species within the Pacific Coast Groundfish and Pacific Coast Salmon Fisheries Management Plans, and also a Habitat Area of Particular Concern. Eelgrass beds are considered special aquatic sites under the 404(b)(1) guidelines of the CWA (40 CFR 230.43). Numerous environmentally sensitive habitat areas (ESHAs) in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments (as defined by the Coastal Act Section 30107.5) also occur throughout the Program Area, although there is no comprehensive inventory of their locations.

3.11.2.2 Terrestrial Vegetation Species

Based on the literature review, 28 special-status plant species have the potential to occur within the Program Area. Table 3.11-1 describes these species in more detail.

Table 3.11-1. Special-Status Plants Known or with Potential to Occur in the Program Area or That May Be Affected by the Project

Common Name *Scientific Name*	Legal Status (Federal/ State/CRPR)	General Habitat Description	Identification Period	Suitable Habitat Present
Pink sand-verbena *Abronia umbellata var. breviflora*	-/-/1B.1	North Coast: from Del Norte to Sonoma County; Oregon. Disturbed sandy areas, coastal dunes, and scrub; below 10 meters.	Jun–Oct	Yes. Suitable habitat present in the coastal dune mat and European beach grass swards alliances.
Coastal marsh milk-vetch *Astragalus pycnostachyus var. pycnostachyus*	-/-/1B.2	Coastal California with reported occurrences in Humboldt, Mendocino, Marin, and San Mateo Counties. Moist sites in coastal dunes, along streams in coastal salt marsh and swamps; below 30 meters.	Apr–Oct	Yes. Suitable habitat present in pickleweed mats, saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes, and coyote brush scrub vegetation alliances.
Twisted horsehair lichen *Bryoria spiralifera*	-/-/1B.1	Del Norte, Humboldt, Monterey, San Luis Obispo, and Sonoma Counties; Oregon. Typically, on conifers in North Coast coniferous forest (immediate coast); below 30 meters.	N/A	Yes. Suitable habitat present in Sitka spruce forest vegetation alliance.
Seaside bittercress *Cardamine angulata*	-/-/2B.1	Del Norte, Humboldt, Marin, and Siskiyou Counties (all occurrences historical); also, Alaska, and Oregon, Washington. Wet areas, streambanks in lower montane coniferous forest, North Coast coniferous forest; 65-915 meters.	Mar–Jul	No. Outside of elevation range
Northern clustered sedge *Carex arcta*	-/-/2B.2	North Coast in Del Norte, Humboldt, and possibly Mendocino Counties, Sierra Nevada in Mariposa and Tulare Counties; Oregon and elsewhere. Bogs and fens, moist places in North Coast coniferous forest; 60-1,400 meters.	Jun–Sep	No. Outside of elevation range.
Bristle-stalked sedge *Carex leptalea*	-/-/2B.2	North coast, outer North Coast Ranges, central coast in Del Norte, Humboldt, Marin*, and Trinity Counties; Idaho, Oregon, and elsewhere. Bogs and fens, mesic meadows and seeps, marshes and swamps; below 700 meters.	Mar–Jul	Yes. Suitable habitat present in pickleweed mats, saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes, and coyote brush scrub vegetation alliances.

Common Name *Scientific Name*	Legal Status (Federal/ State/CRPR)	General Habitat Description	Identification Period	Suitable Habitat Present
Lyngbye's sedge *Carex lyngbyei*	-/-/2B.2	North Coast: from Del Norte to Marin Counties; Oregon and elsewhere. Brackish or freshwater marshes and swamps; below 10 meters.	Apr–Aug	Yes. Suitable habitat present in pickleweed mats, saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marsh vegetation alliances.
Northern meadow sedge *Carex praticola*	-/-/2B.2	North Coast, central and southern High Sierra Nevada in Del Norte, Humboldt, Madera, Mono, Siskiyou, and Tuolumne Counties; Idaho, Oregon, Washington, and elsewhere. Wet meadows and seeps below 3,200 meters.	May–Jul	Yes. Suitable habitat is present in the tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes, and Sitka spruce forest vegetation alliances.
Humboldt Bay owl's-clover *Castilleja ambigua var. humboldtiensis*	-/-/1B.2	North Coast in Humboldt, Mendocino, and Marin Counties. Coastal salt marshes below 3 meters.	Apr–Aug	Yes. Suitable habitat is present in the pickleweed mats, saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes vegetation alliances. Multiple known CNDDB occurrences throughout Humboldt Bay.
Oregon coast paintbrush *Castilleja litoralis*	-/-/2B.2	North Coast from Del Norte to Mendocino Counties; Oregon. Sandy soils in coastal bluff scrub, coastal dunes, coastal scrub; 15-100 meters.	Jun	Yes. Suitable habitat is present in the coyote brush scrub vegetation alliance.
Point Reyes salty bird's-beak *Chloropyron maritimum ssp. palustre*	-/-/1B.2	Coastal northern California, from Humboldt to Santa Clara County; Oregon. Coastal salt marsh; below 10 meters.	Jun–Oct	Yes. Suitable habitat is present in the pickleweed mats, saltmarsh bulrush marshes, salt grass flats, salt rush swale, and pale spike rush marshes vegetation alliances. Multiple known CNDDB occurrences throughout Humboldt Bay.
Round-headed Chinese-houses *Collinsia corymbosa*	-/-/1B.2	North Coast and northern Central Coast: from Del Norte County to Marin County. Coastal dunes; below 20 meters.	Apr–Jun	Yes. Suitable habitat present in the coastal dune mat and European beach grass swards alliances.
Humboldt Bay wallflower *Erysimum menziesii ssp. eurekense*	FE/SE/1B.1	Coastal Humboldt, Mendocino, and Monterey Counties. Coastal dunes; below 35 meters.	Mar–Sep	Yes. Suitable habitat present in the coastal dune mat and European beach grass swards alliances.

Common Name *Scientific Name*	Legal Status (Federal/ State/CRPR)	General Habitat Description	Identification Period	Suitable Habitat Present
Coast fawn lily *Erythronium revolutum*	-/-/2B.2	Del Norte, Humboldt, Mendocino, Siskiyou, Sonoma, Tehama, and Trinity Counties; also, Oregon and Washington. Moist areas and streambanks within bogs and fens, broadleaf upland forest, North Coast coniferous forest; below 1600 meters.	Mar–Jul (Aug)	Yes. Suitable habitat is present in the Sitka spruce forest and coastal dune willow thicket vegetation alliances.
Minute pocket moss *Fissidens pauperculus*	-/-/1B.2/FSS	Butte, Del Norte, Humboldt, Mendocino, Marin, and Santa Cruz Counties. Damp, coastal soil in North Coast coniferous forest; 10-1024 meters.	N/A	Yes. Suitable habitat present in Sitka spruce forest vegetation alliance.
Pacific gilia *Gilia capitata ssp. pacifica*	-/-/1B.2	North Coast: Del Norte, Humboldt, and Mendocino Counties; Oregon. Coastal bluff scrub, chaparral openings, and coastal prairie; 5-1330 meters.	Apr–Aug	Yes. Suitable habitat present in tufted hair grass, annual grassland and coyote brush scrub vegetation alliances.
Dark-eyed gilia *Gilia millefoliata*	-/-/1B.2	Northern coastal California from Del Norte to San Francisco County. Coastal dunes; 2-30 meters.	Apr–Jul	Yes. Suitable habitat present in the coastal dune mat and European beach grass swards alliances. Known occurrence at Samoa lagoons.
Short-leaved evax *Hesperevax sparsiflora var. brevifolia*	-/-/1B.2	Den Norte, Humboldt, Mendocino, Marin, Santa Cruz, San Francisco, and Sonoma* Counties; Oregon. Coastal dunes, coastal prairie, sandy soils in coastal bluff scrub; below 215 meters.	Mar–Jun	Yes. Suitable habitat present in coyote brush scrub vegetation alliance.
Seaside pea *Lathyrus japonicus*	-/-/2B.1	Del Norte, Humboldt Counties; Oregon, Washington. Coastal dunes; 1-30 meters.	May–Aug	Yes. Suitable habitat present in the coastal dune mat and European beach grass swards alliances.
Marsh pea *Lathyrus palustris*	-/-/2B.2	Del Norte, Humboldt, Mendocino; Oregon, Washington, and elsewhere. Wet areas in bogs and fens, coastal prairie, coastal scrub, lower montane coniferous forest, marshes and swamps, North Coast coniferous forest; 1-100 meters.	Mar–Aug	Yes. Suitable habitat is present in the pickleweed mats, saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes, and coyote brush scrub vegetation alliances.

Common Name *Scientific Name*	Legal Status (Federal/ State/CRPR)	General Habitat Description	Identification Period	Suitable Habitat Present
Beach layia *Layia carnosa*	FE/SE/1B.1	Scattered occurrences along coastal California from Humboldt County to Monterey County, formerly to Santa Barbara County. Coastal dunes, coastal scrub on sandy soil; below 60 meters.	Mar–Jul	Yes. Suitable habitat is present in the coyote brush scrub vegetation alliance.
Western lily *Lilium occidentale*	FE/SE/1B.1	Del Norte and Humboldt Counties; Oregon. Bogs and fens, coastal bluff scrub, coastal prairie, coastal scrub, freshwater marshes and swamps, openings in North Coast coniferous forest; 2-185 meters.	Jun–Jul	Yes. Suitable habitat is present in the saltmarsh bulrush marshes, tufted hair grass meadows, salt grass flats, salt rush swale, pale spike rush marshes, and coyote brush scrub vegetation alliances,
Ghost-pipe *Monotropa uniflora*	-/-/2B.2	Del Norte and Humboldt Counties; widespread throughout the U.S. Broadleaved upland forest, North Coast coniferous forest; 10-550 meters.	Jun–Aug (Sep)	Yes. Suitable habitat is present in Sitka spruce vegetation alliance.
Howell's montia *Montia howellii*	-/-/2B.2	Outer North Coast Ranges: Del Norte*?, Trinity and Humboldt Counties; Washington, Oregon, British Columbia. Freshwater emergent wetland, including meadows and seeps and other vernally wet areas in Douglas-fir forest, annual grasslands, vernal pools, seasonal swales, and ditches; below 835 meters.	(Feb) Mar–May	Yes. Suitable habitat is present in the tufted hair grass meadows, pale spike rush marshes, coyote brush, and Sitka spruce vegetation alliances.
Wolf's evening-primrose *Oenothera wolfii*	-/-/1B.1	Del Norte, Humboldt, Mendocino, and Trinity Counties; Oregon. Usually wet areas with sandy soils in coastal bluff scrub, coastal dunes, coastal prairie, lower montane coniferous forest; 3-800 meters.	May–Oct	Yes. Suitable habitat is present in the tufted hair grass meadows and coyote brush scrub vegetation alliances.
Dwarf alkali grass *Puccinellia pumila*	-/-/2B.2	Humboldt and Mendocino Counties; Oregon, Washington. Mineral spring meadows, coastal salt marsh and flats; 0-10 meters.	Jul	Yes. Suitable habitat is present in the pickleweed mats, saltmarsh bulrush marshes, salt grass flats, salt rush swale, and pale spike rush marshes vegetation alliances.

Common Name *Scientific Name*	Legal Status (Federal/ State/CRPR)	General Habitat Description	Identification Period	Suitable Habitat Present
Siskiyou checkerbloom *Sidalcea malviflora ssp. patula*	-/-/1B.2	North Coast: Del Norte, Humboldt, and Mendocino Counties; Oregon. Coastal bluff scrub, coastal prairie, and North Coast coniferous forest, often on roadcuts; 15-880 meters.	May–Aug	Yes. Suitable habitat is present in the tufted hair grass meadows, coyote brush scrub, and Sitka spruce vegetation alliances.
Coast checkerbloom *Sidalcea oregana ssp. eximia*	-/-/1B.2	Del Norte, Humboldt, Siskiyou, and Trinity Counties. Lower montane coniferous forest, meadows and seeps, and North Coast coniferous forest; 5-1340 meters.	Jun–Aug	Yes. Suitable habitat is present in the tufted hair grass meadows, pale spike rush marshes, and coastal dune willow thicket vegetation alliances.
Western sand-spurrey *Spergularia canadensis var. occidentalis*	-/-/2B.1	Humboldt County; Oregon, Washington, & elsewhere. Coastal salt marshes and swamps; below 3 meters.	Jun–Aug	Yes. Suitable habitat is present in the pickleweed mats, saltmarsh bulrush marshes, salt grass flats, salt rush swale, and pale spike rush marshes vegetation alliances.
Cylindrical trichodon *Trichodon cylindricus*	-/-/2B.2	Humboldt, Lake, Mendocino, Plumas, Shasta, Sierra, and Siskiyou Counties; also, from Oregon and elsewhere. On sandy exposed soil and muddy road banks in meadows, broad-leafed upland forest, upper montane coniferous forest; 50-2002 meters.	N/A	No. Outside of elevation range
Alpine marsh violet *Viola palustris*	-/-/2B.2	North Coast: Del Norte, Humboldt, Mendocino, and Shasta Counties; also, Oregon, Washington, and elsewhere. Swampy shrubby places in coastal scrub or coastal bogs; below 150 meters.	Mar–Aug	Yes. Suitable habitat is present in the coyote brush scrub vegetation alliance.

Status Definitions:
–: No listing.
FE: Federally listed as Endangered under the federal Endangered Species Act
SE: State listed as Endangered under the California Endangered Species Act
FSS: United States Forest Service-Sensitive
1B: CNPS Rare, Threatened, or Endangered in California and Elsewhere
2B: CNPS Rare, Threatened, or Endangered in California,, but More Common Elsewhere
0.1-Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80 percent occurrences threatened/moderate degree and immediacy of threat)

3.11.2.3 Terrestrial Wildlife Species

Northern Red-legged Frog

Northern red-legged frogs (*Rana aurora*) are a state species of special concern and are known to occur along the California coast from Mendocino County north to southwestern British Columbia, at elevations from sea level to 1,160 meters (0 to 3,800 feet). Breeding (oviposition) for northern red-legged frogs generally occurs in late winter through early spring, typically when water temperatures exceed 6 to 7°C (43 to 46°F). Females deposit approximately 500 to 800 eggs in a large mass, attached to herbaceous vegetation in low or no-flow areas. Eggs hatch in the spring (March through April), and tadpoles metamorphose in June or July. Adults may move large distances (300 meters [greater than 1,000 feet]) from breeding ponds in riparian areas. Northern red-legged frogs use a variety of habitats throughout their various life stages. Aquatic sites such as coastal lagoons, pools, marshes, ponds, or backwater areas are used for breeding, and upland habitats such as open grasslands with seeps and springs may be used for over-summering and foraging.

Western Pond Turtle

The western pond turtle (*Actinemys marmorata*) is a state species of special concern. Suitable habitat includes permanent ponds, marshes, rivers, streams, and irrigation ditches with abundant vegetation, and either rocky or muddy bottoms, in woodland forest and grasslands from sea level to 1,430 m (4,690 ft). Turtles require basking sites located on logs, rocks, floating vegetation mats, and/or exposed banks. Egg-laying sites are located on suitable upland habitats which can be sandy banks along large slow-moving streams, or hillsides along foothill streams. Females lay eggs from March to August and can travel considerable distances (up to 100 m [350 ft]) to find suitable nesting substrate.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was delisted from the federal ESA in August 2007 although it remains listed as endangered under CESA. They live near rivers, lakes, and marshes where they can find fish, although they will also eat waterfowl, turtles, rabbits, snakes, and other small creatures and will scavenge on carrion. Their habitat also includes estuaries, reservoirs, rivers, and some sea coasts. They require large, old-growth, or dominant live trees with open branchwork for nesting, where they build a large stick platform nest, usually below the tree crown. They are relatively long-lived in the wild, ranging from 15 to 25 years.

Northern Harrier

The Northern harrier (*Circus cyaneus*) is a state species of special concern. They breed locally within coastal lowlands along the coast from Clam Beach to the Humboldt Bay lowlands (Shuford and Gardali 2008). They breed and forage in numerous habitats including freshwater marshes, brackish and saltwater marshes, weedy borders of rivers and streams, wet meadows, and ungrazed or lightly grazed pastures. Prey includes a broad variety of small- to medium-sized vertebrate, primarily rodents and passerines. Northern harriers nest on the ground mostly in patches of dense, often tall vegetation in undisturbed areas.

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus*) is a federally threatened species. Western yellow-billed cuckoos appear to require large blocks of riparian habitat for nesting and foraging, particularly habitat with cottonwoods (*Populus fremontii*) and willow. They migrate from southern Canada to as far south as northern Argentina; however, the species' distribution in the west has contracted in recent years, and the northern limit of breeding in the coastal states is now the Sacramento Valley (USFWS 2020). In July and August 2015, at least one western yellow billed cuckoo was observed at the Arcata Marsh and Wildlife Sanctuary. The species is also periodically recorded in the Eel River estuary.

Short-eared Owl

The short-eared owl (*Asio flammeus*) is a state species of special concern. The species breeds over much of northern North America, although the dramatic fluctuations that occur in owl numbers in response to periodic cycles of their primary prey make it difficult to give general geographic statements about range or abundance (Shuford and Gardali 2008). The breeding range tends to expand and contract significantly in response to prey abundance cycles. Sightings that were strongly suggestive of breeding birds occurred at the Humboldt Bay NWR in 2001. Nesting owls require open habitat with sufficient herbaceous cover to conceal their ground nests from predators. Suitable habitat includes saltwater and freshwater marshes, ungrazed grassland and old pasture.

Western Snowy Plover

The western snowy plover (*Charadrius nivosus nivosus*) nests along the Pacific Coast from Damon Point, Washington to Bahia Magdalena, Baja California, Mexico (USFWS 2007). The Pacific Coast population was listed federally as Threatened in 1993 and is considered a state species of special concern. A Recovery Plan was released in 2007, and in March 2011 revised critical habitat designations were proposed (USFWS 2011b). Degradation and use of habitat for human activities has been largely responsible for the decline in snowy plover breeding population; other important threats to the snowy plover are mammalian and avian predators, and human disturbance. In the Humboldt Bay region, western snowy plovers primarily breed and winter in ocean-fronting beaches (Brindock and Colwell 2011) although small numbers of plovers have been documented nesting in gravel bars of the Eel River (Colwell et al. 2011). Nonbreeding western snowy plovers occasionally occur on the interior of Humboldt Bay (Colwell 1994), but they are expected to occur mainly in the southern portion of the bay on sandier substrates rather than on softer substrates associated with mudflats in the northern portion of the bay. Snowy plovers are expected to occur in the Program Area rarely as occasional foragers.

Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) occurs along the Pacific coast from Alaska to California, foraging nearshore in marine subtidal and pelagic habitats for small fish and invertebrates (USFWS 2011). Breeding occurs in mature, coastal coniferous forest with nests built in tall trees. In California, breeding occurs primarily in Del Norte and Humboldt counties. The loss of old-growth forest is a primary reason for this species' decline (USFWS 1992). They are also vulnerable to oil spills along the coast. Nesting habitat is not present in the Program Area; however, marbled murrelets can occur in Humboldt Bay as foragers, and are expected to primarily occur in the entrance portion of the bay.

3.11.2.4 Aquatic Wildlife Species

Coho and Chinook Salmon, Steelhead Trout, and Coastal Cutthroat Trout (Salmonids)

Humboldt Bay supports three salmonid species that are listed as threatened under the federal ESA: coho salmon, Southern Oregon/Northern Coastal California (SO/NCC) evolutionary significant unit (ESU), the Northern California steelhead trout Distinct Population Segment (DPS), and the California Coastal Chinook salmon ESU. The coho salmon SO/NCC ESU is also listed as threatened under CESA. Additionally, Humboldt Bay supports coastal cutthroat trout (*O. clarki clarki*), a CDFW species of special concern.

Salmonid life history is characterized by periods of pelagic conditions, adult upstream migration, spawning and egg development, fry, and juvenile development, smolt outmigration, and estuary rearing. Channels within marsh habitats may be of particular importance to subyearling salmonids (*Oncorhynchus spp.*) because of the high insect and invertebrate prey resources and potential refuge from predators (Bottom et al. 2005). Wallace (2006) found significant use of the tidal portions of Freshwater Creek, Elk River, and Salmon Creek (Humboldt Bay tributaries) by juvenile Chinook salmon, coho salmon and steelhead trout. Pinnix et al. (2013) found that in Humboldt Bay, juvenile coho salmon primarily utilize deep channels, channel margins, and floating eelgrass mats.

Seasonal occurrences of salmonids in Humboldt Bay vary depending on species. Coho salmon smolts are found within Humboldt Bay for an average of 15–22 days each year, as early as April through the beginning of July (Pinnex et al 2013). Chinook salmon demonstrate several seasonal runs; however, they typically leave freshwater systems for estuaries and marine waters as smolts between 3 months to 2 years of age. Steelhead typically spawn between December and April in freshwater streams. Juvenile steelhead may reside in freshwater up to 3 years before migrating to estuaries or the ocean. Coastal cutthroat trout may remain in freshwater their whole lives, and must spawn in freshwater; however, some individuals will reside in coastal lagoons and estuaries.

Green Sturgeon – Southern DPS

Green sturgeon is a long-lived, slow-growing fish species listed as threatened under the federal ESA, and as a state species of special concern. Mature males range from 4.5–6.5 ft (1.4–2 m) fork length and they do not mature until they are at least 15 years old, whereas mature females range from 5–7 ft (1.6–2.2 m) fork length and do not mature until they are at least 17 years old (NMFS 2009). Maximum ages of adult green sturgeon are likely to range from 60–70 years. This species is found along the west coast of Mexico, the United States, and Canada.

The life history of green sturgeon is typical of anadromous fish. They likely spend most of their lives in nearshore oceanic waters, bays (including Humboldt Bay), and estuaries. Spawning occurs in deep pools in "large, turbulent, freshwater river mainstems" and juvenile green sturgeon spend several years in freshwater systems before migrating toward bays and estuaries (NMFS 2009). Currently, spawning is believed to occur in the Klamath River basin, the Sacramento River, and the South Fork of the Trinity River. Spawning is unlikely to occur in creeks flowing into Humboldt Bay. Green sturgeon adults are regularly observed in channels within Humboldt Bay. In 2009, National Marine Fisheries Service (NMFS) designated Humboldt Bay as critical habitat for sDPS Green Sturgeon.

Eulachon – Southern DPS

The Pacific eulachon is a small anadromous fish from the eastern Pacific Ocean (NMFS 2011). In March 2010, NMFS listed the Southern DPS as threatened under the federal ESA; the DPS includes populations in Washington, Oregon, and California. Critical habitat was designated in October 2011; in California, critical habitat includes the Mad River (NMFS 2011).

Eulachon spend 3–5 years at sea before returning to freshwater to spawn, from late winter to mid-spring. Eggs are fertilized in the water column, where they then sink and adhere to the river bottom of coarse sand and gravel. Most adults die after spawning. Eggs hatch in 20–40 days, and larvae are carried downstream and "are dispersed by estuarine and ocean currents shortly after hatching" (NMFS 2011).

Eulachon have been documented in Humboldt Bay and nearby coastal rivers such as Redwood Creek and the Mad River. In 1996, the Yurok tribe supported a eulachon sampling effort on the Klamath River of over 110 surveying hours, from early February to early May. No eulachon were observed. Considering the low abundance for over 20 years, CDFW considers the fish to be "nearly extirpated from California" (CDFW 2010). Although eulachon have historically been found in Humboldt Bay, it is unlikely the species would occur based on the aforementioned species accounts, and as such they are not further considered for impact discussion in this document.

Longfin Smelt

Longfin smelt are estuarine fish listed as threatened under the CESA. Longfin smelt are known to occur in Humboldt Bay, but little is known regarding their distribution, abundance, or life history in the region. Recent CDFW data suggests longfin smelt spawn in Freshwater Slough and its tributaries. Specifically, between January-March of 2017, early larval stages were detected upstream of the Samoa Bridge in Freshwater Slough (James Ray, CDFW, unpublished data). It is a short-lived (generally 2 years) species. Adults spawn in low salinity or freshwater areas within the lower reaches of coastal rivers and the buoyant larvae are swept into more brackish waters where they rear and then move to marine waters. Spawning typically occurs between January and March.

Tidewater Goby

Tidewater goby are federally listed as endangered, and a California State species of special concern. This benthic species is found in shallow lagoons with low salinity brackish waters. Tidewater goby typically live only 1 year and live in small groups where they feed on small invertebrates. Tidewater goby are found in Jacoby Creek, a tributary to Arcata Bay, Gannon Slough, and Mad River Slough. Tidewater goby can spawn year-round; however, peak spawning occurs in summer, when male gobies will dig burrows in clean coarse sand for egg deposition and guarding.

California Sea Lion

California sea lions (*Zalophus californianus*) are restricted to middle latitudes of the eastern North Pacific. There are three recognized management stocks: (1) the U.S. stock from Canada to Mexico, (2) the western Baja California stock, and (3) the Gulf of California stock (Lowry et al. 2008; Carretta et al. 2009). Breeding colonies only occur on islands off southern California, along the western side of Baja California, and in the Gulf of California (Heath and Perrin 2008). California sea lions feed on fish and cephalopods, some of which are commercially important species. California sea lions do not

breed along the Humboldt County coast; however, non-breeding or migrating individuals occur in Humboldt Bay and use various docks and other structures as haul-out areas.

Harbor Seal

Harbor seals (*Phoca vitulina*) are widely distributed throughout the northern Atlantic and Pacific Oceans along coastal waters, river mouths, and bays (Burns 2008; Lowry et al. 2008). Harbor seals consume a variety of prey, but small fishes predominate in their diet (Tallman and Sullivan 2004). Foraging occurs in a variety of habitats, from streams to bays to the open ocean. Harbor seals breed along the Humboldt County coast and inhabit the area throughout the year (Sullivan 1980). In Northern California, pupping peaks in June and lasts about two weeks; pups are weaned in four weeks (Burns 2008). Harbor seals use Humboldt Bay as a pupping and haul-out area with other nearby haul-out sites located in Trinidad Bay and the mouths of the Mad and Eel Rivers.

Harbor Porpoise

Harbor porpoises (*Phocaena phocaena*) are distributed throughout the coastal waters of the North Atlantic and North Pacific Oceans, and the Black Sea. In the North Pacific, they range from Point Conception, California, to as far north as Barrow, Alaska, and west to Russia and Japan (Angliss and Allen 2009; Carretta et al. 2009). Harbor porpoises have been observed throughout the year at the entrance to and within Humboldt Bay, usually as single individuals, but sometimes in groups, with a maximum size of 12 animals (Goetz 1983). Abundance peaks between May and October, and porpoises are most abundant in Humboldt Bay during the flooding tide.

3.11.3 Regulatory Setting

3.11.3.1 Federal

Endangered Species Act

Species listed as endangered and/or threatened by USFWS or NMFS are protected under Section 9 of the federal ESA, which forbids any person to take an endangered or threatened species. *Take* is defined in Section 3 of the act as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The U.S. Supreme Court ruled in 1995 that the term *harm* includes destruction or modification of habitat. Sections 7 and 10 of the act may authorize *incidental take* for an otherwise lawful activity (a development project, for example) if it is determined that the activity would not jeopardize survival or recovery of the species. Section 7 applies to projects where a federally listed species is present and there is a federal nexus, such as a federal CWA Section 404 permit (e.g., impacts on waters of the United States) that is required. Section 10 applies when a federally listed species is present, but no federal nexus is present.

Marine Mammal Protection Act

The MMPA prohibits, with certain exceptions, the take of marine mammals in waters of the United States and by U.S. citizens on the high seas and the importation of marine mammals and marine mammal products into the United States. Congress passed the MMPA based on the following findings and policies: (1) some marine mammal species or stocks may be in danger of extinction or depletion as a result of human activities, (2) these species of stocks must not be permitted to fall below their optimum sustainable population level (depleted), (3) measures should be taken to

replenish these species or stocks, (4) there is inadequate knowledge of the ecology and population dynamics, and (5) marine mammals have proven to be resources of great international significance.

The MMPA was amended substantially in 1994 to provide for: (1) certain exceptions to the take prohibitions, such as for Alaska Native subsistence, and for permits and authorizations for scientific research; (2) a program to authorize and control the taking of marine mammals incidental to commercial fishing operations; (3) preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; and (4) studies of pinniped-fishery interactions. NMFS and USFWS administer the MMPA. The proposed project must be analyzed to ensure that marine mammals protected under the MMPA would not be harassed or injured as a result of project activities in or adjacent to Humboldt Bay. Any project activities that may result in Level A or B harassment, injury, or mortality would require consultation with NMFS and USFWS under the MMPA.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) domestically implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act further provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 U.S.C. §§ 703–712). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA can be found in the November 1, 2013 *Federal Register* (78 FR 65844–65864). This list comprises several hundred species, including essentially all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and of personal property. USFWS publishes a list of birds of conservation concern to identify migratory nongame birds that are likely to become candidates for listing under the federal ESA without additional conservation actions. The birds of conservation concern list is intended to stimulate coordinated and collaborative conservation efforts among federal, state, tribal, and private parties.

Clean Water Act Section 404 Wetlands

Under Section 404 of the Clean Water Act (CWA), wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (USEPA 2019). Two general categories of wetlands are recognized: coastal or tidal wetlands, and inland or non-tidal wetlands. USACE defines three characteristics of wetlands: hydrology, hydrophytic plants, and hydric soils. An area must exhibit all three characteristics to be considered a "jurisdictional wetland." Some areas may perform the functions of wetlands, yet not be delineated as jurisdictional wetlands if they do not exhibit all three wetland characteristics.

USACE and US EPA 2008 Compensatory Mitigation for Losses of Aquatic Resources; Final Rule

When there is a proposed discharge of dredged or fill material into wetlands, streams, or other waters of the United States, all appropriate and practicable steps must first be taken to avoid and minimize impacts on aquatic resources. For unavoidable impacts, compensatory mitigation is

required to replace the loss of wetland, stream, and/or other aquatic resource functions. The rule provides standards to promote no net loss of wetlands by improving wetland restoration and protection policies, increasing the effective use of wetland mitigation banks, and strengthening the requirements for the use of in-lieu fee mitigation.

3.11.3.2 State

California Endangered Species Act

CESA establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. For projects that affect both a state- and federally listed species, compliance with the federal ESA will satisfy CESA if CDFW determines that the federal incidental take authorization is consistent with CESA under California Fish and Game Code Section 2080.1. For projects that would result in a take of a state-only listed species, the project proponent must apply for a take permit under Section 2081(b).

Fully Protected Species

Sections 3511, 3513, 4700, and 5050 of the California Fish and Game Code pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock or if a natural community conservation plan has been adopted.

Protection of Birds and Raptors

Section 3503 of the California Fish and Game Code prohibits the killing of birds and/or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and/or the destruction of raptor nests. Typical violations include destruction of active bird and raptor nests as a result of tree removal, and failure of nesting attempts (loss of eggs and/or young) as a result of disturbance of nesting pairs caused by nearby human activity. Section 3513 prohibits any take or possession of birds designated by the MBTA as migratory nongame birds except as allowed by federal rules and regulations pursuant to the MBTA. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

California Rare Plant Rankings

CDFW maintains lists of plants of special concern in California, in addition to those listed as threatened or endangered. These species have no formal protection under CESA, but the values and importance of these lists are widely recognized. Plants with a California Rare Plant Rank of 1A, 1B, and 2 meet the definitions of Section 1901 of the California Fish and Game Code and may qualify for state listing. Accordingly, for purposes of analysis, such plant species are considered rare plants pursuant to Section 15380 of CEQA.

Section 1600 of the California Fish and Game Code

Sections 1600–1603 of the California Fish and Game Code state that it is unlawful for any person or agency to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources, or to use any material from the streambeds, without first notifying CDFW. A Lake and Streambed Alteration Agreement must be obtained if effects are expected to occur. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and that support wildlife, fish, or other aquatic life. This definition includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

California Coastal Act

The California Coastal Act of 1976 recognizes California ports, harbors, and coastline beaches as primary economic and coastal resources and as essential elements of the national maritime industry. Decisions to undertake specific development projects, where feasible, are to be based on consideration of alternative locations and designs in order to minimize any adverse environmental impacts. The California Coastal Act is implemented by the Coastal Commission.

California Eelgrass Mitigation Policy and Implementing Guidelines

The National Marine Fisheries Service (NMFS) is an office of the National Oceanic Atmospheric Administration and is responsible for the stewardship of the nation's ocean resources and their habitat. NMFS developed the California Eelgrass Mitigation Policy (CEMP) in order to establish and support a goal of protecting eelgrass and its habitat functions (NMFS 2014). The CEMP includes guidance on defining eelgrass habitat, surveying, mapping, assessing impacts, avoiding, and minimizing impacts on eelgrass, and mitigation options. Avoidance and minimization measures included within the CEMP relate to turbidity, shading, circulation, and nutrient and sediment loading impacts. Mitigation options include comprehensive management plans, in-kind mitigation, mitigation banks and in-lieu-fee programs, and out-of-kind mitigation. NMFS has provided this policy to other state and federal agencies, including CDFW, as guidance for handling project-related impacts on eelgrass habitat. The California Coastal Commission typically relies on CEMP guidance when assessing projects that may affect eelgrass.

California Wetlands Conservation Policy

The goals of the California Wetlands Conservation Policy, adopted in 1993 (EO W-59-93), are "to ensure no overall net loss, and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California, in a manner that fosters creativity, stewardship, and respect for private property"; to reduce procedural complexity in the administration of state and federal wetlands conservation programs; and to make restoration, landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation.

3.11.3.3 Local

Humboldt Bay Management Plan

The statutory purpose of the HBHRCD is to manage Humboldt Bay for the promotion of commerce, navigation, fisheries, recreation, and the protection of natural resources, and to acquire, construct, maintain, operate, develop, and regulate harbor works and improvements (California Harbors and Navigation Code, Appendix II). The HBHRCD has regulatory jurisdiction over all of the tide and submerged lands of Humboldt Bay, shoreward to the mean higher high water (MHHW) elevation. The Board of Commissioners exercises development authority over every development project proposed in Humboldt Bay, and in many cases serves as the lead agency for compliance with the requirements of CEQA. The Humboldt Bay Management Plan is the HBHRCD planning document that provides an ecosystem-based management approach to improve the management of Humboldt Bay, and balance port-related commercial and industrial uses, recreational uses, and environmental protection of the resources of the Bay.

Humboldt Bay Eelgrass Comprehensive Management Plan

Although the CEMP provides statewide uniformity in governing standards and resource management principles with respect to eelgrass, it also includes provisions for the development of Comprehensive Management Plans (CMPs) to develop region or system specific approaches to achieving the objectives of the CEMP. The Humboldt Bay Eelgrass CMP provides an ecosystem-based management approach to:

- Ensure that the sum of individual eelgrass restoration and protection actions in the Bay has the greatest benefit to eelgrass and eelgrass functions
- Facilitate more efficient regulatory processes for projects in the Bay
- Provide a long-term eelgrass habitat conservation strategy that allows for sea level rise adaptation, dredging, and economic development in Humboldt Bay

3.11.4 Impacts Analysis

3.11.4.1 Methodology

The following sections analyze potential impacts on sensitive biological resources with a high likelihood to occur in the vicinity of the dredging, material processing, and beneficial-use sites, as well as the potential impacts associated with those.

3.11.4.2 Thresholds of Significance and Baseline Conditions

Baseline conditions are those that have been documented at the time that the NOP was published. These conditions are described above as the present conditions of biological resources within and in the vicinity of the Proposed Program area.

The CEQA Guidelines provide direction in evaluating project impacts and determining which impacts would be significant. Under CEQA Guidelines Section 15065 (Mandatory Findings of Significance), a project's effects on biotic resources are deemed significant where the project would:

- Substantially reduce the habitat of a fish or wildlife species

- Cause a fish or wildlife population to drop below self-sustaining levels
- Threaten to eliminate a plant or animal community
- Substantially reduce the number or restrict the range of an endangered, threatened, or rare species

In addition to the Section 15065 criteria that trigger mandatory findings of significance, Appendix G of the CEQA Guidelines provides a checklist of other potential impacts on consider when analyzing the significance of project effects. For biological resources, the impact would be considered significant if the Proposed Program resulted in any of the following conditions:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan

3.11.4.3 Impacts and Mitigation Measures

The proposed program activities include dredging, dredged material processing, and beneficial use of sediments. This section describes the potential impacts to biological resources associated with the proposed program activities as well as the alternatives.

Impact BIO-1—Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS or NMFS.

Proposed Program

Dredging

Aquatic Impacts

Humboldt Bay is host to a number of sensitive fish species. Coho and Chinook salmon, steelhead trout, coastal cutthroat trout, green sturgeon, longfin smelt, and tidewater goby occur within Humboldt Bay. All of these species, excluding tidewater goby, are anadromous in nature, and many of them must pass through the bay at critical stages in their life history. Adult anadromous species

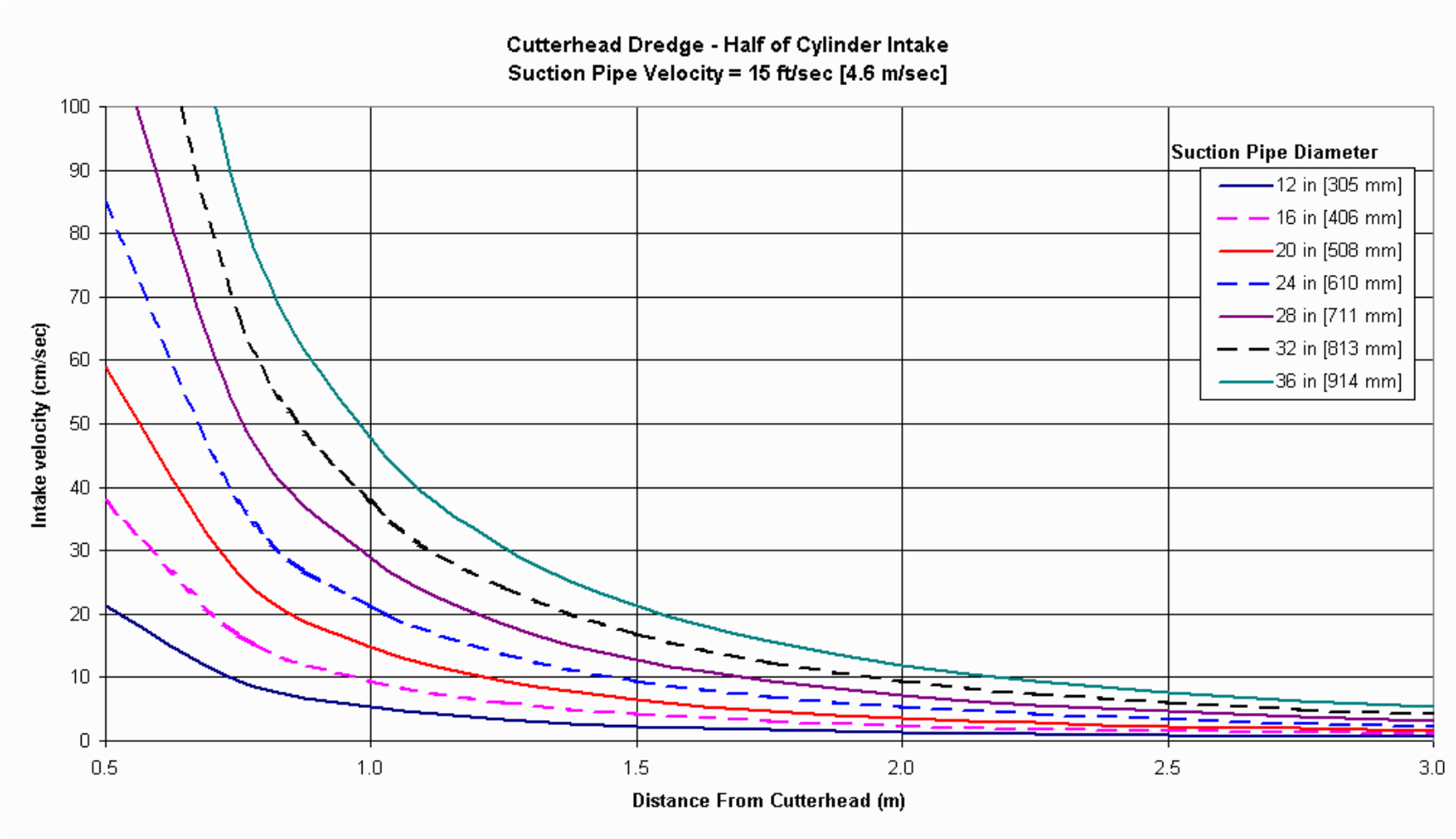
listed in Section 3.11.2, *Species Potentially Affected*, must migrate through the bay to upstream freshwater sources to spawn, and outmigrant juvenile and larval life phases must travel from freshwater sources to the ocean. In addition to sensitive fish species, Humboldt Bay also contains commercially and recreationally significant aquatic species including Dungeness crab (*Metacarcinus magister),* California halibut *(Paralichthys californicus),* Pacific herring *(Clupea pallasii),* and rockfishes (*Sebastes* spp.).

Dredging operations are limited to either cutterhead suction dredging or mechanical clamshell dredging, or a combination of the two, in areas around marinas, docks, and smaller channels. The mechanics of these methods are described in Chapter 2, *Project Description*. Both forms of dredging have potential to impact sensitive and commercially and recreationally significant ~~fish and other~~ aquatic organisms through physical entrainment into the dredge equipment, noise impacts associated with dredge equipment, and elevated suspended sediment concentrations in the water column as a result of dredge activities. Transport and offloading of dredged material also have potential to impact sensitive species. A summary discussion of each impact is provided below.

Entrainment

Entrainment is the direct uptake of aquatic organisms by the suction field generated by hydraulic dredges (Reine and Clarke 1998). Entrainment also occurs when an organism is trapped in the uptake of sediments and water being removed by dredging machinery (Reine and Clarke 1998). Benthic infauna are particularly vulnerable to being entrained by dredging uptake, but mobile epibenthic and demersal organisms such as burrowing shrimp, crabs, and fish can also be susceptible to entrainment, especially if the individuals are not able to escape the intake velocities produced by the hydraulic dredge equipment. Entrainment impacts are not expected for marine mammals or birds.

Intake water velocities for seven differently sized cutterhead dredge suction pipes ranging from 0.3 to 0.9 m (12 to 36 in) in diameter were studied by Clausner (2005). The report found that 0.3 m (12 in) suction pipes generated the lowest water velocities with an intake velocity of about 22 cm/s (0.75ft/s) at 0.5 meters (m) (1.6 ft) from cutterhead to 5 cm/s (0.16 ft/s) at 1 m (3.3 ft) from the cutterhead, respectively (Figure 3.11-1). The District-owned Nehalem dredge that could be used under the Proposed Program has a 0.3 m (12 in) suction pipe and a pumping rate of 4.6–6.1 m/s (15– 20 ft/s) (CCC 2005).



Source: Clausner 2005

Figure 3.11-1. Cutterhead Suction Pipe Approach Velocities

CDFW (2009b) studied longfin smelt and splittail entrainment and diversion water velocities at the Morrow Island Distribution System (MIDS). The MIDS is an unscreened diversion that is used to channel drainage water from adjacent wetlands into Grizzly Bay and Suisun Slough (San Francisco Bay). CDFW found that few staging adult longfin smelt were entrained when the maximum water velocity toward the MIDS diversion was less than 0.9 m/s (3 ft/s). No data were found regarding longfin smelt swim velocities. However, the USACE (EDRC 2013) used swim speed data developed by Sprengel and Luchtenberg (1991) for European smelt (*Osmerus eperlanus*) as a surrogate for longfin smelt. Swim speeds for the European smelt were conservatively estimated to be between 25 and 40 cm/s (ERDC 2013). Given that a 0.3 m (12 in) cutterhead suction pipe has an intake velocity of about 20 cm/sec at 0.5 m (1.6 ft) from the opening, a smelt would need to be closer than 0.5 m (1.6 ft) from the cutterhead, ignore the high suspended sediment concentrations (SSC) in the immediate vicinity, and not be disturbed by the action of the cutterhead or turbidity in order to be entrained.

There have been several field studies conducted to investigate cutterhead dredging impacts on longfin smelt and salmonids. SWCA Environmental Consultants (SWCA 2007) assessed suction dredging in two regions of the San Joaquin River ship channel and three regions in the lower Sacramento River ship channel. Dredging occurred between 2 October and 17 December 2006 and resulted in the removal of 463,000 cubic yards of sediment. The dredging was conducted with a hydraulic cutterhead suction dredge with an 18-inch (inside diameter) discharge pipe. No longfin smelt or salmonids were observed in the 3,350,000 gallons of slurry that flowed over a custom-built entrainment screen and into experimental settling ponds. Additionally, no longfin smelt, or salmonids were observed in the ponds. However, 7,654 fish of 26 species (10 native) were captured during the fish community trawl surveys of which 895 were longfin smelt; no salmonids were collected. It is noteworthy that in this study longfin smelt were documented in the immediate vicinity of suction dredging operations, however the species was not observed in any samples taken from dredged material, indicating that while there is potential for entrainment impacts on these species, it is uncommon that they become entrained from dredge operations.

In another study, Robinson and Greenfield (2011) reported that Swedberg and Zentner (2009) filtered 65,000 cubic yards of dredged material from the Port Sonoma project at the mouth of the Petaluma River that used a 10-in cutterhead. One longfin smelt was entrained in 2006 while the cutterhead was running above the sediment surface, emphasizing the importance of correct dredging technique (i.e., only running the cutterhead when on the bottom), which may have prevented entrainment of that fish. While large numbers of longfin smelt were caught in the area when trawling for shrimp (establishing presence), no longfin smelt were found in the dredged sediment in 2007 despite a four-fold increase in sampling effort. The authors concluded that the risk of longfin smelt entrainment was very low from cutterhead dredging.

If the District-owned Nehalem dredge is used for the Proposed Program, the cutterhead size is 12", which would exhibit a maximum intake velocity expected to be less than 25 cm/second within 0.5 meters distance from the cutterhead. Assuming that the primary mechanism for fish entrainment from a hydraulic dredge is associated with swimming velocities exhibited by fish, species which cannot swim at speeds greater than the intake velocities of the dredge may have a higher likelihood to be entrained by the cutterhead than species which exhibit greater swimming speeds. Table 3.11-2, below, shows expected swim speeds of ESA listed fish species that occur in Humboldt Bay. Salmonid swim speed data is averaged with the minimum observed swim speeds also described in

the table, however individual sizes of fish and the correlated swim speeds were not described in the source.

Table 3.11-2. Federal ESA-Listed Fish Species Expected Swim Velocities

Fish Species	Scientific Name	Size/Age Class	Swim Speed (meters/second)	
			minimum	max
Chinook	*Oncorhynchus tshawytscha*	Not defined in study[1]	0.14	6.223
Coho Salmon	*Oncorhynchus kisutch*		0.131	4.059
Steelhead Trout	*Oncorhynchus mykiss*		0.115	6.406
Coastal Cutthroat Trout	*Oncorhynchus clarki clarki*		0.277	0.9
Tidewater Goby	*Eucyclogobius newberryi*	No entrainment impacts expected; no data for tidewater goby found in literature search		
Green Sturgeon	*Acipenser medirostris*	25–55 days post hatch[2]	0.29 m/s (25 days post hatch)	0.54 m/s (55 days post hatch)
Eulachon	*Thaleichthys pacificus*	No entrainment impacts expected; no data for Eulachon swim speed, species not expected to occur within Proposed Program area		
Longfin Smelt	*Spirinchus thaleichthys*	European Smelt used as surrogate species[3]	0.25	0.4

Sources: [1] Katopodis and Gervais 2016; [2] Verhille et al. 2014; [3] ERDC 2013

Based on the studies described above, flow fields generated by the hydraulic cutterhead dredge would pose a very low risk of entrainment to juvenile or adult listed fish species, therefore entrainment impacts to salmonids and sturgeon are expected to be less than significant. Additionally, the disturbances created by the dredge operations are likely to trigger an avoidance response from fish species utilizing the area, further reducing the likelihood that fish would remain in the active project sites once dredging has started.

Larval fish may have difficulty avoiding the intake velocities of the cutterhead suction dredge; however, impacts to larval salmonids ~~and larval and young juvenile longfin smelt would not~~are unlikely to occur, as larval salmonids would still be within natal waters (i.e., freshwater) at this life stage. Implementation of MM-BIO-1, *Establish an environmental work window for all dredge operations,* restricting dredge operations to between July 1 and October 15 would reduce potential entrainment impacts on salmonids to less than significant as they are not expected to occur within the Bay during this timeframe at a life stage vulnerable to entrainment.

Larval and juvenile longfin smelt are most abundant in salinities of 2 parts per thousand (ppt) up to 15 ppt (Kimmerer et al 2009); however, adults prefer a range of 15 to 30 ppt (Moyle 2002). While there have been historical observations of young longfin smelt in the Bay (Eldridge and Bryan 1972), this data suggests that the salinity in Humboldt Bay, particularly in areas where dredging is planned, is less likely to provide suitable conditions for younger age class longfin smelt. However, adult longfin smelt are likely present in Humboldt Bay year-round.

Longfin smelt are a pelagic species, and while hydraulic dredging entrainment is expected to primarily impact demersal fish species, dredge operations may still impact pelagic fish when the

dredge pumps operate above the seafloor. Implementation of MM-BIO-2, *Minimize operating hydraulic dredge pumps when the intake is suspended above the seafloor,* would reduce entrainment impacts to sensitive pelagic fish by minimizing the amount of time the dredge pumps create a flow field in open water habitat, where longfin smelt are most likely to reside. Because dredge operations may require pump priming or operational maintenance, circumstances may arise where the dredge must pump water from the bay through the pipeline, which may entrain pelagic fish, including longfin smelt. Although entrainment risk for longfin smelt is low and would be further reduced through implementation of MM-BIO-2, hydraulic dredging activities conducted for the Proposed Program may result in entrainment and mortality of longfin smelt. This impact would not be allowed without prior obtain of a State Incidental Take Permit (ITP) authorizing the take under CESA. The ITP would require full mitigation of the take. MM-BIO-14 requires that ITPs are obtained prior to suction dredging and that full mitigation for take of longfin smelt is implemented. With implementation of MM-BIO-2 and MM-BIO-14 the impact of entrainment to longfin smelt is less than significant. ,

Lamprey Species

Both Pacific lamprey (*Entosphenus tridentatus)* and western river lamprey (*Lampetra ayresi)* have potential to occur within Humboldt Bay as adults migrating upstream into freshwater systems to spawn, or as "macropthalmia", the pelagic juvenile phase, which would be migrating downstream to the marine environment. There is a higher likelihood that dredging could impact the ammocoete life stage of lamprey species, as this life stage will burrow in fine sediments and are poor swimmers. However, dredging operations are not expected to impact lamprey found in Humboldt Bay, as the life stages expected to be present in the Bay are pelagically oriented, and have a lower susceptibility to dredge entrainment impacts. Therefore, impacts to both lamprey species are less than significant.

Commercially and Recreationally Significant Species

Commercially and recreationally significant demersal and benthic species like California halibut and rockfishes (*Sebastes)* and Dungeness crab may also be susceptible to entrainment impacts from hydraulic dredging. The 2018 and 2019 Sacramento and Stockton Deepwater Ship Channel Maintenance Dredging entrainment monitoring data indicates that three starry flounder (*Platichthys stellatus),* 17 prickly sculpins (*Cottus asper),* and hundreds of introduced goby and catfish species were entrained. Along with demersal fish, decapods like yellow shore crab (*Hemigrapsus oregonensis),* red swamp crayfish (*Procambarus clarkia)* and signal crayfish (*Pacifastacus leniuscluls)* were also observed during the entrainment monitoring (ICF 2019, ICF 2020). It is expected that the disturbance created by dredge operations would trigger an avoidance behavior from most fish present within the area, however there is still a high likelihood that some fish, along with less mobile aquatic species like crabs and other invertebrates, may not flee the dredge area and would become entrained. However, the impact from the limited amount of dredging that would occur under the program for these relatively common species (e.g., not listed under state or federal endangered species acts) is less than significant.

Pacific herring (*Clupea pallasii),* a pelagically oriented fish of commercial value, may be susceptible to entrainment impacts, although to a much a lesser extent as compared to demersal fish species. Pacific herring typically enter Humboldt Bay as adults in order to spawn in the winter months (December to February), outside of the environmental work window described in MM-BIO-1. Implementation of MM-BIO-1 would reduce the potential entrainment impacts on Pacific herring by avoiding peak spawning season of this species. However, due to some seasonal variability in their spawning runs, there is a small potential that this work window may not fully avoid all impacts to

Pacific herring from dredge operations. In the event that spawning migrations occurred within the designated environmental work window for in-water dredging, it is most likely that migrating adult Pacific herring would be able to avoid entrainment impacts by exhibiting avoidance behavior when approaching dredge disturbances.

Spawning generally occurs -in lower salinity calm waters, but can occur in Humboldt Bay eelgrass beds, aquaculture areas, and on docks, pilings, and other intertidal structures where herring can adhere eggs. Spawning Pacific herring are sometimes easy to identify because the eggs are visible on intertidal structures, and there will be a significant increase in marine mammal and piscivorous bird activity around spawning aggregates of this species. Eelgrass is the dominant vegetation type in Humboldt Bay, and is the primary spawning habitat for herring (CDFW 2019), indicating that dredge operations would already avoid spawning habitats as active dredging isn't planned within eelgrass beds, and implementation of MM-BIO-3, *Avoid equipment staging and/or anchoring within eelgrass beds* would further avoid staging and anchoring within eelgrass. Because dredging operations would most likely not overlap either temporally with spawning herring, or occur in primary spawning habitat, and because Pacific herring are pelagically oriented strong swimmers that are unlikely to become entrained by dredge operations, impacts to Pacific herring from dredging operations are considered less than significant.

Southern Distinct Population Segment Green Sturgeon Designated Critical Habitat

Humboldt Bay is designated critical habitat for sDPS green sturgeon, a fish which could occur in Humboldt Bay throughout the year. Habitat modifications would not occur as a result of dredging, as these sites are routinely dredged, and are subject to frequent disturbances. The resulting habitat modifications from dredging would be limited to temporary entrainment of food sources for sensitive fish species and change in depth, however the habitat type would remain the same. Food sources which may become entrained would be benthic and demersal invertebrates and fish species incapable of avoiding intake velocities from the dredge operation. Mechanical clamshell dredging would also remove food sources that occur in these areas. Dredging under the Proposed Program is expected to occur at 25 sites, at a frequency ranging from annually, to every 25 years, as well as an undetermined frequency. The proposed dredging locations are comprised of marinas, boat docks, and small channels, all of which are not unique structural habitat nor do these sites contain particularly valuable habitat for any sensitive aquatic species in Humboldt Bay. Impacts from loss of food sources would be temporary as recolonization would occur over time, and loss of food sources would not be permanent. Reduced foraging potential for sturgeon would be limited to the footprint of the dredging area and would not prevent sturgeon from finding food sources throughout the bay. These entrainment impacts to food sources for green sturgeon, as well as other sensitive species would not be significant.

There are very few studies that evaluate potential entrainment rates as a result of mechanical clamshell dredging. The general consensus is that clamshell dredging has a very low likelihood of entraining fish due to the disturbance generated by the clamshell causing fish to flee from the active dredging area, and the relatively slow and localized nature of this dredging methodology allowing fish ample opportunity to escape entrainment. As such, entrainment impacts to fish species are not expected to occur from clamshell dredging Marine mammals are not expected to be susceptible to physical entrainment from either method of dredging.

Dredging Operation Noise Generation

A hydraulic cutterhead dredge can produce continuous noise in the range of 150 to 170 decibels (dB) when measured 10 meters from the cutterhead (CDWR 2013), with noise levels varying with dredge size and sediment type. This is comparable to underwater noise levels of 160 to 180 dB root mean square (rms) produced by small boats and ships (MALSF 2009).

Acoustic monitoring was conducted in the Stockton Ship Canal by Reine and Dickerson (2014) in November 2012 during dredging that used a cutterhead suction dredge with an 18-inch diameter pipeline and 1,000 hp diesel engine. Sound recordings were made to a distance of nearly 500 m astern of the dredge. Sound pressure levels (SPL) reached a maximum 148.3 dB rms at 87 m (total distance to cutterhead = 117.3 m) astern of the dredge. The actual distance to the cutterhead assembly was not crucial since most of the sound generated by the study dredge was associated with generator noise (generators were centrally located on the dredge plant), and not from the sediment excavation process (i.e. the rotation of the cutterhead in the soft silty sediment). Out of 5,000 discrete SPLs recorded, a total of nine exceeded 140 dB rms (Reine and Dickerson 2014). The majority of SPLs averaged 130 dB+3dB rms over distances of less than 100 m astern of the dredge.

Studies on the effects of noise on anadromous Pacific coast fishes are primarily related to pile-driving activities. The interagency Fisheries Hydraulic Working Group has established interim criteria for noise impacts from pile driving on fishes. A peak SPL of 206 dB is considered injurious to fishes. Accumulated SPLs of 187 dB for fishes that are greater than 2 grams, and 183 dB for fishes below that weight, are considered to cause temporary shifts in hearing, resulting in temporarily decreased fitness (i.e., reduced foraging success, reduced ability to detect and avoid predators). The NMFS uses 150 dB as the threshold for adverse behavioral effects.

As stated in Section 3.11.2, *Species Potentially Affected,* the life history patterns of listed salmonids indicate that they would not be present in the Program Area during dredging operations that occur between July 1 and October 15. Longfin smelt larvae would also not be present in Humboldt Bay due to the salinity levels. Most dredging occurring at LMS is removing sediment at depths less than 10 feet, ~~and~~ which are depths where adult and later stage juvenile longfin smelt would have a relatively low likelihood of presence during operations as these life stages preferentially select deeper channels rather than shallow water habitats, thus limiting their exposure to dredging-related noise effects. Dredging does occur in 16 locations where ~~that occurs in~~ depths of 18–25 feet (such as at California Redwood Company shipping docks) are expected, and as such, these are areas~~may occur~~, where longfin smelt are more likely present. However, adult longfin smelt commonly inhabit open water shipping channels in bays and estuaries, which are subject to frequent noise disturbances from vessel traffic, and noise levels from dredge operations are not expected to be high enough to cause direct injury to the species. Activities such as dredging and barge operations generally produce more continuous, lower energy sounds below the thresholds associated with direct injury, but may cause avoidance behavior or temporary hearing loss or physiological stress if avoidance is not possible or exposure is prolonged (Popper and Hastings 2009). The noise disturbance from the cutterhead dredge would likely be of similar sound pressure levels as small boats and ships to which smelt are habituated, and individuals would most likely flee the dredging area if noise disturbances were too high or frequent, thus reducing the noise impact to longfin smelt to less than significant. Additionally, the dredge used in the Reine and Dickerson (2014) study had an 18-inch diameter suction pipe, 6 inches in diameter larger than the Nehalem dredge, which would therefore be expected to generate less noise than the larger cutterhead dredge monitored by Reine and

Dickerson (2014). Accordingly, noise generated by cutterhead dredging will have very little, if any, effect on listed salmonids and longfin smelt.

Noise levels generated by mechanical clamshell dredging is expected to be less than those exhibited by hydraulic dredging methods. Mechanical dredging has a number of operations which produce sound impacts, ranging from winching up the bucket, closing it within the sediments, and digging. The highest sound levels are routinely observed when the dredge initially comes into contact with the substrate (Dickerson et al 2001). The substrate type also plays a major role in the sound impacts expected to occur from mechanical dredging, where coarse substrates are expected to produce higher sound levels as compared to fine substrates. Substrates are expected to be soft-bottom sediments for the proposed project, as these areas ware routinely dredged.

Based on data measuring underwater sound from mechanic dredging, SPLs are expected be between 107 to 124 dB measure at 154 meters from the dredge operations, which are below thresholds expected to injure fish (Dickerson et al 2001). While sound levels are likely much higher when closer to the dredge operations, the in-water disturbances created by the dredging activities will likely preclude fish from becoming exposed to the sound impacts, therefore noise generated by mechanical dredging is not expected to impact sensitive fish species.

There is little known in regard to noise impacts to green sturgeon, however since it is likely any sturgeon present would flee the disturbance caused by the dredging operation prior to injury, impacts to green sturgeon are expected to be less than significant.

Marine mammals present in Humboldt Bay are likely to occur within or adjacent to the dredge locations on a transient basis. Boat docks and other manmade structures can serve as haul out locations for pinniped species. These species are accustomed to anthropogenic noise disturbance as residents of the bay, and frequently use areas around boats which exhibit in-water noise levels up to 180 dB rms. Marine mammals are mobile, and individuals are likely to flee the area if disturbed. Impacts to marine mammals from noise are thus not expected to occur as a result of dredge operations.

<u>Generating Suspended Sediment</u>

The disturbance of the channel bottom by the dredge equipment will result in the resuspension of sediment into the water column. Spillage from a cutterhead dredging operation occurs when material that is excavated from the cutter is not sucked up into the suction line. This material is also known as a “residual” and can either settle to the bottom or become resuspended sediment (RSS) in the water column causing cloudiness or “turbidity” (Hendriksen 2009).

The turbidity resulting from dredging and the placement of dredged material may affect marine organisms and aquatic wildlife during various life stages by affecting respiration (clogging gills); reducing visibility and the ability to forage or avoid predators; and altering movement patterns (due to avoidance of turbid waters). Suspended sediments have been shown to affect fish behavior, including avoidance responses, territoriality, feeding, and homing behavior. Wilber and Clarke (2001) in USACE (2014) found that suspended sediments result in cough reflexes, changes in swimming activity, and gill flaring. Generally, bottom-dwelling fish species are the most tolerant of suspended solids, and filter feeders are the most sensitive (USACE 2014).

Harbor dredging was conducted by the Nehalem at Woodley Island Marina, Small Boat Basin, and the Fishermen’s Terminal between November 2006 and March 2007. Approximately 120,000 cubic yards of sediment were removed during the project. Sediment at the 2006/2007 dredge sites was

composed of approximately 15 percent sand, 45 percent silt, and 40 percent clays (CCC 2005). In accordance with the *Reasonable and Prudent Measures* (RPM) section of the Section 7 Consultation and Final Biological Opinion, File No. 151422SWR2004AR9177, issued by the Southwest Region, National Marine Fisheries Service (NMFS) for the project on December 6, 2005, the applicants were required to insure that the plume of suspended sediment generated by dredging with concentrations greater than 200 mg/L be confined to a 1,000 foot by 1,500 foot area in the immediate vicinity of the dredge, and the duration not exceed 3.5 days. Suspended sediment monitoring was conducted during the dredging operation to comply with the RPM. A total of 215 water samples were collected between 500 and 2,000 feet from the dredge Nehalem during operations (Pacific Affiliates 2007). Reported suspended sediment concentrations (SSC) ranged from 10 to 48 mg/L prior to dredging, 20 to 74 mg/L during dredging, 13 to 58 mg/L 24 hours following dredging, 18 to 100 mg/L three days following dredging, and 28 to 60 mg/L four days after dredging (Pacific Affiliates 2007). However, many of the samples were collected following rainfall runoff events, which resulted in relatively high background turbidity from tributary stream runoff and elevated the SSC levels. The effect of these suspended sediment concentrations from the combination of natural and dredging-related disturbances would be to reduce feeding rates of some predatory fish, while potentially increasing potential food sources for other fish species.

Elevated turbidity and SSC concentrations as a result of dredge operations has potential to reduce fitness in some fish species. While fish species in Humboldt Bay, specifically those which are benthic oriented are accustomed to fluctuations in turbidity, localized increases may make sensitive species more likely to experience mortality due to predation and decreased foraging potential, specifically pelagically oriented fish. The biological opinion issued for Humboldt Harbor and Bay Operations and Maintenance Dredging (2016–2020) indicated that NMFS expects an increase in predation from bird species and decreased foraging success for both juvenile SONCC coho and CC Chinook salmon in Humboldt Bay from elevated suspended sediment concentrations from overflow dredging. Overflow dredging is not expected for the proposed project, and localized increases in turbidity would be limited to a small project footprint while dredging occurs only. It's unlikely that the disturbances from dredging would result in long lasting turbidity plumes, which may impact juvenile salmonid predator avoidance and foraging behavior. It is expected that the presence of dredging would likely result in a fleeing response from salmonids in the project area, thus reducing the impacts from impaired water quality to less than significant.

Adult longfin smelt have been observed in higher densities in turbid waters (Hobbs 2009), and turbidity may be an important part of longfin smelt larval habitat (Kimmerer et al. 2009). Elevated turbidity resulting from dredge activities may attract adult longfin smelt, potentially increasing the likelihood that the species may become entrained by dredge activities, however as mentioned in the discussion of potential entrainment impacts, studies conducted in areas where longfin smelt are known to occur have not documented significant entrainment impacts on the species from suction dredging. Localized increases in turbidity may also result in impaired foraging and increased predation of listed salmonid species within the dredging area. Potential impacts from dredge operations resulting in elevated turbidity would be significant. Implementation of MM-BIO-1 would reduce turbidity impacts to less than significant for salmonids as this work window restricts dredging operations to a timeframe outside of the expected seasonal presence of salmonids in Humboldt Bay. Mitigation measures designed to reduce impacts associated with water quality impairment are described in Section 3.8, *Hydrology and Water Resources*. While these measures are designed to reduce water quality impacts, implementation would also reduce potential impacts to biological resources. Specifically, implementation of MM-HWR-1, *Minimize turbidity during*

maintenance dredging, would reduce turbidity impacts to biological resources, including green sturgeon, longfin smelt, piscivorous birds, and marine mammals.

Anchoring in Sensitive Habitats

Humboldt Bay is host to benthic habitat and extensive eelgrass beds. During dredging activities, long stakes called *spuds* are often used to anchor the dredge or barges into place for stability. Winches and cables attached to the spuds can then be used to pull the vessel into the position required. In addition, dredge slurry pipeline used to transport sediment must be supported with floats that are anchored in place; alternatively, the pipeline itself may be sunk to the bottom of navigation channels to avoid interference with boat traffic. Spuds, anchors, or pipeline placed directly in eelgrass beds could result in negative impacts through scarring of the bed and destruction of individual plants. Implementation of MM-BIO-3 will reduce this impact to eelgrass to less than significant.

Spuds, anchors, and pipeline will temporarily displace or cover benthic habitat used by animals, including polychaetes, crustaceans and mollusks, and also used for foraging by bird and fish species. The duration of this impact will be limited to hours in some cases, and a maximum of several weeks during a dredging operation, and the habitat is expected to recover rapidly after disturbance. In addition, the spatial extent of the impact will be small relative to the total area of benthic habitat in Humboldt Bay, thus this impact is considered less than significant.

Terrestrial Impacts

Pilings, docks, and other structures are commonly used as nesting locations by birds such as osprey, cormorants, and gulls which are protected under the Migratory Bird Treaty Act, and as haulouts for California sea lions. Breeding special status birds and sea lions may be affected by noise caused by dredging equipment and support vessels. Disturbance due to noise will depend on many factors such as proximity to the noise, the levels of ambient noise, the nature of ambient noise, and the ability of birds or pinnipeds to habituate to new noise. Dredging under the Proposed Program is occurring at marinas and docks with boating, shipping, and associated on-shore activities, therefore the temporary increase in noise and activity associated with periodic dredging events would not result in a substantial change to existing conditions. This impact is less than significant.

Dredged Material Transport and Processing

Aquatic Impact

Dredged sediment offloading and storage is primarily a land-based activity occurring at the Samoa Lagoons, Redwood Marine Terminal II, and Fields Landing Boatyard properties. As described above and in Section 2.2.2, *Dredged Material Processing Sites*, these areas were identified as locations where dredged material could be offloaded and stored prior to transport to a beneficial use location. Landside material processing has potential for chemical contaminants like oil and grease, trash, or constituents of concern bound to the sediments to discharge directly into Humboldt Bay as a result of the dewatering activities required. In addition to chemical contaminants, decant water may elevate turbidity in the localized area of the discharge point.

There are two primary methods for offloading sediment from a barge into a storage facility. Under one method, dredged material would be slurried by mixing it with bay water pumped into the barge, and the resulting slurry would then be pumped to the storage and processing location. Water intakes have the potential to impinge and/or entrain small organisms, including special status fish species, that may be present in the bay. Thus, this method will require the intake pump to be

screened to the following criteria established by CDFW and NMFS, to reduce the potential for pumping aquatic organisms into the slurry.

- Round or square (measured diagonally) openings in intake screens will not exceed 2.38 millimeters (mm) (3/32 in).
- Slotted opening in the screen will not exceed 1.75 mm (0.0689 in).
- Approach velocity will not exceed 0.2 ft per second for self-cleaning screens or 0.05 ft per second for non-self-cleaning screens. Self-cleaning screens must achieve full clearance of the entire screen at least once every five minutes.
- Overall screen porosity will be a minimum of 27 percent.

This method results in a large amount of water to be pumped, and ultimately de-watered from the stockpile location, before sediment is available for beneficial use. The release of decant water may result in a localized elevation of turbidity in the receiving waters due to high velocities of discharge water creating a hydraulic jump, creating resuspension of sediments from the discharge event. As discussed previously, elevated turbidity may have a temporary impact on listed salmonid species through decreased predator avoidance and decreased foraging, which would be significant. Implementation of MM-HWR-5, *Implement Best Management Practices (BMPs) during operation of dredged material processing sites* would reduce impacts to less than significant.

The second method of material offloading is to manually excavate dredged material from the transport scow with an excavator. This process will reduce the amount of water needed to move material, thus reducing the likelihood of significant discharges to the bay from dewatering the dredged material. Additionally, the amount of dredged material and potential impacts to receiving water would be reduced to very small amounts of sediment which may slough off the sides of the excavator bucket and fall into the bay when removing material from the scow. Implementation of MM-HWR-5 would reduce impacts to less than significant.

In the event that dredged material offloading isn't required, and materials can be delivered via floating pipeline directly to a storage or beneficial use location, there is potential that the slurry pipeline could release slurry into the aquatic environment if there were a pipeline leakage or failure. Such an unplanned release could have a significant impact on sensitive species or habitats if it were to occur. This potential impact would be reduced to less than significant by the implementation of MM-HWR-3, *Prepare and implement dredge slurry and hazardous materials spill contingency plan*.

Terrestrial Impacts

All three proposed sediment handling facility locations are commonly used as nesting locations by birds protected under the Migratory Bird Treaty Act, particularly osprey. Breeding special status birds may be temporarily affected by noise caused by pumps and equipment discharging slurry into the containment basins, and by heavy equipment used in the handling, loading, and transport of sediment. Disturbance due to noise will depend on many factors such as proximity to the noise, the levels of ambient noise, the nature of ambient noise, and the ability of birds to habituate to new noise. While Redwood Marine Terminal II and the Fields Landing Boatyard are active industrial sites where birds appear to be habituated to disturbance, the relative increase in human activity and noise due to the use of heavy equipment at the sediment handling facilities in the vicinity of active nests has the potential to disturb nesting birds, causing nest abandonment and mortality of eggs or nestlings. This impact is considered significant. Implementation of MM-BIO-4, *Schedule sediment handling and processing activities to avoid bird nesting season to the extent practicable* will avoid

impacts to sensitive species through timing of activities that are not otherwise time-restricted. For instance, the construction of temporary sediment dewatering basins can occur prior to the typical nesting season. When the active nesting season cannot be avoided, implementation of MM-BIO-5, *Pre-activity nesting bird surveys and nest monitoring,* and MM-BIO-6, *Passive nesting bird deterrents* would reduce potential impacts to less than significant.

The Redwood Marine Terminal II and Fields Landing Boatyard sediment handling sites are located in industrial facilities and containment basins would be constructed on existing impervious surfaces, therefore there would be no impact to special status plants at these locations. The Samoa Lagoons site consists of two sediment dewatering basins and a series of dikes constructed from sandy material and previously dredged bay sediment. The site was last used for dredge material storage in 1998 (Appendix B) and was acquired by the HBHRCD in 2004. In the years since its active use as a dredge disposal site, the Lagoons has become densely vegetated with a range of non-native and ruderal species. While the Samoa Lagoons does not constitute prime habitat for rare plants, there is low potential for state and federally endangered beach layia (*Layia carnosa*) to occur, and prior botanical surveys of the site have documented a number of native species, including a population of dark-eyed gilia (*Gilia millefoliata*). Beach pines (*Pinus contorta* var. *contorta*) are also present in scattered groups at the site. Prior to any new dredge sediment deposition, the Lagoons would need to be cleared of vegetation which has the potential to affect special status plants that may be present at the site. MM-BIO-7, *Pre-construction sensitive species, habitat, and sensitive natural communities surveys*, and MM-BIO-8, *Beach pine avoidance at Samoa Lagoons*, would ensure that any impact to rare, threatened, or endangered plants or habitats that may result from clearing the site in order to resume its historic use as a dredge sediment dewatering and storage facility would be less than significant.

Pipeline transport of dredge material as a slurry, either to a sediment handling facility or to a beneficial use site, may require placement of the pipeline in areas that constitute sensitive natural communities or habitat for special status plant species or nesting birds. Implementation of MM-BIO-4, MM-BIO-5, and MM-BIO-7 would reduce potential impacts to sensitive natural communities, special status plant species, and nesting birds by requiring surveys of all pipeline placement locations to avoid these resources to the extent practicable. Where impacts to these resources are unavoidable due to project constraints, the need for additional measures such as biological monitoring, salvage and revegetation plans and/or compensatory mitigation would be evaluated on a project basis.

Beneficial Use of Dredged Material

Dredged sediments excavated from Locally Maintained Sites may be suitable for beneficial uses throughout Humboldt Bay. The Project Description, identifies 76 potential beneficial use sites where dredged material could be used for fill material to protect waterfront property, replenish beaches, increase shoreline resiliency against sea level rise, and restore salt marsh habitat. A detailed description is provided in Appendix A.

Waterfront Sites

Dredged material could be placed at 16 waterfront sites to increase protection from tidal inundation related to sea level rise. Typically, these vulnerable areas are zoned as commercial or residential property and are slated for future development. However, placement of sediment to increase surface elevation could potentially impact terrestrial biological resources. Placement of

sediment could impact nesting birds, particularly ground nesting species or species that nest in low lying vegetation. Direct impacts to nesting birds could occur through unintentional covering with dredge material or destruction of nests by construction equipment. Noise and visual impacts from construction activities could have indirect impacts to nesting birds near the project site causing nest abandonment. Implementation of MM-BIO-4 and MM-BIO-5 will reduce these impacts to less than significant. Rare plant species could be impacted by dredge material placement in areas where suitable habitat exists through direct loss of individuals. Since commercial or residential property is the most common land type for this beneficial use, there is low potential for state and federally endangered species to occur. Implementation of MM-BIO-7 would ensure that any impact to rare, threatened, or endangered plants or habitats would be less than significant.

Beach Replenishment

Five beach replenishment sites along Humboldt Bay have been identified for placement of dredged material under the Proposed Program. These sites are in areas of high wave energy and experience erosion in the winter from storm waves. Beach surf zone placement of dredged sediment has occurred in the past on the Samoa peninsula, most recently for the dredging event that occurred in November 2006 – March 2007. A monitoring program was designed for that event to assess conditions at the discharge point, areas in close proximity, and a control point away from the project site. Each location was monitored prior to operations, during the beach disposal application, immediately following completion of application, and for five-years afterwards. Monitoring data showed a short-term impact to biological communities at the discharge point, and no impacts at areas in close proximity or the control location. Abundance and species-richness of macroinvertebrates returned to pre-project conditions within three months following termination of beach surf zone disposal operations (SHN 2017). Other potential adverse impacts to flora and fauna temporarily displaced or covered by dredging pipeline were found by the CCC to be less than significant due to the ability of these organisms to rapidly recolonize from adjacent areas once the pipeline is removed (CDP 1-05-039), and the implementation of MM-BIO-9, *Offshore anchoring of the dredge slurry pipeline*, would minimize potential scouring of mudflat or eelgrass habitat due to lateral shifting of the pipeline to less than significant. Bird species that nest in sandy substrates, such as snowy plover, are not likely to be impacted by the placement of dredge sediment in surf zones, except in cases where dredge pipeline is placed overland through dune habitat. Implementation of MM-BIO-4 and MM-BIO-5 would avoid impacts to nesting birds. Therefore, impacts from nearshore surf zone disposal are expected to be less than significant.

Diked Shoreline Structures and Diked Former Tidelands

Dredged material could be used at 23 locations to rebuild eroded dike segments, increase low (less than 10 feet) dike crest elevations, and increase the elevation of dikes at former tidelands in Humboldt Bay. Diked shoreline re-use sites in Mad River Slough have potential to overlap with tidewater goby habitat as activities are relatively close to their habitat; however, reuse activities at these locations are expected to be land-based, and as such, placement of materials should not occur within waters where these sensitive species would occur and direct placement of materials is not expected to impact tidewater goby. As stated in Section 3.8, *Hydrology and Water Resources,* placement of dredged material could result in sediment suspension and elevated turbidity through use of heavy equipment, erosion, and sedimentation. The temporary increase in turbidity may impact tidewater goby and any sensitive salmonids which may occur near the beneficial reuse site

through reduced respiration, decreased foraging potential, or increased mortality due to predation. Tidewater goby may also be impacted through sedimentation of burrows sites. Additional impacts from pollutants associated with construction, and re-use of sediment may impact this species. Constituents of concern like heavy metals, pesticides, dioxin would be screened prior to reuse as part of permit requirements, reducing impacts from constituents of concern to less than significant. Implementation of MM-HWR-1 and MM-HWR-2, *Prepare and implement spill prevention and management plan,* would reduce impacts to tidewater goby and listed salmonid species to less than significant.

Placement of sediment to increase surface elevation for diked shoreline re-use sites could potentially impact rare plants and nesting birds, particularly ground nesting species or species that nest in low lying vegetation. Direct impacts to nesting birds could occur through unintentional covering with dredge material or destruction of nests by construction equipment. Noise or visual impacts by construction activities could have indirect impacts to nesting birds near the project site causing nest abandonment. Additionally, special status terrestrial wildlife species that have the potential to occur could be impacted by construction activities directly and indirectly through noise, visual, habitat loss, and direct mortality. Rare plant species could be temporarily impacted by dredge placement in areas where suitable habitat exists by smothering. Implementation of MM-BIO-4, MM-BIO-5, and MM-BIO-7 would ensure impacts would be less than significant.

Living Shorelines and Salt Marsh Habitat

Under the Proposed Program, there are four potential living shoreline sites which could help protect vulnerable built shoreline structures and low-lying areas from wave-induced erosion or overtopping, and 11 salt marsh restoration sites where use of dredged sediments could occur to provide habitat, independent of protecting shoreline infrastructure.

Beneficial uses of dredged sediments performed in upland areas are not expected to impact sensitive aquatic resources directly, however there is potential for localized water quality impairment resulting from upland construction and run-off, resulting from beneficial use activities. Localized impairment of water quality, similar to the impacts from dredge processing, may impact sensitive fish species due to decreased predator avoidance and decreased foraging potential if elevated turbidity is prolonged or widespread. Impacts to listed fish resulting from elevated turbidity would be significant and require mitigation. Implementation of MM-HWR-4 *Implement erosion and sediment control measures* would reduce impacts to less than significant.

Restoration projects may use placement of a thin layer (8 to 10 inches) of sediment to increase surface elevation for the creation and restoration of salt marsh habitat. Alternatively, larger projects involving the construction of marsh habitat, such as the White Slough Tidal Wetlands Restoration Project at the Humboldt Bay National Wildlife Refuge, may use large volumes of sediment (240,000 cubic yards in this example) to fill and construct tidal ridges and drainage cells, creating a complex mosaic of tidal marsh and depressional wetlands. Both methods of sediment placement could potentially impact nesting birds, terrestrial wildlife, and rare plants.

Direct impacts to nesting birds, particularly those that nest on the ground or in low-lying vegetation, could occur through unintentional covering with dredge material or destruction of nests by construction equipment. Noise or visual impacts by construction activities could have indirect impacts to nesting birds near the project site causing nest abandonment. Roosting or

foraging birds may also be temporarily displaced from the area by construction activities. Special status terrestrial wildlife species could be impacted by construction activities directly and indirectly through direct mortality, noise disturbance, and habitat loss. Construction equipment could crush or injure animals while the increased noise and human activity could temporarily displace them from the area. Construction activities requiring vegetation removal may result in loss of habitat for some species. Thin-layer sediment application will cover some, but not all, vegetation at a beneficial use site. Rare plant species could be impacted by sediment placement in areas where suitable habitat exists by smothering. In addition, larger projects requiring grading and filling activities could result in the loss of populations of rare plant species if they are located in the construction area. Implementation of MM-BIO-4, MM-BIO-5, and MM-BIO-7 would ensure impacts to nesting birds, terrestrial wildlife and rare plants would be less than significant. In instances where impacts to special-status plants cannot be avoided, the need for additional measures such as salvage and revegetation plans would be evaluated on a project basis as necessary to fully mitigate any impacts. Projects may also need to consider the feasibility of restricting construction activities to a work window that avoids the seasonal period of greatest precipitation. Overall, temporary adverse effects on special status species and their habitats are expected to be compensated for by the long-term improvement in habitat that will result from living shoreline and salt marsh restoration projects.

Alternative 1 – Suction Dredging Only

The impact analysis described above assumes that both suction and clamshell dredging may occur at the Locally Maintained Sites. As a proposed alternative, dredging will only be performed using a hydraulic suction dredge. Entrainment of sensitive fish species and elevated localized turbidity impacts are significant and would require mitigation under this alternative. Implementation of MM-BIO-1 would reduce entrainment impacts to sensitive fish species to less than significant, and implementation of MM-HWR-1 would further reduce associated water quality impacts to aquatic biological resources to less than significant.

Alternative 1 has no impact on Dredged Material Processing activities. Under these alternatives, Dredged Material Processing activities would still occur at the same locations, and localized water quality impacts would still be significant. Implementation of MM-HWR-5 would reduce impacts to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would require all dredge operations to use mechanical methods with a clamshell bucket and crane barge. With this method, temporary localized increases in turbidity would occur. This impact would be significant and require mitigation. Entrainment is not expected as a result from clamshell dredging, however localized water quality impacts may reduce foraging and predator avoidance capabilities of sensitive fish species. Implementation of MM-BIO-1 would reduce impacts to these fish by limiting dredging to a work window when water quality impacts would occur during the period sensitive fish species are least likely to be present in Humboldt Bay. Additionally, implementation of MM-HWR-1, would reduce turbidity impacts to year-round fish species to less than significant.

Project Alternative 2 has no impact on Dredged Material Processing activities. Under these alternatives, Dredged Material Processing activities would still occur at the same locations, and

localized water quality impacts would be significant. Implementation of MM-HWR-5 would reduce impacts to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Under Alternative 3, sediment from the dredge sites would only be transported directly to beneficial use sites, without the need for dredged material processing, therefore there would be no impacts to the terrestrial wildlife or plant species at any of the proposed sediment handling facilities as these locations would not be in use. While the Locally Maintained Sites are already subject to frequent disturbances, including dredging, and habitat modifications are temporary around the dredge locations, these impacts would not result in habitat modifications different than those discussed above, and are temporary and not considered significant. Under this alternative, it is possible that an increased length of dredge slurry pipeline or more frequent barge trips would be needed to transport materials to beneficial use sites, which may require additional overwater and overland equipment staging. Adding pipeline and additional equipment to deliver dredged material directly to beneficial sites may require the use of heavy equipment, increasing the potential for water quality impairment from toxic materials, fuels, solvents, and oil. Decreased water quality from this activity would be significant. Implementation of MM-HWR-2 would reduce the potential for water quality impacts through use of BMPs, to less than significant. Additionally, using pipeline to deliver dredged slurry will likely require several linkages to have a long enough section of pipeline to reach beneficial use sites. Each link of the pipeline has potential to leak dredged slurry and hazardous materials related to pumping fuels, lubricants, and other operational chemicals. Impacts associated with unintentional discharge of dredged slurry or chemicals related to the use of the pipeline into surface waters or the surrounding environment would be significant. Implementation of MM-HWR-3 would reduce impacts due to accidental release of dredge slurry and associated chemicals to less than significant.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Program. Under this alternative, Locally Maintained Sites would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging Locally Maintained Sites in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS rather than used for beneficial purposes around the bay. Dredging impacts at these locations would be the same as those described for the Proposed Program. Implementation of mitigation measures for this alternative would be determined by the relevant permits received for each individual dredging project and would likely be similar to the measures included in this PEIR.

Under this alternative, it is likely that beneficial use sites would not receive any dredged material, and as such, impacts are not expected as a result of beneficial re-use activities. Placement of material at HOODS is not expected to have adverse impacts on fish species or habitat, as deposition of dredged material would briefly elevate turbidity from the sediment release, and then return to normal before reaching the ocean floor. HOODS is routinely used for sediment disposal activities for USACE dredge operations, and in recent years, the existing dredge projects for the Locally Maintained Sites.

Impact BIO-2—Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS.

Proposed Program

Three terrestrial sensitive natural communities as defined by CDFW occur within the Program Area: Northern Coastal Salt Marsh, Sitka Spruce Forest, and Northern Foredune Grassland. In addition, mudflat habitat and eelgrass beds are present within intertidal areas throughout the bay. Mudflats provide a unique intertidal habitat for both terrestrial species to forage, and aquatic species to shelter in place. Eelgrass is a marine plant that provides predation refuge and serves as an important food source for a diverse group of marine species. Eelgrass beds reduce wave and current action, thus reducing erosion by stabilizing sediment, and improve water quality by trapping suspended particulates and also generate oxygen for the marine environment during daylight hours. Numerous other terrestrial habitats in the Program Area are classified as ESHA.

Dredging

Aquatic Impacts

Eelgrass is present throughout Humboldt Bay at depths ranging from 1.3 m MLLW in the North Bay to -2.1 m MLLW in the South Bay, and in some instances occurs within or immediately adjacent to some of the proposed dredging locations. Impacts to eelgrass from dredging would occur in the event that eelgrass is directly removed through dredge operations, damaged by staging of dredge equipment, damaged by prop wash or grounding of watercraft, or through reduced primary productivity as a result from elevated turbidity from dredge operations. Impacts leading to a loss of eelgrass habitat would be considered significant. The Proposed Program describes maintenance dredging activities, thus many of the dredging sites have previously implemented mitigation for the loss of eelgrass that occurred due to their original construction (for example, the Park Street Marsh mitigation site for the Woodley Island Marina) and do not incur additional mitigation obligations for maintenance dredging operations. Any dredging operations that result in new and previously unmitigated impacts to eelgrass, such as dredging in the King Salmon Channel, will require mitigation according to the ratios defined by CEMP. Implementation of MM-BIO-10, *Tide limitations for in-water work,* and MM-BIO-11, *Eelgrass mitigation*, as well as implementation of MM-HWR-1 and MM-BIO-3 would reduce impacts to eelgrass to less than significant levels. The potential impacts of anchoring in sensitive habitats during dredging operations is discussed under Impact BIO-1.

Terrestrial Impacts

Dredging is an in-water activity that would not affect any upland riparian habitat or other sensitive natural community; therefore, there would be no impact.

Dredged Material Transport and Processing

Aquatic Impacts

Offloading of sediment either via re-slurrying and pumping from a barge or using an excavator to remove sediment from the barge is not expected to have any direct impacts on sensitive aquatic habitats. Likewise, landside dredged material processing activities are not expected to have direct impacts on any eelgrass or mudflat habitat. Discharge of decant water from the dewatering process

has potential to elevate local receiving water turbidity, which may have impacts on eelgrass habitat through reduction in primary production, ultimately leading to reduction in eelgrass habitat. In addition, when offloading isn't required, and materials can be delivered via floating pipeline directly to a storage or beneficial use location, placement of the dredge transport pipeline could result in impacts to benthic habitat or eelgrass beds from scouring due to tidal action or shading of eelgrass. Implementation of MM-HWR-1, MM-HWR-5, and MM-BIO-9 would reduce these impacts to less than significant levels.

Terrestrial Impacts

Dredge pipeline used to transport slurry from the dredging site to the processing site will be located on land for short distances from the water's edge to the sediment containment basin. None of the proposed sediment handling facilities are located within riparian habitat or any other sensitive natural community, therefore there would be no impact to these resources. Pipeline placement to deliver sediment directly to a beneficial use location may occur in sensitive habitats. However, implementation of MM-BIO-7 and MM-BIO-9 will avoid and minimize impacts to less than significant.

Beneficial Use of Dredged Material

Aquatic Impacts

Similar to discussion under Impact BIO-1, beneficial re-use of dredge activities is primarily associated with terrestrial sites. Beneficial re-use activities have potential to elevate turbidity in adjacent waters, which may have impacts on eelgrass primary productivity and eventual loss of eelgrass habitat. Impacts to eelgrass as result of water quality impairment would be significant. However, implementation of MM-HWR-2, MM-HWR-3 and MM-HWR-4 would reduce impacts to eelgrass to less than significant levels.

Terrestrial Impacts

Of the three CDFW-defined terrestrial sensitive natural communities occurring in the Program Area, northern foredune grasslands and Sitka spruce forest occur outside areas currently identified for beneficial use. Therefore, impacts to these terrestrial sensitive natural communities are not expected to occur. Riparian habitat may occur within beneficial use sites and impacts to vegetation and wildlife in these areas could occur, as previously discussed under Impact BIO-1. The Proposed Program identifies 16 areas of salt marsh habitat as potential restoration site locations, as well as four locations where constructed salt marsh (i.e. living shorelines) could be created. Application of dredge sediment in salt marsh habitat would raise the elevation of the marsh to increase resiliency to sea level rise. Increased flooding can cause marshes to convert to open water, particularly in areas subject to land subsidence. Therefore, application of dredge sediment to maintain salt marsh habitat is expected to have a net beneficial effect in this habitat. Application of sediment to salt marshes for beneficial use projects is considered a fill activity. When fill of wetlands is permitted, compensatory mitigation must be undertaken so that wetlands are restored, created, and enhanced to replace the permitted loss of wetland area and function to ensure no net loss of wetlands. Some beneficial use projects may result in the conversion of wetland types, thus requiring compensation for the wetland type that is converted. Implementation of MM-BIO-12, *Wetland mitigation*, would reduce impacts to less than significant.

Construction of living shorelines, particularly at sites LS-1 and LS-2 would necessitate the conversion of mudflat habitat to salt marsh habitat. However, this conversion accomplishes a small restoration of the historical extent of salt marsh habitat around Humboldt Bay. While mudflat is also a valuable and ecologically important habitat in the Bay, the areas of conversion represented are a very small percentage of the overall mudflat habitat currently extant in the Bay. In addition, with continuing sea level rise and increased inundation, it is expected that other areas will convert to mudflat. Application of dredge sediments for the restoration of historical salt marsh habitat is expected to have a net beneficial effect.

Alternative 1 – Suction Dredging Only

As a proposed alternative, dredging will only be performed using a hydraulic suction dredge. This activity is a subset of the activities of the Proposed Program and thus the impacts and mitigation are similar to the Proposed Program. Turbidity reduction measures described in CEMP propose that utilization of low impact equipment such as hydraulic suction dredges rather than clamshell or hopper dredges may be used to control turbidity levels that may adversely impact eelgrass. Thus, Alternative 1 proposes to only use equipment that would likely result in less turbidity impacts to eelgrass.

Alternative 2 – Clamshell Bucket Dredging Only

As a proposed alternative, dredging will only be performed using a clamshell bucket dredge. This activity is a subset of the activities of the Proposed Program and thus the impacts and mitigation are similar to the Proposed Program. Turbidity reduction measures described in CEMP propose that utilization of low impact equipment such as hydraulic suction dredges rather than clamshell or hopper dredges may be used to control turbidity levels that may adversely impact eelgrass. Thus, Alternative 2 proposes to only use equipment that would likely result in greater turbidity impacts to eelgrass.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Direct transport of dredged material from dredge sites to beneficial use sites has potential to impact both eelgrass and mudflat habitats, as this may require equipment staging within, or adjacent to these habitats. Limiting construction impacts on ambient water quality within or adjacent to eelgrass, as well as minimizing the likelihood of grounding of barges and other watercraft would be recommended if work were in proximity to eelgrass beds. Use of pipelines to transport material may result in discharge of dredged slurry at pipe connections, or discharge of fuels, oils, or other hazardous chemicals required to pump these materials and may result in ambient water quality impairment. Water quality impairment impacts from the use of the pipeline on eelgrass would be significant as would the scarring or scouring of eelgrass beds due to equipment or watercraft grounding. Implementation of MM-HWR-2, MM-HWR-3, MM-BIO-3, and BIO-MM-9 would reduce water quality impairment and direct impacts eelgrass to less than significant levels.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Program. Under this alternative, Locally Maintained Sites would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging Locally Maintained Sites in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS rather than used for beneficial purposes around the bay. Impacts from dredging would be similar to the

Proposed Program, and no impacts to sensitive natural communities would occur with disposal of sediment at HOODS.

Impact BIO-3: Would the Proposed Program Have a Substantial Adverse Effect on State or Federally Protected Wetlands (Including, but not Limited to, Marsh, Vernal Pool, Coastal, etc.) through Direct Removal, Filling, Hydrological Interruption, or Other Means?

Proposed Program

Sediment could be transported through a temporary pipeline from the dredging area to material processing sites or directly to beneficial use sites. Potential impacts to wetlands include vegetation removal for pipeline placement and pipeline failure resulting in dredge slurry being released into wetlands. Vegetation removal would be limited to the minimum amount required for installation and maintenance of the pipeline. To avoid the potential equipment failure, daily inspections of the pipeline will occur to ensure all joints and pipe segments are functioning properly. Additionally, with the implementation of MM-BIO-13, *Wetland delineation*, pipelines will be positioned to avoid wetlands to the extent possible.

Amendments to tidal wetlands can be considered a fill activity that may require compensatory mitigation, and MM-BIO-12 *Perform Wetland Mitigation* would reduce this impact to less than significant. However, beneficial use of dredged sediment for marsh restoration, enhancement or creation would be used to offset wetland losses and increase the resiliency of coastal areas by mitigating erosion, storm surge impacts, and sea level rise impacts. Given an adequate sediment supply, coastal marshes are a natural infrastructure that protects coastlines and built infrastructure while providing a host of ecosystem services and important habitat functions. Application of dredged sediments for these purposes would often have a net beneficial effect. Implementation of MM-BIO-11, MM-BIO-12 and MM-BIO-13 would reduce any impacts to less than significant.

Alternative 1 – Suction Dredging Only

Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, dredged material from LMSs would likely continue to be disposed of at HOODS. There would be no new impacts.

Impact BIO-4: Would the Proposed Program Interfere Substantially with the Movement of any Native Resident or Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife Corridors or Impede the Use of Native Wildlife Nursery Sites?

Proposed Program

The Proposed Program's dredging locations, dredged material processing sites, and beneficial use sites do not contain unique habitat for migratory or resident sensitive fish or wildlife species that is not present at other locations in Humboldt Bay, nor are they located in, or would create barriers to, established wildlife corridors. Eelgrass is classified as EFH and provides valuable nursery habitat for many species. Impacts and mitigation to eelgrass habitat are discussed under Impact BIO-2.

Tidewater goby have potential to occur adjacent to beneficial use sites in brackish waters in northern Humboldt Bay. Tidewater goby dig burrows which are subsequently used for breeding. Water quality impairment from sediment management practices has potential to increase sediment discharge to surface waters, and potentially cover burrows used by tidewater goby for breeding which would be considered significant and require mitigation. Implementation of MM-HWR-4 would reduce water quality impacts from beneficial use activities to less than significant.

Additionally, Pacific herring, commercially important as well as a key prey species for many other fish and wildlife species, adhere their eggs to intertidal and subtidal structures during spawning migrations. It is expected that sediment management activities may generate noise disturbances, as well as localized changes in water quality within or adjacent to dredging locations. Exposure to elevated noise and suspended sediment may preclude Pacific herring use of the proposed sediment management locations for spawning activities, however, there is an abundance of suitable spawning habitat throughout the bay, and because these activities are local and each proposed site is relatively small in footprint, impacts to Pacific herring would not be significant, and would not require mitigation.

Alternative 1 – Suction Dredging Only

Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, dredged material from LMSs would likely continue to be disposed of at HOODS. There would be no new impacts.

Impact BIO-5: Would the Proposed Program Conflict with any Local Policies or Ordinances Protecting Biological Resources, such as a Tree Preservation Policy or Ordinance?

Proposed Program

The Proposed Program would be fully permitted and would not conflict with local policies and ordinances protecting biological resources. Project activities do not involve the removal of trees; however, beach pine that occur within the project area may be affected by project activities. Implementation of MM-BIO-8 would reduce the likelihood of impact to beach pine. Therefore, the project would not conflict with local tree-preservation policies or ordinances.

Alternative 1 – Suction Dredging Only

Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, dredged material from LMSs would likely continue to be disposed of at HOODS. There would be no new impacts.

Impact BIO-6: Would the Proposed Program Conflict with the Provisions of an Adopted HCP, Natural Community Conservation Planning (NCCP), or Other Approved Local, Regional, or State HCP?

Proposed Program

The following HCPs, Safe Harbor Agreements (SHA), and Candidate Conservation Agreements with Assurances (CCAA) occur within Humboldt County according to USFWS (USFWS 2020).

- Green Diamond Resource Company Forest HCP (FHCP) and Final EIS
- Green Diamond Resource Company California Timberlands (formerly Simpson Timber Company) Northern Spotted Owl HCP
- Humboldt Redwood Company (formerly Pacific Lumber Company) HCP
- Forster Gill, Inc. SHA
- Green Diamond Resource Company (formerly known as Simpson Timber Company) Aquatic CCAA
- Humboldt Bay Municipal Water District Habitat Conservation Plan For Its Mad River Operations

None of these plans overlap with the Program Area, therefore there are no conflicts with the provisions of any of these plans, and thus no impact.

Alternative 1 – Suction Dredging Only

Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

No-Project Alternative

Under the No-Project Alternative, dredged material from LMSs would likely continue to be disposed of at HOODS. There would be no new impacts.

Mitigation Measures

BIO-1: Establish an environmental work window for all dredge operations.

In-water work for dredging operations is limited to between July 1st and October 15th to avoid impacts to listed fish species. This work window avoids the life stages most vulnerable to direct impacts from dredging through physical entrainment of fish, as well as indirect impacts from impaired water quality when these species are present in Humboldt Bay.

BIO-2: Minimize operating the hydraulic dredge pumps when the intake is suspended above the Humboldt Bay seafloor.

In-water dredge operations should minimize operation of pumps or generation of an intake flow field when the hydraulic dredge intake is suspended off the bottom to the maximum extent practicable. This modified dredge operation will avoid potential impacts to longfin smelt, a pelagically oriented sensitive fish species which is expected to occur in Humboldt Bay throughout the year.

BIO-3: Avoid equipment staging and/or anchoring within eelgrass beds.

Dredge equipment, tug, and barge operators shall ensure that anchored construction barges are located outside of eelgrass. Where existing piles are present, the barge may attach to the piles to maintain position. In the absence of current eelgrass mapping data, a preconstruction eelgrass survey will demarcate any eelgrass present or adjacent to dredging and beneficial use sites. No anchoring, grounding, pipeline placement (and other bottom-disturbing activities) shall occur within eelgrass beds without consideration of additional mitigation.

BIO-4: Schedule sediment handling and processing activities to avoid bird nesting season to the extent possible.

The general bird nesting season is typically from February 1 – August 31, which overlaps with the in-water dredging work window for aquatic species of July 1 – October 15. When possible, sediment processing and handling activities in locations with potential for nesting birds, such as construction of temporary sediment storage basins, or placement of overland sediment transport pipe, should be scheduled to occur outside the active nesting season.

BIO-5: Conduct pre-activity nesting bird surveys and nest monitoring.

No more than 15 days prior to the initiation of activities at sediment handling, ~~or~~ beneficial use sites, or other project locations scheduled to occur during the active bird nesting season, a qualified biologist will conduct a minimum of one visual survey to identify active nests within the area of potential impact. -Surveys will be conducted by visually inspecting all ground, vegetation, rock outcrops, and manmade structures suitable for nesting within 300 feet of work areas for passerines, and within 500 feet of work areas for raptors. If an active nest is found, the biologist will determine (in consultation with CDFW and/or USFWS if necessary) the no-disturbance buffer zone to be established around the nest location based on factors such as nesting chronology of the species, existing ambient conditions, type and extent of disturbance, duration and timing of disturbance, and the species' site-specific level of habituation to the disturbance. A qualified biological monitor will observe active nests for signs of disturbance during Program activities. If birds at active nests display behaviors indicating an inability to tolerate the level of disturbance, work will cease at that location until the biologist determines that the young have fledged or that the nest is otherwise no longer active.

BIO-6: Implement passive nesting bird deterrents.

To minimize harm to birds, their eggs, or their young, passive deterrents may be implemented in advance of the typical nesting season to minimize the potential for the establishment of nests in active work areas. All nesting deterrents should be intended to prevent nesting attempts and should not include the use of devices that prevent nesting from continuing once a nest is built. Nesting deterrents should also avoid the use of all materials that may result in the entrapment of wildlife (e.g. monofilament netting).

BIO-7: Conduct preconstruction sensitive species, habitat, and sensitive natural communities surveys.

Prior to site clearing, equipment staging, material storage, or sediment disposal operations, project sites will be surveyed by a qualified biologist for the presence of sensitive species or their habitat, and sensitive natural communities. Surveys will be conducted in accordance with the most current guidance from CDFW, USACE, and/or USFWS. If sensitive species or habitat is present, the need for species specific or protocol surveys and the need for biological monitors during project work will be evaluated and implemented if necessary. All sensitive natural communities will be mapped and avoided to the extent feasible.

BIO-8: Practice beach pine avoidance at Samoa Lagoons.

Prior to site clearing, equipment staging, material storage, or sediment disposal operations, the Samoa Lagoons site will be surveyed for the extent of established beach pines. The perimeter of

beach pines greater than 6-inch diameter will be located and marked with temporary flagging for avoidance. Workers will avoid depositing and/or removing material in areas with marked beach pines. If beach pines are damaged during project activities, individual trees greater than 6-inch diameter will be replaced at a 3:1 ratio as close to the area of disturbance as practicable.

BIO-9: Utilize offshore anchoring of the dredge slurry pipeline.

In locations where the dredge slurry pipeline may be placed in soft bottom habitat (i.e., eelgrass or mudflat), the pipeline will be anchored offshore and outside of these sensitive habitats in such a way as to minimize any lateral shifting of the pipeline during ebbing and flooding of the tide.

BIO-10: Implement tide limitations for in-water work.

In-water work will be conducted at a tide of sufficient elevation to float barges, tugs, and all other watercraft to avoid prop wash or prop scarring of mudflats and eelgrass. Vessels will be prevented from grounding to avoid scarring mudflats or damaging any eelgrass beds that are not directly within the dredging work area.

BIO-11: Mitigate eelgrass impacts.

Impacts to eelgrass will be mitigated following ratios recommended in the CEMP. Eelgrass will be established at a ratio of 1.2:1 relative to the area impacted.

BIO-12: Perform wetland mitigation.

Beneficial use projects will be designed to provide an overall net gain in wetland habitat quality and will minimize loss of existing habitat functions. When feasible, projects will provide, as part of project design, for no net loss of wetland habitats, or will provide compensatory mitigation for lost wetland habitat in accordance with state and federal mitigation requirements.

BIO-13: Conduct wetland delineation.

Prior to site clearing, equipment staging, material storage, or sediment beneficial use operations, project sites will be surveyed by a qualified biologist for the presence of wetlands. Surveys will be conducted in accordance with the most current guidance from the applicable regulatory agencies. All wetlands present within the Program Area that are not the subject of a beneficial use action will be avoided to the extent feasible.

BIO-14: Obtain State Incidental Take Permit and Fully Impact for Take of Longfin Smelt.

Hydraulic (suction) dredging may result in entrainment and mortality of longfin smelt. The mortality would be defined as take under CESA. Prior to hydraulic dredging, a State ITP shall be obtained by the project proponent. The ITP shall describe mitigation measures that will be implemented for longfin smelt take.

3.12 Transportation

3.12.1 Environmental Setting

3.12.1.1 Marine Transportation and Navigation

The Port of Humboldt Bay is a working port that can handle ocean-going vessels with domestic or international cargoes, including mid-sized cargo ships up to the "Panamax"[16] class. Humboldt Bay is the only deep-water shipping port between San Francisco, 225 nautical miles to the south, and Coos Bay, Oregon, 156 nautical miles to the north. Maintaining an improved entrance to the Bay and dredging the entrance channel and major navigation channels are necessary to accommodate safe and economically viable shipping, as well as commercial fishing, by ocean-going ships and barges. In general, the channel system in Humboldt Bay consists of the entrance channel and turning basin, a northerly channel from the turning basin to North Bay and Samoa that forks around Woodley Island, and a southerly channel to Fields Landing in South Bay that ends in a turning basin. After a 12-year effort, the Humboldt Bay Channel Deepening Project was completed in April 2000, resulting in a 48-foot deep Bar and Entrance Channel and 38-ft deep North Bay and Samoa Channels, intended to provide for greater navigation safety and improved vessel economics.

Approximately 15 percent of Humboldt Bay's shoreline is devoted to port-related, marine uses and activities. Adjacent to the Humboldt Bay channels are seven operating docks that can serve ocean-going dry cargo vessels, and one oil terminal that serves liquid bulk cargo vessels. Three of the eight docks are located on the Eureka waterfront, four are located on the Samoa Peninsula, and one is located at Fields Landing. Historically, forest products were the mainstay of commercial shipping in the Bay, and despite declines in the industry overall, they remain critically important, with woodchips, logs, and fuel products accounting for essentially all present day cargo vessel calls (County of Humboldt 2018). Extreme shoaling at the entrance to Humboldt Bay due to winter storm activity has required the Humboldt Bar Pilots to issue draft restrictions in recent years.

Commercial fishing remains an active industry in the Bay, with Eureka-area ports accounting for an average of 38 percent of regional commercial landings from 1981–2017 (County 2018). Woodley Island Marina and the Eureka Public Marina provide moorage for commercial and recreational vessels, with the majority of the active Humboldt fishing fleet based at Woodley Island. Without regular dredging in the marinas, shoaling can make some slips unusable for deeper draft vessels.

3.12.1.2 Land-Based Transportation

The transportation system within the Proposed Program area consists of various modes of land-based transportation, including walking, biking, public transit, and automobile. This system is primarily defined by the existing land uses within the Proposed Program area including Coastal Dependent Industrial (CDI), Public/Quasi/Public (PQP), Natural Resource (NR), Water Conservation (WC), Water Development (WD) within the City of Eureka's jurisdiction, and Agriculture Exclusive (AE) within the City of Arcata. See Figure 3.9-2 within Section 3.9, *Land Use and Planning*, for a map of the land use types within the Proposed Program area.

[16] Panamax class cargo vessels are the largest size vessel that can transit the Panama Canal.

The Proposed Program area public transit services, consisting of bus services, are served by two providers. Services are provided by the Redwood Transit System, which services the communities of Scotia, Fortuna, Loleta, Fields Landing, Eureka, Arcata, McKinleyville, Westhaven, and Trinidad. Bus services are also provided by Southern Humboldt Intercity which provides service to the communities of Redcrest, Weott, Meyers Flat, Miranda, Phillipsville, Redway, Garberville, Benbow Rio Dell, Fortuna, and Eureka, as well as the College of the Redwoods. In addition to public transit, the Proposed Program area has an extensive bicycle and pedestrian network. This network includes both designated bicycle/pedestrian facilities as well as those that are shared by motorized vehicles.

3.12.2 Regulatory Setting

3.12.2.1 Federal

America's Marine Highway Program

The U.S. Department of Transportation Maritime Administration (MARAD) published a final rule in 2009 (amended and expanded in 2012 and 2017) that established America's Marine Highway Program. The Marine Highway Program authorizes the designation of Marine Highway Routes and Projects and makes funds available to support short sea transportation projects. The objectives of America's Marine Highway Program are to mitigate the economic, environmental, and energy costs of landside congestion; integrate the marine highway into the transportation planning process; and research improvements in efficiencies and environmental sustainability. The Port of Humboldt Bay is adjacent to Marine Highway M-5 Route which includes the Pacific Ocean coastal waters, connecting commercial navigation channels, ports, and harbors from San Diego, CA to the US-Canada border north of Seattle, WA. It connects to the M-84 Route at Astoria, OR, and the M-580 Route at Oakland, CA, and serves the landside route Interstate 5.

3.12.2.2 State

State Senate Bill 743 and State CEQA Guidelines Section 15064.3)

SB) 743, codified in Public Resources Code Section 21099, shifted transportation impact analysis under CEQA from a focus on automobile delay as measured by level of service (LOS) toward a focus on reducing VMT. The Legislature required the Governor's OPR to propose new criteria for determining the significance of transportation. The statute states that on certification of the new criteria, automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion, would not be considered a significant impact on the environment under CEQA, except in any locations specifically identified in the new criteria. Lead agencies are required to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, and other resource areas that may be associated with transportation. The new criteria, contained in CEQA Guidelines section 15064.3, was certified, and adopted in December 2018. Section 15064.3 provides that VMT is the most appropriate metric to assess transportation impacts with limited exceptions and a project's effect on automobile delay does not constitute a significant environmental impact. Other relevant considerations may include the project's effects on transit and nonmotorized travel.

3.12.2.3 Local

Humboldt County Regional Transportation Plan

The Humboldt County Association of Governments (HCAOG) is a joint powers authority comprising the County of Humboldt and the seven incorporated cities, each with a seat on the Board of Directors. Under its authority as the Regional Transportation Planning Agency for Humboldt County, HCAOG adopts and submits an updated Regional Transportation Plan (RTP), a long-range (20-year) transportation planning document for Humboldt County, to the California Transportation Commission and Caltrans every 5 years. The most recent updates of the RTP were completed in 2014 and 2017 and are entitled "Variety in Rural Options of Mobility" (VROOM). The Goods Movement Element of the RTP includes the following policies relevant to the Proposed Program:

Policy GM-1 (Intermodal) HCAOG will fully consider goods movement needs and impacts in developing a multimodal transportation system, in partnership with other governmental entities, community organizations, shippers and carriers, and other interested parties. {California Transportation Plan 2025 Strategy}

Policy GM-2 (Intermodal) HCAOG will promote multiple uses of transportation corridors and strategic use of intermodal transfer facilities.

Policy GM-5 (Maritime) HCAOG will support the Harbor District's efforts to develop a fully operational, sustainable, and environmentally compatible maritime transportation system as consistent with the Harbor District's mission and goals.

Policy GM-10 (Goods Movement) HCAOG will support projects that improve intermodal freight access and reduce congestion, especially along freight corridors, including designated marine highways.

Policy GM-13 (Maritime) HCAOG will assist local, regional, or state lead agencies in preserving coastal-dependent land uses as necessary for successfully operating the regional maritime transport system.

3.12.3 Impacts Analysis

3.12.3.1 Methodology

This section contains a discussion of the existing setting for the Proposed Program and surrounding area, and evaluates the potential impacts related marine navigation, marine transportation, and land-based transportation as a result of the Proposed Program. To provide the basis for this evaluation, Section 3.12.1, *Environmental Setting*, describes the existing marine and land-based transportation system for the Proposed Program area, and Section 3.12.2, *Regulatory Setting,* describes the regulatory background that applies to the Proposed Program. Section 3.12.3, *Impact Analysis*, establishes the thresholds of significance, evaluates potential impacts, and identifies the significance of impacts. Where appropriate, mitigation measures are presented to reduce impacts to less-than-significant levels.

3.12.3.2 Thresholds of Significance

Baseline conditions are those that have been documented at the time that the NOP was published. These conditions are described above as the present conditions of transportation systems within and in the vicinity of the Proposed Program area.

In accordance with Appendix G of the CEQA Guidelines, the Proposed Program would be considered to have a significant effect if it would result in any of the following conditions:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b).
- Substantially increase hazards due to a geometric design feature (i.e., sharp curves or dangerous intersections) or incompatible uses (i.e., farm equipment).
- Result in inadequate emergency access.

3.12.3.3 Impacts and Mitigation Measures

The transportation system needed to move dredged material to processing or beneficial-use sites, and the potential impacts associated with movement of dredged material via these systems, can differ depending on the specific processing or beneficial use site. Impacts associated with increased traffic volumes, noise, and use of the transportation systems themselves (e.g., increased repairs to roadways heavily used by trucks) may occur under certain circumstances. Specific transportation methods and any significant impacts associated with their use must therefore be evaluated on a case-by-case basis. Similarly, project-specific mitigation measures would have to be developed for any adverse effects identified. Site- and project-specific assessments of these kinds are outside the scope of this PEIR. However, there are general differences between the placement environments that can be assessed.

There is a potential for a variety of transportation-related adverse impacts associated with placement of dredged sediments at upland processing or beneficial-use sites. Impacts are primarily related to the need to re-handle the material prior to its final placement, and to the logistics of accessing potential beneficial-use sites. In cases where the dredging site is within pumping distance of the beneficial use site, hydraulic dredging with direct placement can eliminate the need for re-handling. However, when sediments are dredged from locations that are distant from the final receiving site, or when the receiving site is not yet ready to accept sediment, the dredged material must be transported to an intermediate processing site where it can be dewatered and stored for future transport. Typically, dredged material can be brought to a processing facility relatively efficiently by either pumping the slurry directly from the dredging site, or if barge access is available, sediment can be reslurried and pumped from the barge or offloaded using an excavator or crane.

When additional sediment handling is necessary, traffic-related impacts may become a concern. Once the material has been dewatered, it is generally excavated (using routine construction machinery such as bulldozers and front-end loaders) and placed into trucks for transport. Although barges (even “small” shallow-draft barges that only carry 1,000 cy) are relatively efficient at moving large volumes of dredged material without causing other traffic-related impacts, trucks are particularly inefficient in this regard. A medium-size dump truck with a capacity of 10 cy would need to make 200 round trips to move one typical 2,000-cy barge-load of dredged material. Movement of large quantities of dredged material by truck therefore has the potential to generate substantial traffic-related impacts including increased traffic volumes, noise, emissions, and impacts on the transportation system itself (e.g., increased roadway repairs). Such impacts may be significant on a site-specific basis.

Impact TT-1: Would the Proposed Program Conflict with a Program, Plan, Ordinance or Policy Addressing the Circulation System, Including Transit, Roadway, Bicycle, and Pedestrian Facilities?

Proposed Program

Marine Transportation and Navigation

The Proposed Program includes maintenance dredging of the existing marinas, docks and associated access channels of Humboldt Bay not maintained by the USACE. The marinas and associated access channels provide water access to the City of Eureka, Woodley Island, the Samoa Peninsula, Fields Landing and King Salmon. The Proposed Program would provide long-term benefits to marine transportation by maintaining safe and navigable depths of waterways that would allow for continued boat use. Use of the marina facilities, docks, and associated access channels may be temporarily limited in the immediate vicinity of dredging equipment during dredging events; however, access would never be fully restricted. As necessary to minimize impacts, boats in marinas may be temporarily relocated to new moorings while their regularly assigned slips and fairways are dredged or moved back a few feet into their slips in coordination with their owners. Conflicts with safe navigation in the Proposed Program area are not anticipated during dredging activities. All vessels operated for disposal of dredged material are required to participate in the Coast Guard's Vessel Traffic Control Service (VTS) and must notify VTS via radio Channel 14 their time of departure from the dredge site and the disposal site. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Impacts on land-based transportation as a result of the Proposed Program would be limited to the use of trucks to load and offload materials and construction of processing and beneficial-use sites, as well as transporting materials to beneficial-use sites. Trucks could interfere with existing traffic patterns within the Proposed Program area; however, this impact would be temporary and would not result in any permanent changes to existing traffic patterns or long-term decreases capacity. Truck traffic associated with the Proposed Program would not permanently interfere with public transit services, bike routes, or pedestrian accessibility. Temporary impacts as a result of the Proposed Program would be less than significant with the implementation of TRAN-1, described below.

Alternative 1 – Suction Dredging Only

Marine Transportation and Navigation

Activities under Alternative 1 are a subset of those described above for the Proposed program. Conflicts with safe navigation in the Proposed Program area are not anticipated during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be

the same as those described above for the Proposed Program with respect to the circulation system. With the implementation of TRAN-1 *Create Transportation Impact Plan* impacts would be reduced to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Marine Transportation and Navigation

Activities under Alternative 2 are a subset of those described above for the Proposed program. Conflicts with safe navigation in the Proposed Program area are not anticipated during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-Based Transportation

Alternative 2 would carry out sediment removal through clamshell bucket dredging only and dredged sediments would be transported to processing sites or directly to beneficial-use sites. These activities are a subset of the activities discussed above associated with the Proposed Program and impacts would be the same as those described above for the Proposed Program. With the implementation of TRAN-1, impacts would be reduced to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Marine Transportation and Navigation

Activities under Alternative 3 are a subset of those described above for the Proposed program. Conflicts with safe navigation in the Proposed Program area are not anticipated during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for use (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would require minimal land-based transportation, such as the use of heavy trucks for transport. As such, impacts would be less than significant.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Project. Under this alternative, LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS, rather than used for beneficial projects around the bay. As a result, there would not be a change in current marine navigation, marine transportation, or land-based transportation.

Impact TT-2: Would the Proposed Program Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3 Subdivision (b)?

Proposed Program

Marine Transportation and Navigation

CEQA Guidelines Section 15064.3 Subdivision (b) pertain to a project's impacts on transportation using VMT, the amount and distance of automobile travel attributable to a project, as the metric of evaluation. Under the Proposed Program, dredging equipment (hydraulic dredge or barge with excavator), slurry pipeline, dump scow, and associated support vessels would be working in proximity to the marinas, docks, and their associated access channels for a period of days to weeks. All watercraft in Humboldt Bay would be diverted around dredging equipment; however, distances traveled by boats to avoid dredging equipment would be minimal. It is anticipated that these minimal diversions in watercraft would not result in an associated increase in VMT within the Program area. Impacts are expected to be less than significant.

Land-based Transportation

Existing models are not currently available to estimate the VMT for the particular projects being considered under the Proposed Program, as such VMT have been analyzed qualitatively. As stated above, impacts on land-based transportation as a result of the Proposed Program would be limited to the use of trucks to load and offload materials, as well as construct beneficial use and processing sites. Truck traffic on local roadways would be temporary. Trucks could interfere with existing traffic patterns within the Proposed Program area; however, this impact would be minor and would not result in any permanent changes to existing traffic patterns or decrease capacity, resulting in an overall increase in VMT.

It is not anticipated that the Proposed Program would limit or substantially interfere with public transit, bicycle, or pedestrian circulation and/or capacity. Any detours resulting from the Proposed Program would be minimal in nature and limited to construction and transportation of materials and are not anticipated to result in a significant increase in VMT within the Proposed Program area. As such, impacts as a result of the Proposed Program are anticipated to be less than significant.

Alternative 1 – Suction Dredging Only

Marine Transportation and Navigation

Potential effects on VMT under Alternative 1 would be the same as described for the Proposed Program. This impact is less than significant.

Land-based Transportation

Alternative 1 would carry out sediment removal through suction dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to VMT. Impacts are anticipated to be less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Marine Transportation and Navigation

Potential effects on VMT under Alternative 2 would be the same as described for the Proposed Program. This impact is less than significant.

Land-based Transportation

Alternative 2 would carry out sediment removal through clamshell bucket dredging and dredged sediments would be transported to processing sites or directly to beneficial-use sites for utilization. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to VMT. Impacts are anticipated to be less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Marine Transportation and Navigation

Potential effects on VMT under Alternative 3 would be the same as described for the Proposed Program. This impact is less than significant.

Land-based Transportation

Alternative 3 would carry out sediment removal either through suction dredging or clamshell bucket dredging and dredged sediments would be transported directly to beneficial-use sites for utilization (e.g., beach replenishment, diked shoreline structures, diked former tidelands). These activities are a subset of the activities pursued by the Proposed Program and would require minimal to no land-based transportation, such as the use of heavy trucks for transport of sediment. As such, impacts associated with VMT would be less than significant.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Project. Under this alternative, LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS, rather than used for beneficial projects around the bay. As a result, there would not be a change in current marine navigation, marine transportation, or land-based transportation.

Impact TT-3: Would the Proposed Program Substantially Increase Hazards due to a Geometric Design Feature (i.e., Sharp Curves Or Dangerous Intersections) or Incompatible Uses (i.e., Farm Equipment)?

Proposed Program

Marine Transportation and Navigation

Construction of structures in the bay is not proposed. Maintenance dredging involves removal of recently deposited sediments to return areas to design depths that were determined at the time of construction to provide safe and navigable depths compatible with the proposed uses of the facility in question. No impacts are anticipated from the proposed dredging activities.

Land-based Transportation

The Proposed Program does not propose the construction of any geometric design feature that would result in increased hazards. As such, no impact under Impact TT-3 is expected.

Alternative 1 – Suction Dredging Only

Marine Transportation and Navigation & Land-based Transportation

The Proposed Program does not include geometric design features that would result in increased hazards. Alternative 1 is a subset of activities that would occur under the Proposed Program as described above; as such, no impacts would occur.

Alternative 2 – Clamshell Bucket Dredging Only

Marine Transportation and Navigation & Land-based Transportation

The Proposed Program does not include geometric design features that would result in increased hazards. Alternative 2 is a subset of activities that would occur under the Proposed Program as described above, as such no impacts would occur.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Marine Transportation and Navigation & Land-based Transportation

The Proposed Program does not include geometric design features that would result in increased hazards. Alternative 3 is a subset of activities that would occur under the Proposed Program as described above, as such no impacts would occur.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Project. Under this alternative, LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS, rather than used for beneficial projects around the bay. As a result, there would not be a change in current marine navigation, marine transportation, or land-based transportation.

Impact TT-4: Would the Proposed Program Result in Inadequate Emergency Access?

Proposed Program

Marine Transportation and Navigation

Dredging activities would not result in fully restricted access to marinas, docks, and associated channels. Boat traffic would be temporarily diverted around dredging equipment; however, this is not anticipated to impede emergency access. The U.S. Coast Guard (USCG) cutter Barracuda and the Humboldt Bay Fire Department Fireboat One are berthed at Woodley Island Marina. The ability of these and other emergency vessels and their crews to respond in an emergency would not be impeded by dredging activities. Temporary berthing accommodation for these vessels would be chosen to ensure no increase in their response times in the event of an emergency. Accommodations

to allow for unimpeded movement of emergency vessels would be a priority of the Harbor District, as a result, impacts are anticipated to be less than significant.

Conflicts with safe navigation in the Proposed Program area are not anticipated during dredging activities. Dredging vessels remain in radio communication with USCG watchstanders and broadcast their locations and activities on Marine Channel 16 which is accessible to all mariners.

Land-based Transportation

As stated previously, impacts on land-based transportation as a result of the Proposed Program would be limited to the use of trucks to load and offload materials, as well as construct, beneficial-use sites. The presence of trucks within the Proposed Program area could temporarily impact traffic circulation and result in temporary detours. However, with the implementation of TRAN-1, which includes the coordination with affected agencies prior to any construction or detour, it is anticipated that this impact would be less than significant.

Alternative 1 – Suction Dredging Only

Marine Transportation and Navigation

Activities under Alternative 1 are a subset of those described above for the Proposed program. Delays in emergency response times and operations in the Proposed Program area are not anticipated during dredging activities. Coordination with emergency service providers would occur during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Alternative 1 would carry out sediment removal through suction dredging, and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to emergency services. With the implementation of TRAN-1, impacts would be reduced to less than significant.

Alternative 2 – Clamshell Bucket Dredging Only

Marine Transportation and Navigation

Activities under Alternative 2 are a subset of those described above for the Proposed program. Delays in emergency response times and operations in the Proposed Program area are not anticipated during dredging activities. Coordination with emergency service providers would occur during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Alternative 2 would carry out sediment removal through clamshell bucket dredging, and dredged sediments would be transported to processing sites or directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to emergency services. With the implementation of TRAN-1 impacts would be reduced to less than significant.

Alternative 3 – Sediment Direct Delivered to Beneficial Use Sites Only

Marine Transportation and Navigation

Activities under Alternative 3 are a subset of those described above for the Proposed program. Delays in emergency response times and operations in the Proposed Program area are not anticipated during dredging activities. Coordination with emergency service providers will occur during dredging activities. Potential impacts from the proposed dredging activities are anticipated to be temporary and less than significant.

Land-based Transportation

Alternative 3 would carry out sediment removal through clamshell bucket or suction dredging, and sediment would be pumped directly to beneficial-use sites for use. These activities are a subset of the activities discussed above associated with the Proposed Program and would be the same as those described above for the Proposed Program with respect to emergency services. With the implementation of TRAN-1, impacts would be reduced to less than significant.

No-Project Alternative

The No-Project Alternative is the scenario of not implementing the Proposed Project. Under this alternative, LMSs would continue to be dredged by their respective responsible entities, but there would be no comprehensive plan for dredging LMSs in Humboldt Bay. Dredged sediments would likely continue to be disposed of at HOODS rather than used for beneficial projects around the bay. As a result, there would not be a change in current marine navigation, marine transportation, or land-based transportation.

Mitigation Measures

TRAN-1: Create Transportation Impact Plan.

Transportation Impact Plan will be prepared and implemented for traffic management during the transport of materials to, and the construction of beneficial-use sites. The plan will include, but not be limited to, the following.

- Advise motorists of impending and ongoing beneficial use construction activities through a public information program (e.g., through media listings/notifications, website, related-agency website, portable message signs, information signs at the construction site).
- Require approval from the appropriate city, or Caltrans, if necessary, for any beneficial use construction-related traffic detours, work requiring encroachment into public rights-of-way, or any other street use.
- Provide safety measures for pedestrians and bicyclists such as barriers for protection and signage that indicates pedestrian and bicycle detour routes where existing facilities would be affected.
- Notify all affected agencies (e.g., Police Department, Fire Department, Department of Public Works, affected transit entities) about any scheduled detours.
- Schedule and expedite work to cause the least amount of disruption and interference to the adjacent vehicular and pedestrian traffic flow, to the extent feasible.

- Monitor traffic conditions during beneficial use construction and, if needed, assign traffic control officers to direct vehicular traffic.
- Limit any queuing of trucks to onsite areas and prohibit truck queuing on local streets.
- Provide a beneficial use construction-period parking plan that minimizes the use of local streets for parking.

3.13 Topics Not Covered in Detail in this PEIR

The following topics, which are commonly included in EIRs, have been omitted from this document because they involve resources that would not have the potential to be significantly affected by the Proposed Program:

- Aesthetics
- Mineral Resources
- Paleontological Resources
- Population and Housing
- Public Services
- Recreation
- Utilities
- Wildfire Hazards

Section 15060(d) of the CEQA Guidelines requires that that the lead agency "focus the draft EIR on the significant effects of the program and indicate briefly its reasons for not determining that other effects would not be significant or potentially significant." Section 15128 of the CEQA Guidelines states that "an EIR would contain a statement briefly indicating the reasons that various possible significant effects of a program were determined not to be significant and were therefore not discussed in detail in the EIR."

The sections below briefly explain the reasons why detailed analysis of the topics listed above is not needed in this PEIR.

3.13.1 Aesthetics

The Humboldt Bay shoreline is irregular, with numerous small tributaries and sloughs creating marsh areas that transition to open water, depending on tides and storm flow. It is topographically flat, supporting both native and non-native vegetation and is characterized by diverse activities and uses including agricultural lands, recreational areas, open spaces, wildlife refuges, maritime and industrial uses, and trail areas. The streams and sloughs that connect to Humboldt Bay provide a land/water interface that is generally visually appealing.

Any potential impacts on visual resources associated with the Proposed Program are regulated under resources goals and policies contained within of the *Humboldt County General Plan* (HCGP), adopted October 23, 2017, which has been informed and supported by the Local Coastal Plans (LCPs) of the Humboldt Bay Area and the Humboldt Bay Management Plan (May 2007). Relevant

goals and policies within the HCGP related to scenic resources include: scenic resource protection (SR-G1), scenic value of working landscapes (SR-P1), minimizing visual disturbance of natural features in mapped scenic areas (SR-P2) and scenic highway protection (SR-P3).

The LCP of the HCGP, Volume II, *Humboldt Bay Area Plan* (HBAP), also includes several policies and guidance regarding scenic resources in the Proposed Program area. These include visual resource protection of coastal areas (30251); protection of visual disruption to habitat areas (30240(a)); and minimization of adverse environmental effects related to diking, filling, or dredging (30233(a)). Relevant goals and policies of the Humboldt Bay Management Plan include maintaining the visual character of the Humboldt Bay (4.7.1), protection of existing views (4.7.2) and minimization of excessive lighting (RVR-6).

Short-term and temporary visual effects from the Proposed Program would include changes in visual character due to the presence of construction related uses, including dredging crews and equipment and the transportation of the materials to an upland processing site to a beneficial-use site.

Construction related activities can have short term, temporary effects on scenic resources due to the removal of sediments utilizing mechanical or hydraulic equipment and transportation of the materials to an upland processing site or directly to a beneficial use site. Changes in visual quality may include views of taller mechanical equipment, such as excavators or cranes, the creation of temporary structures, covered areas, dewatering equipment and the transportation of equipment and sediments throughout the Bay.

The degree of visual change depends on the extent or location of the treated area. Construction activities located in areas characterized by existing industrial and active port uses would be less visually divergent, whereas activities within recreational, wildlife and open space uses would be more noticeable. However, it should be noted that construction related changes to the visual environment would be temporary in nature and would not substantially alter, degrade, eliminate, or generate long term contrast with the existing visual character. As such, construction related impacts would be less than significant.

Long-term visual effects from the Proposed Program would include changes in visual character. The creation of new beneficial uses throughout the Bay from dredged sediment would result in visual improvements, including the replenishment of beaches, increased resiliency of diked shoreline structures, creation of living shorelines, and restoration of historic salt marsh habitat. Furthermore, activities associated with the Proposed Program would be consistent with the goals, policies and development standards described in the HCGP, the LCP of the HCGP, and the *Humboldt Bay Management Plan*. Therefore, new features associated with operational impacts of the Proposed Program would not substantially alter, degrade, eliminate, or generate long term contrast with the existing visual character. As such, impacts would be less than significant.

3.13.2 Mineral Resources

Implementation of the Proposed Program would not result in the loss of availability of a known mineral resource, nor in the loss of a locally important mineral resource recovery site as delineated by a local general plan or similar planning or policy document. The objective of this PEIR is to provide an environmental analysis of sediment-management activities that would guide partial implementation of CRSMP. Any mineral resources the Proposed Program would encounter to implement the proposed program would be limited to rock, sand, and gravel that may be present at

the program area. However, these resources would be minimally disturbed and are not considered important mineral resources. Hence, no impacts are expected.

3.13.3 Paleontological Resources

Paleontological resources are considered to be older than middle Holocene (i.e., older than approximately 5,000 years) (Society of Vertebrate Paleontology 2010:11). The Proposed Program would dredge unconsolidated sediment too young and disturbed to contain fossils that remain in their stratigraphic context. No other ground disturbance would occur. The Proposed Program would therefore not damage or destroy paleontological resources, and no impacts on paleontological resources are anticipated.

3.13.4 Population and Housing

The Proposed Program would not facilitate the construction of any homes or businesses or the extension of roads or other infrastructure. New jobs are anticipated to be created with implementation of this Proposed Program. Some of these jobs may be filled by people already living in the area, and some may be filled by people from out of the area. However, it is expected that there is ample housing and other required infrastructure available to support this negligible potential population increase. Typical established local thresholds of significance for housing and population growth, pursuant to CEQA Guidelines Section 15064.7, include effects that induce substantial growth, or concentrate a population, beyond Humboldt County programs; alter the location, distribution, density, or growth rate of the population beyond that programed in the general plan housing element; result in a substantial increase in demand for additional housing; or create a development that significantly reduces the ability of the County or local jurisdictions to meet housing objectives set forth in the general plan housing element or local jurisdiction's housing objectives. The Proposed Program would have no impacts related to these thresholds. Hence, no impacts are anticipated.

3.13.5 Public Services

No buildings or habitable structures are part of the Proposed Program. The Proposed Program would not require the need for new or physically altered fire protection, police protection, school, park, or other public facilities. The Proposed Program would not add residents to Humboldt County; therefore, the Proposed Program would not require additional personnel or resources at the Humboldt County Sheriff's Office, local fire stations, or emergency services. In addition, the Proposed Program would not increase demand for emergency services to the extent that construction of new or expansion of existing public service facilities would be required. Hence, no impacts are expected.

3.13.6 Recreation

Humboldt Bay offers a diverse array of water- and land-based recreational opportunities including hiking, plant and wildlife viewing, boating, kayaking, surfing, fishing, waterfowl hunting, clamming, and visiting sites of historical and cultural interest. Four marinas (Woodley Island, City of Eureka Public Marina, Johnny's Marina, and King Salmon) provide berthing to a mixed fleet of commercial and recreational vessels. The Proposed Program involves maintenance dredging of LMSs that would allow continued safe access and use of the marinas, docks, and associated access channels in

Humboldt Bay. There is no proposed construction or expansion of these facilities, and no proposed increase in residential development that would increase demand for recreational facilities on or surrounding the Bay. Once dredging is complete, the marinas, docks, and associated access channels would continue to operate at their originally designed capacities. None of the activities proposed under the Proposed Program are expected to cause a significant increase in employment, although some temporary jobs may be created. No adverse impacts on recreational facilities are expected and maintaining the access and safety of these facilities would be beneficial.

Proposed Program operations may affect recreationists utilizing the Bay by displacing them from the immediate dredging work area; however, the area of impact would be a small fraction of the total area of the Bay available for recreation. In addition, dredging operations are temporary in nature and are typically completed in a matter of days to a few weeks at each proposed site. Recreationists would be expected to avoid the immediate dredging work area and seek other areas for their activities, therefore impacts from dredging activities are expected to be less than significant.

Sediment processing and transport activities may affect recreationists and disrupt their activities by blocking access to a recreational area, exposing them to unpleasant odors, unsightly containment basins or piles of sediment, and the noise of heavy equipment used to move sediment. Redwood Marine Terminal II is a former pulp mill currently undergoing redevelopment. Much of the property consists of dilapidated and abandoned buildings, piles of scrap and waste, and other detritus associated with demolition. The already redeveloped portion of the property is the site of aquaculture operations and other industrial uses. Fields Landing Boatyard is an active boat repair and storage facility that has access restricted to daylight hours. The addition of sediment processing and transport activities at these sites would not alter the industrial characteristics of these sites, and therefore no impacts are expected to recreationists.

The Samoa Lagoons site is bordered by Highway 255 to the northeast, New Navy Base Road to the northwest and west, and Vance Avenue along the southern bayfront. Scattered residences, an elementary school, the Samoa Cookhouse, the Timber Heritage Association Shops, and privately-owned open space surround the Lagoons. The site historically functioned as an upland dredge spoils disposal site and was utilized by multiple dredging operations in 1987 and 1996–1998. Restoring the Lagoons to active use would likely involve periodically using motorized equipment to till and aerate the dredge material to hasten drying and for general site maintenance, and use of heavy equipment and trucks to load and transport sediments once a receiving site has been identified. Although these activities might affect recreationists visiting the Samoa Cookhouse or Timber Heritage Association, the impacts are expected to be temporary, infrequent, and less than significant.

Placement of dredged sediments at beneficial-use sites may affect recreationists around the Bay by displacing them from the immediate work area. However, similar to dredging activities, the area of impact from a beneficial use program would be a small fraction of the total area of the Bay available for recreation, and the deposition of sediment at a beneficial use site would be a temporary occurrence. Adverse impacts are expected to be less than significant. Habitat restoration programs that utilize dredged sediments, by their very nature, would be expected to have a net beneficial impact to recreationists by increasing the value of the habitat for related recreational activities.

3.13.7 Utilities and Service Systems

Construction of new, or expansion of existing, permanent water, wastewater, stormwater drainage, electrical power, natural gas, or telecommunication facilities is not proposed as part of the Proposed Program. There are 23 diked hydrologic sub-units consisting of 39.6 miles of diked shoreline structure and 7,404 acres of former tidelands on Humboldt Bay. Additionally, due to deferred maintenance, approximately 3.3 miles of diked shoreline are actively eroding and susceptible to breaching during king tides (Trinity Associates 2019). These diked shorelines include the protection of essential utility and service system infrastructure. Beneficial use in the form of reinforcing these diked structures would be a net positive impact of the Proposed Program. Furthermore, the Proposed Program would maintain compliance with federal, state, and local statutes and regulations related to solid waste and utility services. The sediment processing facilities at Redwood Marine Terminal II and Fields Landing Boat Yard would be a temporary feature of the Proposed Program, and as such would not be designated or permitted as landfill sites. The Proposed Program would not exceed the wastewater treatment requirements of the North Coast RWQCB because wastewater would not be handled as part of the Proposed Program. Hence, no impacts or mitigation measures are anticipated related to utilities and/or service systems.

3.13.8 Wildfire Hazards

The California Department of Forestry and Fire Protection's (CAL FIRE) Fire Hazard Severity Zone maps evaluate the likelihood that an area would burn over a 30- to 50-year period. These maps are used to inform building construction standards on building permits, natural hazard disclosure at time of sale, defensible space clearance around buildings, and property development standards, such as road widths, water supplies, and address signs. These maps are also used in city and county general plans. The Proposed Program site is within both the High Fire Hazard Severity Zone and Moderate Fire Severity Zone in Humboldt County's Local Responsibility Area and State Responsibility Area (CAL FIRE 2009a, 2009b).

The County of Humboldt uses the Operational Area Emergency Operations Plan (EOP) to respond to major emergencies and disasters. The plan identifies a broad range of potential hazards and a response plan. In addition to the Operational Area EOP, the Proposed Program would be required to comply with applicable requirements set forth by the County of Humboldt Office of Emergency Services (OES), Humboldt County Sheriff's Office, and Humboldt County's special fire districts, such as requirements related to evacuation during wildfires. The OES provides coordination of emergency response at the local level in the event of a disaster, including wildland fires. The Proposed Program would comply with the Humboldt County Operational Area Hazard Mitigation Plan and the Humboldt County OES. The Proposed Program would not substantially impair an adopted emergency response plan or emergency evacuation plan.

No buildings or habitable structures are proposed. As discussed in more detail in Sections 3.6, *Geology and Soils*, and 3.8, *Hydrology and Water Resources*, construction and operation of the Proposed Program would comply with general plan policies that would specify design requirements to minimize risk of exposure to geologic and hydrologic hazards, including flooding, landslides, runoff, and drainage changes. Furthermore, the Proposed Program would comply with the County of Humboldt's Multi-Jurisdictional Local Hazard Mitigation Plan, which includes strategies to reduce the loss of life, personal injury, and property damage that can result from disasters, including wildfire. All activities under the Proposed Program would be required to comply with applicable

construction and design standards that ensure the incorporation of fire prevention features. Although fire can be a potential threat in some areas of the Proposed Program, the Proposed Program would not include housing or commercial development and would not draw a substantial number of people to the area during construction or operation activities. Hence, no impacts are expected.

Chapter 4
Cumulative Impacts

4.1 CEQA Requirements

CEQA requires lead agencies to evaluate a proposed undertaking's potential to contribute to cumulative impacts in the project or program area. *Cumulative impacts* refer to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines § 15355). As defined by the state, cumulative impacts reflect

> the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant projects taking place over a period of time. (CEQA Guidelines § 15355[b]).

There are two categories of cumulative impacts: those that represent the additive effect of repeated activities taking place as part of a single proposed undertaking and those that represent the combined effect of activities taking place under more than one proposed undertaking.

CEQA requires that a PEIR analyze a proposed undertaking's contribution to a cumulative impact when the existing cumulative impact is significant, and the project's individual contribution to that impact would be *cumulatively considerable*, meaning that it is considerable (significant) when viewed in connection with the effects of other past, current, and probable future projects (CEQA Guidelines § 15130[a], 15065[c]). This ensures that PEIRs fully analyze project effects that are less than significant on an incremental (project-specific) scale but may be considerable in combination with the related effects of other projects. It also serves to focus PEIR analysis only on those cumulative impacts on which a proposed undertaking has the potential to make an important contribution.

4.2 Proposed Program's Potential Contribution to Cumulative Impacts

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the Proposed Program. This cumulative effect assessment looks at the collective impacts posed by individual land use plans and potential projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

4.2.1 Agriculture and Forestry

The Proposed Program would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to nonagricultural uses, and no impacts would occur. Additionally, the Proposed Program is outside any timberlands and would not result in any impact to forestry resources.

Areas zoned for agricultural use (AE) are located within the Proposed Program area, Dredging, transport, and processing sites would not conflict with existing zoning for agricultural use, or a Williamson Act contract. The Proposed Program would require a conditional use permit, pursuant to Humboldt County Code Section 3.1.2, allowing all Proposed Program-related activities located within the AE zone. A use permit from the City of Eureka would also be required for the Proposed Program. With approval of the conditional use permits, the Proposed Program would not conflict with the AE zoning district. Any planned or Proposed Program within the Program area that would convert or be located within the AE zone would also require a conditional use permit. Therefore, the entity with jurisdiction, would have discretion over the potential for any cumulative impacts on occur. With the issuance of a conditional use permit, the Proposed Program is not considered cumulatively considerable. No Williamson Act contracts occur within the Proposed Program area where dredging, processing, and beneficial-use sites are proposed. Therefore, impacts would be less than significant and no additional mitigation measures are required.

4.2.2 Air Quality

As shown in Section 3.2, *Air Quality*, the PEIR, transport of dredge sediments to material processing facilities or beneficial reuse sites, construction and operation of material processing, and transport of processed sediments under the Proposed Program could result in increased emissions, relative to existing conditions. However, not all new activities under the Proposed Program would occur concurrently. Rather they would occur at different times from one another. For instance, transport of dredged sediments to dewatering basins or beneficial reuses sites (Table 3.2-5) would occur separately from activities such as material processing (Table 3.2-6) and on-road haul truck transport (

Table 3.2-7). As shown in Section 3.2, new emission sources under the Proposed Program would not exceed applicable NCUAQMD thresholds. In addition, any emissions increase associated with new emissions sources would be minor relative to the larger reductions anticipated with reduced marine vessel activity under the Proposed Program as marine vessels are more emission intensive (e.g., more polluting) than off-road equipment and on-road vehicles. Therefore, given the above, the Proposed Program would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard.

Any projects that would occur simultaneously with the Proposed Program would need to also be in compliance with local, state, and federal regulations pertaining to air quality, and not exceed NCUAQMD thresholds, resulting in impacts that would not be cumulatively considerable. As such, the Proposed Program would not be cumulatively significant. In addition, Mitigation Measures AQ-1 would be implemented to reduce any impacts on a level less than significant.

4.2.3 Greenhouse Gas Emissions

Potential impacts on GHG as a result of the Proposed Program would occur on a temporary basis during construction and on an annual basis during operational activities. Emissions from marine dredging and marine vessels during dredged sediment transport would not change, relative to existing conditions. It is anticipated that the Proposed Program impacts on GHG would be less than significant. The Proposed Program would comply with regulatory programs and associated state agency guidance. Therefore, the Proposed Program would not generate GHG emissions, either directly or indirectly, and would not result in a significant impact on the environment. Because

compliance with NCUAQMD strategies and rules is mandated to mitigate the cumulative air quality impacts, and in turn GHG emissions, of the Proposed Program and all projects and development in the region, the Proposed Program is not expected to result in a substantial contribution toward cumulatively considerable GHG impacts.

GHG emissions from new equipment and on-road vehicles introduced by the project were estimated using the same methods described under Section 3.2.4.1, *Methods for Analysis*, of the *Air Quality* section. Per the District, Proposed Program activities would not all occur concurrently. As described in Section 3.3, *Air Quality,* of this PEIR, the off-road equipment and on-road vehicles would utilize fossil fuels and represent new GHG emissions sources. However, the reduction in marine vessel activity and associated fuel use is anticipated to offset new fossil fuel use associated with the Proposed Program, resulting in similar or less fuel consumption than existing conditions. Any proposed or planned project within the Program area would also need to be in compliance with all local, state, and federal guidance pertaining to GHG, as detailed in Section 3.3.2, *Regulatory Setting*. As a result, the Proposed Program is not expected to result in a substantial contribution toward cumulatively considerable GHG impacts.

4.2.4 Energy

Although dredging and transport activities under the Proposed Program, Alternatives 1, 2, and 3 would require energy consumption, the fuel requirements would be temporary in nature and limited to the period of active dredging, construction of Program sites and material transport. Fuel required for construction and transport would likely represent a negligible increase in regional demand and an insignificant amount relative to the more than 19 billion gallons of fuel sold in the state as of 2015 (California Energy Commission 2019). The Proposed Program is not anticipated to result in substantial new regional energy demands, as dredging and sediment transport activities in the area are currently occurring, with dredge materials being transported approximately 3 miles offshore to the HOODS facility. Material transport to beneficial use and processing sites would also represent a temporary incremental increase in energy usage within the Proposed Program Area. However, this energy usage would not result in an adverse increase on energy demands within the Program area. The Proposed Program could be considered cumulatively considerable if it is occurring at the same time as the construction of other planned or Proposed Programs within the Proposed area. However, these projects would be required to follow the same fuel consumption standards as the Proposed Program and are not anticipated to substantially alter the energy needs in the region, requiring increased amounts of energy resources or infrastructure. Cumulative impacts would be less than significant under the Proposed Program, and no additional mitigation measures are required.

4.2.5 Cultural Resources

As explained in the cultural resources section of this PEIR, the Proposed Program would not result in a significant impact under CEQA due to temporary construction effects. No permanent or temporary direct or indirect impacts are anticipated as a result of the Proposed Program or Alternatives 1, 2, and/or 3. Avoidance and mitigation measure CUL-1 would ensure the protection of cultural resources in the event of an inadvertent discovery. Implementation of the Proposed Program is anticipated to have low potential to contribute to cumulative impacts on cultural resources in the Proposed Program Area. However, the Proposed Program has the potential to unearth unknown cultural resources. Therefore, the Proposed Program has the potential to result in a cumulatively

considerable impact, only in the event that unknown buried cultural resources are uncovered and affected during project construction.

4.2.6 Geology and Soils

As detailed within section 3.6, *Geology and Soils*, of this PEIR, the activities under the Proposed Program, the dredging of sediment and its storage at processing facilities and beneficial reuse would not expose people or structures to the adverse effects of rupture of a known earthquake fault, strong seismic shaking, ground failure, or landslides. Additionally, the Proposed Program would implement mitigation measures GEO-1 through GEO-3, to further reduce any impacts associated with geology and soils. Therefore, there would be no impact. All related projects would be required by law to comply local, state, and federal regulations pertaining to geology and soil impacts. Therefore, it is expected that related projects would not expose people or structures to a substantial increased risk of harm, to the extent that they would contribute to a cumulative impact related to geology or soils; changes in geologic conditions would not be expected.

Seismic hazards are mitigated on an individual project basis through sound engineering and adherence to geotechnical construction and operational standards. The Proposed Program would not change the existing geologic conditions. Consequently, the Proposed Program would not contribute to adverse cumulative impacts on unique geologic features, and it would not contribute to a cumulative increase in the risks posed by seismic hazards. No adverse cumulative impacts involving geology, soils, seismicity, and/or topography are anticipated as a result of the Proposed Program, and no avoidance, minimization, and/or mitigation measures are proposed.

4.2.7 Hazards and Hazardous Materials and Public Health

As discussed within Section 3.7, *Hazardous Materials and Public Health*, of this PEIR, there is potential that hazardous materials may be present within the Proposed Program footprint; however with the implementation of Mitigation Measures HWR-2, *Prepare and Implement Spill Prevention and Management Plan* discussed in the Hydrology and Water Resources section of this PEIR, potential adverse effects associated with exposure to these materials would be minimized. As such, any exposure to these materials would occur only within the Program footprint and would be handled appropriately. Therefore, the potential impacts associated with the Proposed Program would not contribute to hazardous materials impacts occurring outside the Proposed Program footprint. The Proposed Program would not contribute to hazardous materials impacts from other projects in the area, thus potential impacts would not be cumulatively considerable.

4.2.8 Hydrology and Water Resources

The Proposed Program, Alternatives 1, 2, 3, and the No-Project Alternative would each result in relatively short-term, temporary, and localized water-quality impacts in Humboldt Bay during dredging related primarily to increases in sediment suspension and turbidity, as well as create the potential for decreases in DO related to sediment suspension, releases of contaminants from sediments, or dredging vessels and slurry pipelines into the bay. All alternatives except the No-Project Alternative could contribute to water-quality impacts related to the operation of temporary dewatering basins, management of stockpile areas, and discharge of decant water to surface water or groundwater. In addition, the Proposed Program and all alternatives except the No-Project

Alternative could have potential water-quality impacts related to the beneficial use of dredged material due to potential increases in erosion and site runoff and resultant increases in sediment suspension and turbidity, releases of contaminants from sediments, or accidental releases of hazardous materials from heavy equipment.

Maintenance dredging of the Humboldt Bay Bar and Entrance Channels, as well as the federal navigation channels, in the bay by USACE are the only past, present and reasonably foreseeable dredging projects considered for this analysis. In addition, past, present, and reasonably foreseeable waterfront construction projects, other activities in and near Humboldt Bay (e.g., operation of marinas) and the plan area (e.g., wetland restoration), as well upstream activities in the local watershed (e.g., timber harvesting, farming) were also considered in this cumulative analysis because these actions also have the potential to impact hydrology and water resources through potential construction- and operations-related impacts on water quality and drainage. With the exception of potential water-quality impacts related to dewatering and beneficial use of dredged material, USACE's maintenance dredging would have water-quality impacts in Humboldt Bay related to increases in suspended sediment and turbidity, disturbance and release of contaminated sediments, and potential accidental release of contaminants from sediment and dredging vessels, a subset of dredging of LMSs. Should maintenance dredging of one or more LMSs occur in close proximity to, and overlap in time with, USACE's maintenance dredging, which generally occurs between mid-March through the end of September, potential dredging-related water quality impacts, although temporary and short-term, could be cumulatively significant. Should this occur, the incremental contribution to the water quality impact due to dredging under the Proposed Program or any of the Alternatives would be cumulatively considerable and therefore significant. However, dredging activities in general are tightly regulated, in part, to minimize impacts on water quality. As such, project compliance with applicable federal, state, and local regulations governing surface and groundwater quality, as well as implementation of HWR-1 and HWR-3 would reduce this cumulative impact to less than significant. In addition, given the size and scale of some of the Proposed Programs related to the beneficial use of dredged material, impacts on hydrology and water quality prior to mitigation could be cumulatively considerable relative to other past, present and reasonably foreseeable shoreline or upland construction projects in the study area. However, because these effects would, for the most part be temporary in nature, and would be avoided or minimized through compliance with applicable federal, state, and local regulations, and implementation of HWR-1 through HWR-7, beneficial use of dredged material would result in a less-than-significant cumulative impact on hydrology and water quality.

4.2.9 Land Use and Planning

An analysis of the Proposed Program's consistency with applicable existing land use plans was used to evaluate the cumulative impacts land use within the Proposed Program area. The Proposed Program is consistent with the current HCGP, and the Humboldt County Code; the Humboldt Bay Management Plan, HBAP of the Humboldt County, Beach and Dunes Management Plan, LCP, and the City of Eureka General Plan. In addition, the Proposed Program would not result in development or expand into any adjacent communities. All dredging, transport, and placement activities would occur within suitable use sites such as vacant waterfront property, ocean beach surf zone areas, tidelands, shorelines, and salt marsh habitat. Therefore, the Proposed Program would not physically divide an established community, and no impacts would occur.

Any project that would occur during the same time as the Proposed Program would be required to comply with all zoning and general plans within the Proposed Program area. Compliance with existing land use plans would minimize any impacts on land use to a level that is less than significant. The Proposed Program would have no impacts on land use. No adverse impacts are anticipated to occur under all alternatives, and therefore the Proposed Program is not considered cumulatively considerable. Therefore, no mitigation measures are required.

4.2.10 Noise and Vibration

The study area for cumulative construction noise impacts would consist of the area in the vicinity of the Proposed Program Area that would experience noticeable increases in noise levels due to project-related construction activities. Depending on terrain, obstacles, and atmospheric conditions, the area of impact could extend from 50 feet to 700 feet or more. Under the Proposed Program, dredging would occur at the same LMSs as under existing conditions. As such, noise from dredging would be the same as existing conditions. Additionally, construction noise from the Proposed Program would be temporary, intermittent, and generally limited to daytime hours. The Proposed Program would not result in significant noise impacts, though the potential exists for cumulative impact if it is constructed at the same time as the other planned or proposed construction projects. Because the use of heavy equipment during construction and placement of material at beneficial-use sites would be required to comply with allowed hours of heavy equipment use in the applicable jurisdiction, the potential for cumulative noise impacts for an extended period of time is low.

The use of heavy equipment during construction would generate ground borne vibration that could potentially be noticeable directly adjacent to operating equipment. At distances of 50 ft or more, vibration from heavy equipment would likely not be perceptible inside of structures. No use of impact equipment such as pile drivers or impact hammers is anticipated. This impact is considered to be less than significant, and no mitigation is required.

4.2.11 Biological Resources

The Proposed Program and all alternatives have potential impacts on sensitive biological resources. Both cutterhead suction dredging and mechanical clamshell dredging have potential to increase localized turbidity and SSC concentrations as a result of sediment removal practices. Water quality impairment may be localized during dredge operations, however sensitive fish species which are nearby may become impacted through impaired foraging and predator avoidance capabilities. Additionally, implementation of cutterhead suction dredging has potential to impact sensitive fish through physical entrainment. Dredging operations, other than for Locally Maintained Sites, within Humboldt Bay are limited to maintenance dredging of the federal navigation channels performed by USACE. The USACE typically dredges up to 1 million cy / year from Humboldt Bay. The USACE uses suction dredging to perform this work and disposes of the resulting sediment at HOODS. Assuming physical entrainment of sensitive fish species from suction dredging is the primary pathway for fisheries impacts, total cumulative entrainment impacts from dredging projects could be significant. Implementation of MM-BIO-1 would reduce cumulative impacts to sensitive aquatic resources to less than significant.

All sediment management activities have potential to impact water quality in Humboldt Bay, which has an impact on sensitive wildlife and their habitats. Localized increases in turbidity and suspended solid concentrations has potential to affect the health of eelgrass, reduce fish predator

avoidance and foraging potential, and potentially affect nursery habitat. Because these impacts are localized in nature, and of short duration, the combined impact is not expected to be significant, unless all activities are to occur at the same time. Implementation of MM-BIO-1 would limit dredging operation's water quality impacts to a short work window, and subsequent sediment processing and beneficial use activities would be sequentially staggered, reducing the likelihood of extended water quality impairment in Humboldt Bay to less than significant. Additionally, due to the expected dredge cycle, it is unlikely that all dredging would occur the same year. Cumulative impacts to water quality are expected to be significant under Alternative 3, as all dredging and material placement activities would occur in a relatively short window, increasing the likelihood of extended water quality impacts to aquatic species and habitats. Implementation of MM-HWR-1, MM-HWR-2, and HWR-3 would reduce cumulative water quality impacts to less than significant.

4.2.12 Transportation

The implementation of the Proposed Program, as well as Alternatives 1, 2, and 3 would result in temporary impacts on transportation during construction could result in a temporary increase in vehicular traffic along some localized streets and intersections. Mitigation measure TRAN-1 would be implemented to inform the public of potential affects to access and circulation to traffic during the various phases of construction, as well as to manage circulation and access to the processing and beneficial-use sites and the surrounding vicinity during construction. Planned and pending projects in the region could increase traffic within the project region; however, they would be required to comply with any local long range or general plan. These projects would also be required to implement mitigation measures if potential significant impacts on transportation would occur. With the implementation of mitigation measure TRAN-1, no cumulative impacts are anticipated, and no additional avoidance, minimization, and/or mitigation measures are proposed.

Once implemented, the Proposed Program would not result in any permanent impacts on transportation in the Program area, and thus not contribute toward a cumulative impact, because circulation and access would be the same as under existing conditions.

Chapter 5

Persons Consulted and List of Preparers

Advisory Committee

Pat Higgins, Humboldt Bay Harbor District Commissioner

Larry Doss, Humboldt Bay Harbor District Commissioner

Hank Seemann, County of Humboldt

Miles Slattery, City of Eureka

Mark Andre, City of Arcata

Leroy Zerlang, Zerlang and Zerlang Marine Services

Pete Jackson, Green Diamond Resource Company

Tom Marking, Recreational Fishing Representative

Jennifer Kalt, Humboldt Baykeeper

Cashell Villa, Humboldt Bay National Wildlife Refuge

Tribal Representatives

Ted Hernandez, Wiyot Tribe

Janet Eidsness, Blue Lake Rancheria

Erika Cooper, Bear River Band

ICF

Karin Lilienbecker, Project Director

Sarah Baker, Project Manager

Bernadette Clueit, Deputy Project Manager/Biologist

John Mathias, Senior Lead Editor

Rusty Whisman, Environmental Planner/Energy

Mario Barrera, Environmental Planner/Hazardous Waste and Materials Specialist

Gary Clendenin, PG, Senior Environmental Planner/Hazardous Waste and Materials Specialist

Joel Butterworth, Senior Environmental Planner/Geology and Soils

Ellen Unsworth, Cultural Resources Specialist

Patrick Reed, Cultural Resources Specialist

Sandy Lin, Air Quality and GHG Specialist

Darrin Trageser, Air Quality and GHG Specialist

Laura Yoon, Senior Air Quality and GHG Specialist

Lesa Erecius, Water Resources Specialist

Peter Hardie, Senior Noise Analyst

Jason Volk, Noise Analyst

Charlotte Stadelmann, Environmental Planner

Marissa Mathias, Environmental Planner

Marin Greenwood, Senior Biologist

Brett Bowen, Biologist

Brittany Buscombe, GIS Specialist

David Duncan, GIS Specialist

Tamar Grande, Editor

Trinity Associates

Aldaron Laird

SHN Consulting Engineers and Geologists

Erik Nielsen, PG, CHG

Mike Foget, PE

Pacific Affiliates

Travis Schneider, PE

Humboldt Bay Harbor Recreation and Conservation District

Adam Wagschal, Deputy Director

Chapter 6
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Attachment A

Humboldt Bay Potential Beneficial
Uses of Dredged Sediment Report

Humboldt Bay
Potential Beneficial Uses of Dredged Sediment

Prepared by

Aldaron Laird
Trinity Associates

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1.0 Overview of Beneficial Uses

The purpose of this study is to explore beneficial uses for sediments dredged from Humboldt Bay and to identify suitable use sites. The focus is on dredged sediments, composed of fine-grain material that is 85% silt and clays and 15% sand (Pacific Affiliates 2005) from locally maintained sites such as smaller (not-federally maintained) channels, marinas, bulk cargo docks, and other marine facilities. Dredged sediment could be used to protect waterfront property from sea level rise, replenish beaches, increase resiliency of diked shoreline structures to sea level rise, raise the elevation of diked former tidelands now used for agriculture, create living shorelines, and restore historic salt marsh habitat. Seventy-six suitable sites on and adjacent to Humboldt Bay for each beneficial use are identified and their physical characteristics described.

Historically, dredged sediment from non-federal maintained channels was disposed in several upland sites on the North Spit: a 60-acre site adjacent to Eureka Airport, a 20-acre site at the former Louisiana Pacific pulp mill site, and a site on the beach in the surf zone near Samoa. There are two studies that have explored the use of dredged sediment for beneficial purposes on Humboldt Bay:

1. A Coastal Regional Sediment Management Plan (CRSMP) of the Eureka littoral cell identified seven regional sediment management schemes, primarily for the use of sand generated from dredging the federally maintained navigation channels (CSMWG 2017). Considered schemes include:
    - placement of sand in the Littoral Zone,
    - coastal dune enhancement,
    - tidal marsh restoration (fine-grained material alone or as a cap over sand) on Humboldt Bay,
    - creating soft (living) shorelines within the Bay,
    - dike rehabilitation on the Bay, creation of recreational beaches in the Bay, and
    - the use of dredged material for local construction.

    Several of the schemes (marsh restoration, living shorelines, dike rehabilitation and recreational beaches) considered in the CRSMP are explored further in this study.

2. In 2015, the Humboldt Bay Harbor, Recreation and Conservation District (District) commissioned a feasibility study to investigate the beneficial reuse of dredged sediments for tidal wetland restoration and sea level rise adaptation (SHN 2015). The 2015 study was in response to the state's recognition that the dredged sediments are a resource that can be used in the restoration of tidal wetlands in Humboldt Bay based on the implementation of similar projects on San Pablo Bay. The 2015 study considered several dredged sediment use options:

    - restoring diked former tidelands to salt marsh,
    - restoring eroded salt marsh,

- creating living shorelines to protect critical infrastructure,
- increasing surface elevation of subsided and/or compacted diked former tidelands used for agriculture,
- elevating existing salt marsh areas to increase their resiliency to sea level rise, and
- building up spits to prevent breaching by sea level rise.

The project's advisory committee selected the restoration of diked former tidelands to be the most suitable and desirable for the use of dredged sediment. The study identified 37 potential sites, and four pilot sites were selected. Three involved the restoration of diked former tidelands and a fourth explored the construction of living shorelines to protect existing levees at the City of Arcata's wastewater treatment plant. Three dredged sediment processing sites were also identified for the staging, dewatering and temporary storage. Two sites are in Samoa and one is in Fields Landing.

Two dredging areas are used in this study to determine the distance to each proposed sediment use site: marinas at Woodley Island and City of Eureka and the King Salmon Channel. Dredging at bulk cargo and commercial docks and public marina facilities could also utilize the sediment use sites identified in this study. A slurry of dredged sediment can be piped directly to identified use sites or to a centralized processing area on District property in Samoa and Fields Landing depending on the dredge area to be dewatered before being trucked to sites for use.

1.1 Waterfront Property

Sea level rise vulnerability assessments of Humboldt Bay have identified shoreline segments that are vulnerable to overtopping (Laird 2013). Tidal inundation mapping has identified low-lying areas that could become inundated by rising seas (NHE 2015). Waterfront sites in the unincorporated areas of Humboldt County include properties zoned as Coastal Dependent Industrial, Residential, and Commercial. Sites in the City of Eureka are zoned Waterfront Commercial, General Commercial, and Natural Resources. Waterfront property that is vacant and vulnerable to being tidally inundated by 1.0 meter of sea level rise has also been identified. Based on current conditions, just 0.5 meter of sea level rise could begin to encroach on these areas.

Vulnerable areas could be protected using dredged sediments to increase the surface elevation of the waterfront property to prevent tidal inundation by 1.0 meter of sea level rise. Dredged sediment could also be used to fill low-lying areas and block pathways for inundation of waterfront property and transportation and utility infrastructure. Building resiliency to sea level rise of 1.0 meter would protect these sites from tidal inundation through 2070 based on the high projection for sea level rise, or 2100 relying on the mid-range projection (NHE 2014).

1.2 Beach Replenishment

Ocean beach surf zones are dynamic areas, eroding in the winter from storm waves and rebuilding during the summer. In beach areas experiencing erosion, there may be opportunities to augment the natural sediment supply by introducing dredged sediment.

An ocean beach surf zone near Samoa has received dredged sediment in the past (Samoa Beach Surf Zone Disposal Project), and this study finds there are at least five potential recreational beach sediment use areas on Humboldt Bay—at King Salmon, Elk River Spit, Samoa Boat Launch area, New Navy Base Road, and an area near Fairhaven.

1.3 Diked Shoreline Structures

Dikes were first constructed on Humboldt Bay in 1890, and most have an earthen core of excavated mudflat/salt marsh sediments. Dredged sediment is similar in composition. A recent diked-shoreline sea level rise adaptation feasibility study of Humboldt Bay (Laird 2018) identified 23 diked shoreline hydrologic sub-units that are vulnerable to sea level rise. (Diked hydrologic sub-units are physical land units defined by a common diked shoreline.) Dikes on 14 sub-units currently protect land uses and developments, transportation infrastructure, utility infrastructure, environmentally sensitive habitat areas (ESHA), and wildlife refuges. The remaining nine diked sub-units protect agricultural uses. There are opportunities to use dredged sediment in all 23 sub-units to rebuild 21 miles of highly vulnerable diked shoreline with eroded dike segments and/or low (less than10 feet [ft]) dike crest elevations.

1.4 Diked Former Tidelands

Many of the diked former tidelands on Humboldt Bay in the 23 diked sub-units are now less than 5.8 ft (all elevations in this report are relative to NAVD 88) mean high water (MHW) elevation. This is likely a result of the oxidation of organic material in diked former tidelands (salt marsh) soils. Groundwater is closer to the surface in these areas than on agricultural lands located on alluvial deposits farther inland. Sea level rise may cause groundwater to emerge in these low-lying areas, which could restrict agricultural uses. When diked former tidelands are to be restored to salt marsh by breaching dikes, these low-lying areas need to be raised to above 5.8 ft (MHW) to avoid the formation of mudflats, which occur at lower elevations. Dredged sediment could be used to raise the elevation of these diked former tidelands to sustain agricultural uses or to aid in the future restoration of salt marsh.

1.5 Living Shorelines

Salt marshes are inter-tidal wetlands that protect shorelines from wave-induced erosion and serve important habitat functions. A constructed salt marsh is referred to as a “living shoreline.” Living shorelines can protect shorelines and the assets that they protect in turn.

Relying on an 1870 U.S. Coast Survey, historic salt marsh areas waterward of the current shoreline that have been eliminated or reduced in areal extent have been identified and delineated. Risks of sea level rise, specifically erosion of dike structures or fill, could lead to tidal inundation of critical transportation and utility infrastructure and waterfront developments. Restoring salt marsh in front of vulnerable shoreline reaches can help attenuate wave energy and height to protect vulnerable shoreline segments and at-risk critical assets. Over 300 acres of historical salt marsh on Humboldt Bay

could be restored, with the use of dredged sediment, to protect vulnerable shoreline structures.

Opportunities also exist to create living shorelines to protect vulnerable areas and assets at risk outside the footprint of historic salt marsh distribution on Humboldt Bay. This study has also identified these locations.

Identified sites that support mudflats at elevations below MHW (5.8 ft) could be raised with dredged sediment to create living shorelines. On Humboldt Bay, salt marsh plains occur between elevations of 5.8 ft and the mean annual maximum water (MAMW) elevation of 8.8 ft. Approximately 1,602 cubic yards (CY) of fill per acre is required to raise surface elevation 1 foot. Thus, constructing living shorelines could utilize from 1 to 3 feet of fill, and require 1,602 to 4,806 CY of fill per acre, if available.

There are diked shoreline hydrologic sub-units where a phased retreat of the dike shoreline could utilize dredged sediment. Isolated from daily tidal inundation, these former tidelands are generally 1 to 3 feet lower in elevation than current salt marsh plains because of soil compaction caused by oxidation. Raising the elevation of these former tidelands could create a protective living shoreline in front of the relocated dike shoreline and restore salt marsh habitat values.

1.6 Salt Marsh Habitat

In addition to protecting shorelines, salt marshes provide food, nursery habitat, and refuge for fish, shorebirds, waterfowl and other coastal species. Humboldt Bay has lost as much as 90% of the historic salt marsh habitat areas surveyed in 1870. The salt marsh area has been reduced by wave-induced erosion, by reclamation for agricultural land use, and construction of the North West Pacific railroad (Laird 2007), and other developments. There are, however, opportunities to restore salt marsh, a valuable and diminished coastal resource, with dredged sediments.

Sediment augmentation of salt marsh is a method to build resiliency of salt marsh areas with inadequate sediment supply to accrete in place as sea levels rise. Dredged sediment slurry is a potential source of sediment for such salt marsh areas and could be broadcast by rain bird-like sprayers or discharged from a pipeline that is moved to enable sediment dispersal. Temporary sediment containment structures (water filled coffer dams, composite sheet piling, silt fencing or some combination of these structures) may be necessary to reduce the movement of the sediment slurry. Excessive depth and rate of sedimentation can adversely affect existing vegetation and habitat, therefore applying sediment over time in thin layers may be necessary to avoid burying and killing existing vegetation. This technique was first applied at the Seal Beach National Wildlife Refuge on degraded cordgrass habitat at a rate of 1,350 cubic yards per acre to a depth of 8-10 inches. A harbor maintenance dredging project was the source of sediment that was to be delivered by barge or pipeline. A similar project has been developed for Elk Horn Slough.

2.0 Sediment Use Sites

This study has identified 76 potential sediment use sites. There are 47 discrete sediment use sites (excluding six beach replenishment sites and 23 diked shoreline/diked former tideland sites) that span approximately 976 acres. Between 1,564,000 and 4,626,300 CY of dredged sediments could be used at these sites. The amount of dredged sediment necessary to replenish six beach sites, is not known at this time. The amount of sediment to enhance 21 miles of dike structures rated highly vulnerable to sea level rise or are actively eroding or to elevate 7,400 acres of diked former tidelands can only be roughly estimated at this time.

Identified sites are associated with one of the two primary dredging areas: marinas at Woodley Island and City of Eureka and the King Salmon Channel. Of the 76 sediment use sites identified, 50 are within 3 miles of a dredging area. Both local and state coastal development jurisdictions are involved, including three Local Coastal Programs: Humboldt County's Humboldt Bay Area Plan, City of Eureka, and the City of Arcata.

2.1 Waterfront Sites

Sixteen waterfront sites have been identified that are vulnerable to tidal inundation from 0.5 to 1.0 meter of sea level rise (Table 1). Thirteen of these sites could receive sediment slurry piped from dredging at the marinas, and three sites could receive sediment from dredging at the King Salmon Channel. Seven sites are within approximately 1 mile of the dredging areas, four more are within 2 miles, and the remaining five sites are between 2 and 3 miles away (Figure 1 and Figure 2). The 13 sites associated with the marina dredging areas occupy 230.9 acres and could use 369,800 CY of dredged material minimum and 1,043,900 CY maximum. The three sites near the King Salmon Channel area span 22.2 acres and could use 35,404 CY to 106,212 CY of material.

The District's Redwood Terminal 1 is one of the identified waterfront sediment use sites. It is a low-lying area that is mostly undeveloped and vulnerable to tidal inundation (Figure 3). Sediment could be used alone or in combination with other fill materials to raise the surface elevation of the undeveloped portions of site WF-1 and five other sites (WF-1, WF-2, and WF-7-WF-10) that are mostly undeveloped.

With sea level rise, ten low-lying undeveloped waterfront sites (WF-2-WF-6 and WF-12-WF-16) would become pathways for tidal inundation of other lands and assets inland of these sites. Using dredged sediment to raise the surface elevation of these low-lying undeveloped sites could block these pathways for tidal inundation. Two sites (WF-15 and WF-16) would also protect Fields Landing, a community at risk for sea level rise inundation (Figure 4).

A significant portion of the community of Fairhaven is also at risk for tidal inundation by 1.0 meter of sea level rise. Increasing the elevation of site WF-2 could enable Fairhaven to retreat from sea level rise over time (Figure 5). Similarly, the adjoining low-lying site WF-3 provides a pathway for inundation of Fairhaven but could be raised in elevation to protect against sea level rise (Figure 5). Elevating waterfront sediment site WF-4 in this

area could block a pathway for inundation of New Navy Base Road and the City of Eureka's Samoa Airport. WF-5 and WF-6 are undeveloped low-lying waterfront sites within the City of Eureka that are vulnerable to sea level rise. If raised in elevation, these sites would protect inland urban development from tidal inundation (Figure 6).

Five vacant waterfront sites (WF-7 to WF-11) are low-lying and vulnerable to tidal inundation by 1.0 meter of sea level rise. Raising the elevation of these waterfront lots could allow them to be developed (Figure 7).

Table 1. Summary of waterfront property dredged sediment use sites, dominant land use of sites, coastal development jurisdiction, and Local Coastal Program covering the site.

Site	Area (Acres)	Min. Volume (CY)	Max. Volume (CY)	Distance to Marinas (ft)	Distance to King Salmon Channel (ft)	Land Use	State or Local Jurisdiction	Local Coastal Program
WF-1	68.4	109,577	328,730	5,348		CDI	ST/LO	HBAP
WF-2	41.4	66,323	198,968	11,212		MG	ST/LO	HBAP
WF-3	33.0	52,866	158,598	13,080		MG/RX	ST/LO	HBAP
WF-4	5.6	8,971	26,914	15,372		MG	LOCAL	HBAP
WF-5	3.6	5,767	17,302	7,517		GSC/NR	STATE	COE
WF-6	2.8	4,486	13,457	6,050		WFC	STATE	COE
WF-7	11.4	18,263	36,526	5,153		WFC	STATE	COE
WF-8	9.7	15,603	31,207	4,080		C-WFC	STATE	COE
WF-9	3.0	4,806	9,612	623		C-WFC	ST/LO	COE
WF-10	3.5	5,543	5,543	3,910		CDI	STATE	COE
WF-11	5.0	7,946	7,946	7,551		CDI	STATE	COE
WF-12	15.2	24,350	73,051	11,459		CDI	STATE	COE
WF-13	28.3	45,337	136,010	14,481		CDI/NR	STATE	COE
WF-14	2.0	3,204	9,612		1,450	MR/CDI	STATE	HBAP
WF-15	12.4	19,865	59,594		2,805	MR/MG	ST/LO	HBAP
WF-16	7.7	12,335	37,006		7,328	CDI	ST/LO	HBAP
TOTAL	**253.0**	**405,242**	**1,150,076**					

Land Use: CDI = Coastal Dependent Industrial; MG = General Industrial; RX = Rural Ex Urban; WFC = Waterfront Commercial; MR = Resource Dependent
CY = cubic yard; ft = feet; ST = State; LO = Local; COE = City of Eureka; HBAP = Humboldt Bay Area Plan

Figure 1. Location of waterfront sediment sites WF-1-WF-13.

Figure 2. Location of water front sediment sites WF-14-WF-16.

Figure 3. Low-lying waterfront sediment use site (WF-1) that is vulnerable to 1.0 meter of sea level rise (blue shading).

Figure 4. White arrows point to low-lying waterfront sediment use sites WF-15 and WF-16 (polygons with blue boundary and white shading) that could block pathways for tidal inundation of the community of Fields Landing that is vulnerable to 0.5 meters of sea level rise (blue shading).

Figure 5. White arrows point to low-lying waterfront sediment use sites WF-2 and WF-3 (polygons with blue boundary and white shading) that could block pathways for tidal inundation of the community of Fairhaven, which is vulnerable to 1.0 meter of sea level rise (blue shading). WF-4 could block a pathway to inundation of the New Navy Base Road and the Samoa Airport.

Figure 6. White arrows point to low-lying waterfront sediment use sites WF-5 and WF-6 (polygons with blue boundary and white shading) that could create barriers to tidal inundation of the City of Eureka, which is vulnerable to 1.0 meter of sea level rise (blue shading).

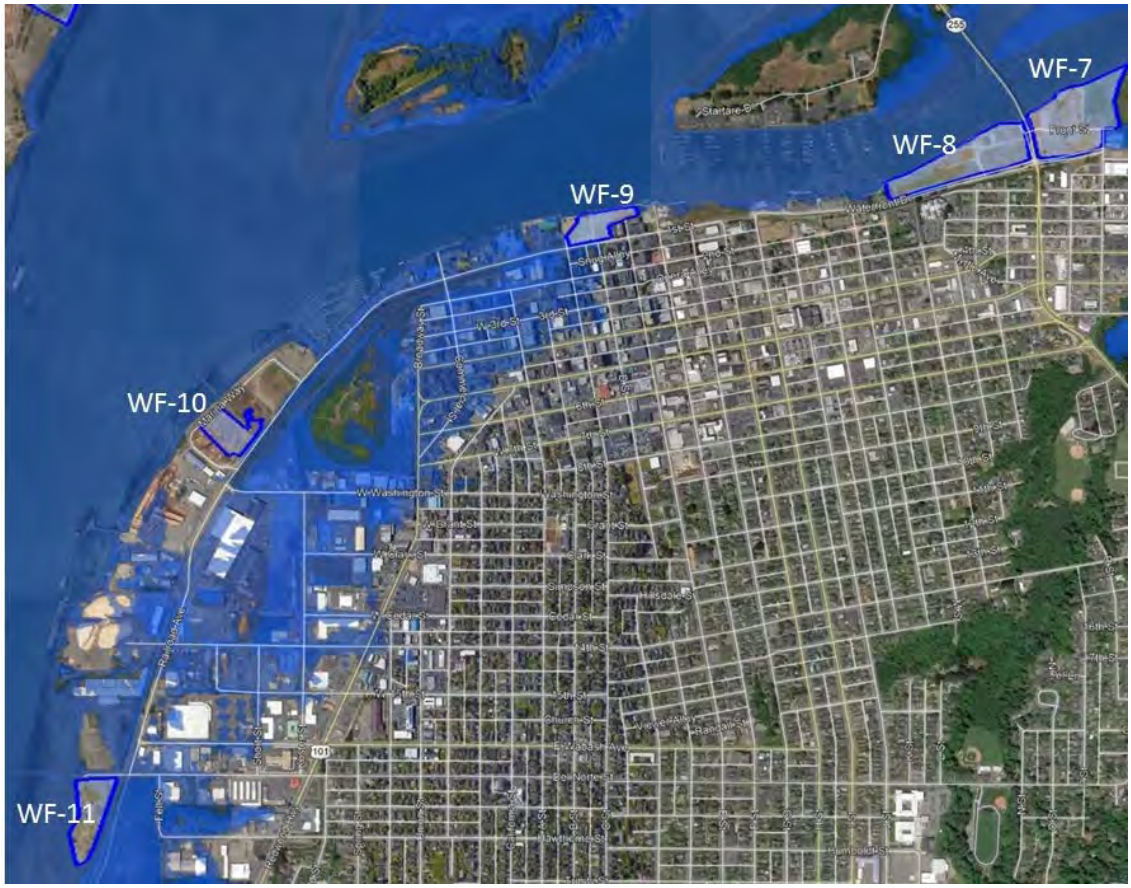

Figure 7. Waterfront sediment use sites WF-7 through WF-11 (polygons with blue boundary and white shading) are low-lying vacant properties that are vulnerable to 1.0 meter of sea level rise at mean monthly maximum water (MMMW) elevation (blue shading).

Potential waterfront sediment use site WF-14 is a remnant of the King Salmon Channel that could be filled to block a pathway for inundation of PG&E's regional power generating facilities (Figure 8). Tidal inundation of the PG&E property and facilities could begin to occur with 1.0 meter of sea level rise by MMMW eight or more times a year.

Figure 8. Waterfront sediment use site WF-14 (polygon with blue boundary and white shading) that could block a pathway for tidal inundation of PG&E's property and facilities vulnerable to 1.0 meter of sea level rise MMMW (blue shading).

2.2 Beach Replenishment

In addition to the former beach disposal site in the surf zone near Samoa, five beach replenishment sites have been identified along Humboldt Bay. These sites are in areas of high wave energy, either directly across from the entrance to the bay or where reflective waves generated by the entrance to the bay come ashore on Elk River Spit and North Spit (Figure 9). Using dredged sediment in lieu of bank fortification will retain the recreational values of these sites for the enjoyment of the public as well as soften the shoreline and reduce erosion (CSMWG 2017). The amount of dredged sediment necessary to replenish the five new beach sites is not known at this time.

Figure 9. Location of beach replenishment sediment sites BR-1–BR-5.

2.3 Diked Shoreline Structures and Diked Former Tidelands

There are 23 diked hydrologic sub-units consisting of a 39.6 miles of diked shoreline structure and 7,404 acres of former tidelands on Humboldt Bay (Figure 10–Figure 12, Table 2). The diked shorelines in these 23 units protect agricultural uses, commercial developments, public airport facilities, utility and transportation infrastructure, and state and federal wildlife refuges (Table 3).

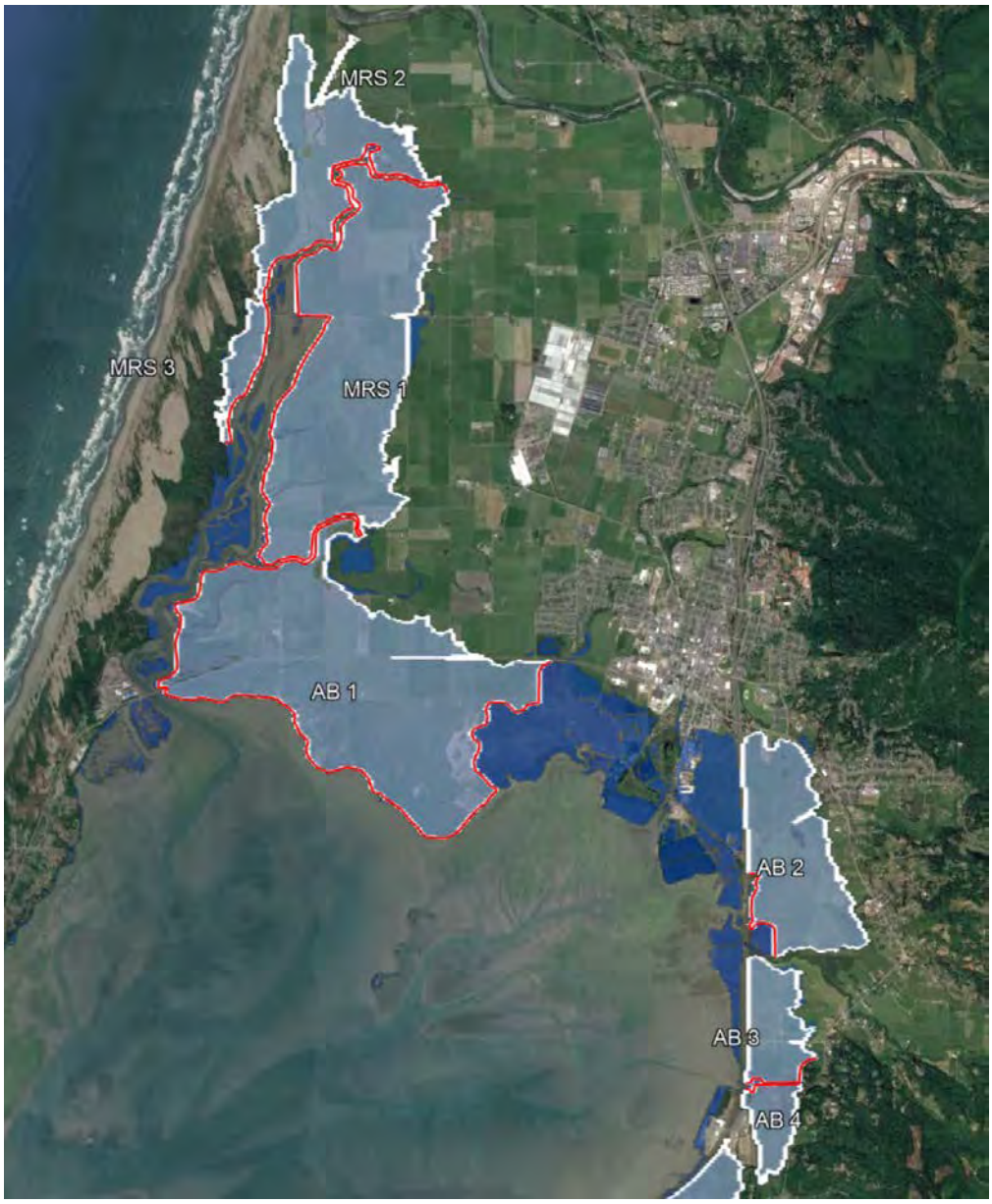

Figure 10. Diked shoreline hydrologic sub-units (white boundary). Two hydrologic sub-units are within Mad River Slough (MRS) and four are within Arcata Bay (AB). Diked shoreline reaches (red) and diked former tidelands (white shading) with potential MAMW inundation area (blue shading).

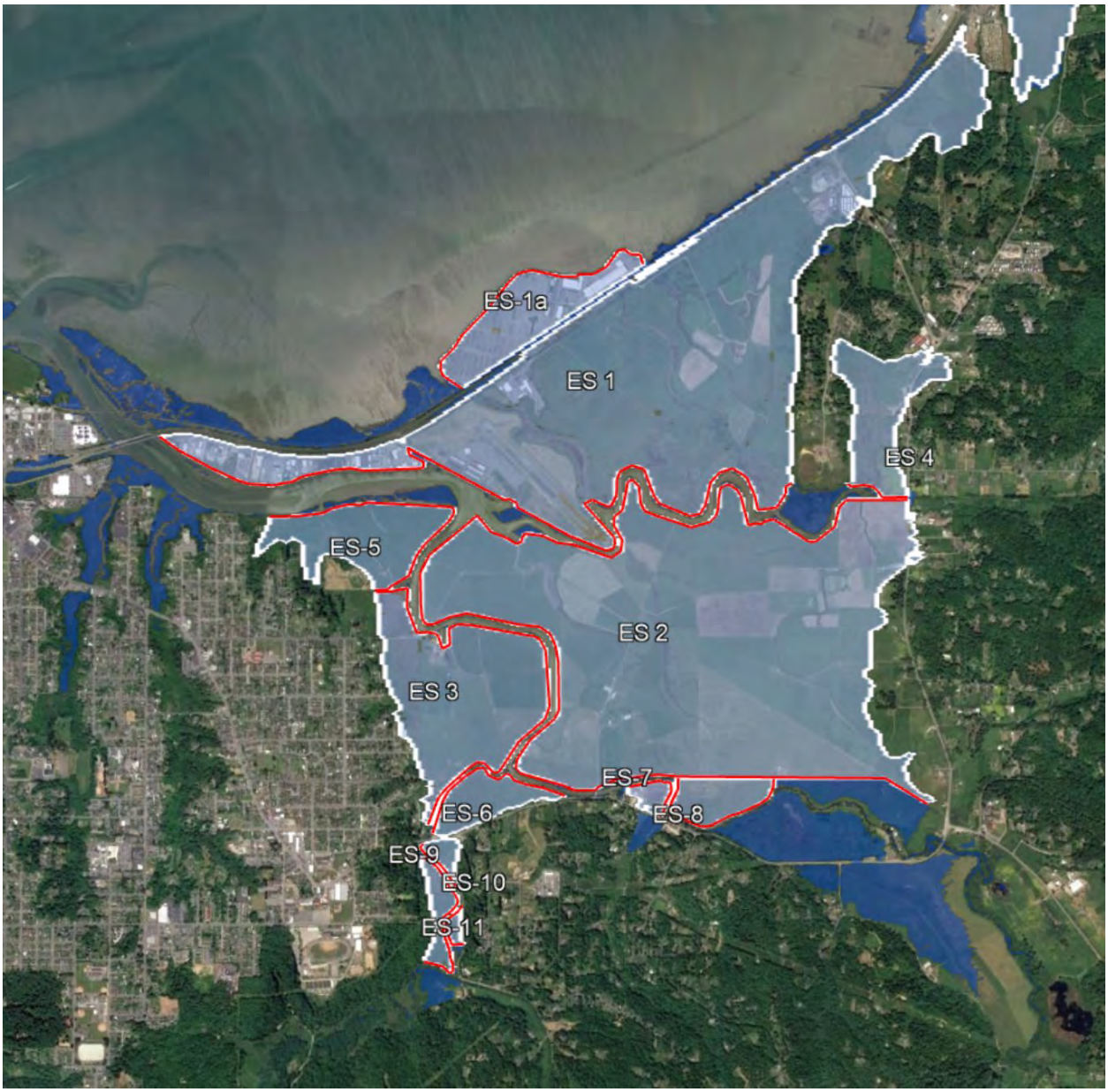

Figure 11. Eleven diked shoreline hydrologic sub-units (white boundary) within Eureka Slough (ES). Diked shoreline reaches (red) and diked former tidelands (white shading) with potential MAMW inundation area (blue shading).

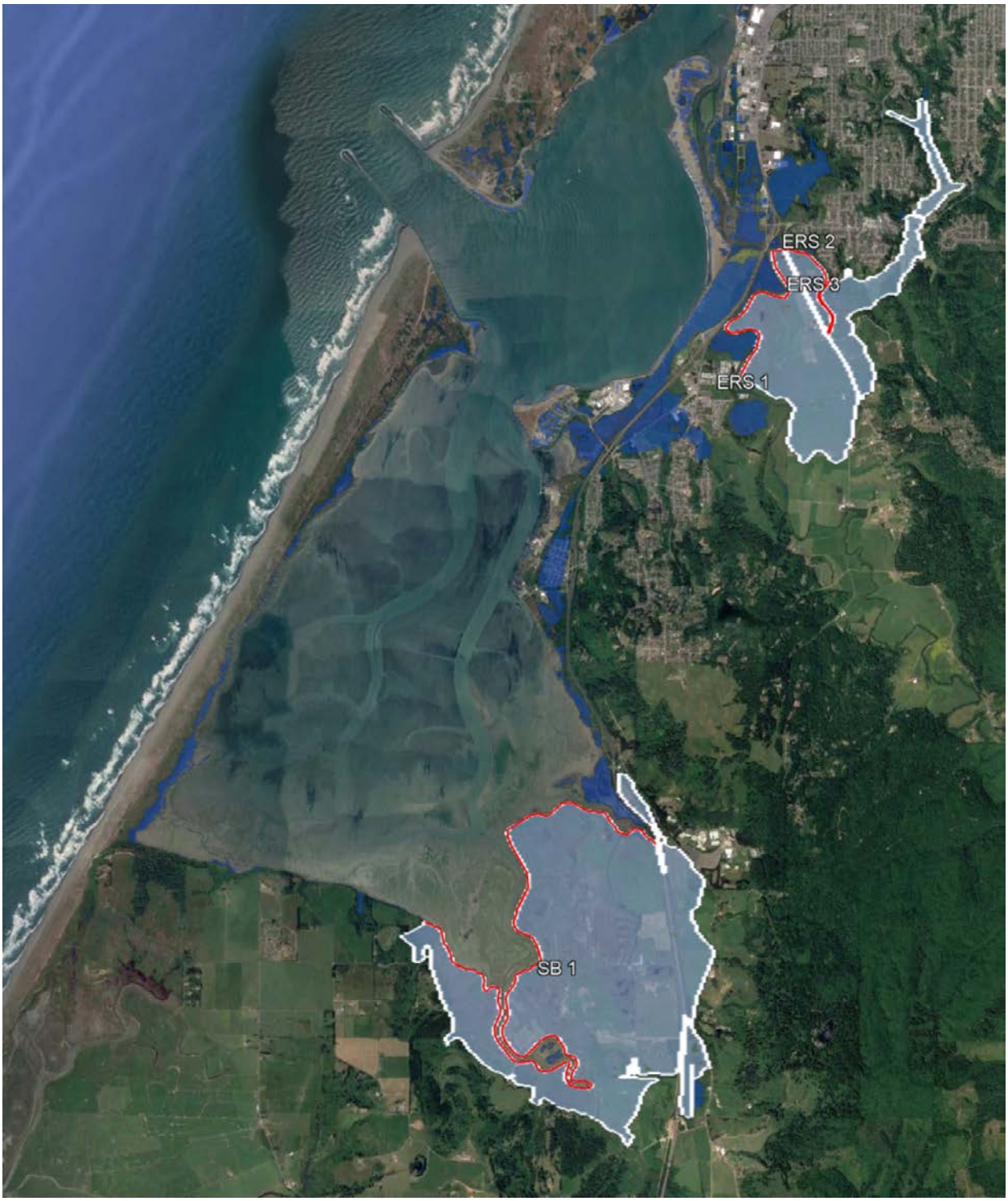

Figure 12. Diked shoreline hydrologic sub-units (white boundary). Three units are within Elk River Slough (ERS) and one in the South Bay (SB) unit. Diked shoreline reaches (red) and diked former tidelands (white shading) with potential MAMW inundation area (blue shading).

Table 1. Summary of diked shoreline hydrologic sub-unit characteristics.

Dike Unit	Dike Length (Miles)	Area (Acres)	Elevation < 9.7 ft (Miles)	Elevation < 10.7 ft (Miles)
MRS-1	4.75	911	0.77	1.31
MRS-2	2	349	0.55	0.51
MRS-3	1.13	72	0.12	0.22
AB-1	6.14	1,218	0.71	1.27
AB-2	0.76	383	0.15	0.11
AB-3	0.55	139	0.55	0
AB-4	0.38	79	0.38	0
ES-1	3.32	775	0.29	0.55
ES-1a	1.1	75	0.01	0.08
ES-2	5.26	799	0.71	1.68
ES-3	1.75	174	0.41	0.78
ES-4	0.23	71	0.03	0.02
ES-5	1.1	77	0	0.09
ES-6	0.64	32	0.08	0.24
ES-7	0.28	8	0.11	0.14
ES-8	0.57	29	0.02	0.21
ES-9	0.21	7	0.11	0.1
ES-10	0.61	15	0.07	0.18
ES-11	0.21	3	0.02	0.06
ERS-1	1.51	371	0.43	0.25
ERS-2	0.79	40	0.7	0.06
ERS-3	0.41	194	0.4	0.03
SB-1	5.94	1,583	2.69	2.53
23 Units	**39.64**	**7,404**	**9.31**	**10.42**

ft = feet
MRS = Mad River Slough; AB = Arcata Bay; ES = Eureka Slough; ERS = Elk River Slough; SB = South Bay.

The CRSMP (2017) identified the opportunity to reinforce dike structures by placing dredged sediment on the landward side of dikes, acting as a stability berm against slope failure and earthquakes. The composition of the dredged sediment is mostly fine silty-clay material, with some sand. When dewatered, the dredged sediment could be utilized as fill material for the core of earthen dikes. An earthen dike designed with a 2:1 slope and a 6-ft surface elevation, a crest elevation of 14 ft (MAMW elevation for the high sea level rise projection by 2100) and a minimum 10-ft crest width for equipment access results in a 42-ft wide base that would require approximately 40,700 CY of fill per mile. Rebuilding an eroded dike could require as much as 20,300 CY of fill per mile. Raising a dike with a 10-ft crest to 14 ft may require approximately 26,600 CY of fill per mile. There are 9.3 miles of diked shoreline that are vulnerable to being overtopped by 2 ft of sea level rise. Another 10.4 miles are vulnerable to being overtopped by 3 ft of sea level rise. There are 7,404 acres that would tidally inundated under existing conditions if the dikes are breached. Due to deferred maintenance, approximately 3.3 miles of diked shoreline are actively eroding and susceptible to breaching during king tides.

A simple rating scheme has been employed to rank sub-units based on the number and type of assets being protected by the diked shoreline (Table 3). All assets have a value of 1 except for state transportation. Highways 101 and 255 were given a higher value of 2 due to their regional importance. A majority of the critical utility and transportation infrastructure assets are in six diked sub-units: ES-1, AB-1–AB-4, and SB-1. For the benefit of the Humboldt Bay region, building resiliency in the dikes on these sub-units should be a priority.

Table 2. Diked hydrologic sub-units and the utility, transportation, and coastal resource assets they protect that are at risk from sea level rise.

Unit	Utilities					Transportation				Wildlife Refuge	Rating
	Municipal Water	Wastewater	Gas	Electrical	Communications	Local	State	Air	Trail/Rail		
MRS-1						X					1
MRS-2											0
MRS-3						X					1
AB-1	X			X		X	X		X	X	7
AB-2	X		X	X	X	X	X			X	8
AB-3	X		X	X	X	X	X			X	8
AB-4	X		X	X	X	X	X				7
ES-1		X	X		X	X	X	X	X	X	9
ES-1a							X		X		3
ES-2	X		X	X		X					4
ES-3	X		X			X					3
ES-4	X		X	X		X					4
ES-5											0
ES-6	?					X					1
ES-7	?					X					1
ES-8											0
ES-9			X			X					2
ES-10											0
ES-11						X					1
ERS-1	X		X	X		X				X	5
ERS-2	X		X			X					3
ERS-3	X	X	X	X		X					5
SB-1			X		X	X	X		X	X	7

MRS = Mad River Slough; AB = Arcata Bay; ES = Eureka Slough; ERS = Elk River Slough; SB = South Bay

2.4 Living Shorelines

The CRSMP (2017) identified the potential to create living shorelines to protect shoreline structures such as dikes, railroad, Bay trail and Highway 101.

A constructed salt marsh is referred to as a “living shoreline.” Living shorelines can protect shorelines and the assets that they protect in turn. Salt marshes are inter-tidal wetlands that protect shorelines from wave-induced erosion and serve important habitat functions.

Four potential living shoreline (LS) sites and 16 salt marsh restoration (SMR) sites have been identified (Figure 13 and 14, Table 4) that could help protect vulnerable built shoreline structures and low-lying areas from wave-induced erosion or overtopping (Table 4). Two LS sites could receive sediment slurry piped from dredging at the marinas. Eight of the SMR-LS sites could receive sediment from dredging at the King Salmon Channel. One LS and three SMR-LS sites are within approximately 2 miles of the dredging areas. Ten additional sites (one LS and nine SMR-LS) are within approximately 3 miles of a dredging area. The remaining six sites are more than 3 miles away. Of the 14 sites within 3 miles of a dredging area, 6 are associated with the marina dredging areas and occupy 77.9 acres, which would use 124,800–374,400 CY of material. The eight sites near the King Salmon Channel area could utilize 157,500–505,600 CY of material to cover 98.3 acres to a depth of 8.8 ft.

Figure 13. Living shoreline sites (LS; green) and salt marsh restoration-living shoreline sites (SMR-LS; gold) in the Arcata Bay area.

Figure 14. Salt marsh restoration-living shoreline sites (SMR-LS; gold) in the South Bay area.

Table 3. Living shoreline (LS) and salt marsh restoration (SMR) sediment use sites, area in acres, minimum and maximum volumes capacities in cubic yards, distance in linear feet to dredging areas, and dominant land use being protected.

Site	Area (Acres)	Min. Volume (CY)	Max. Volume (CY)	Distance to Marinas (ft)	Distance to King Salmon Channel (ft)	Land Use
LS-1	16.3	26,113	78,338	10,817		WC
LS-2	15.3	24,511	73,532	12,949		WC
LS-3	2.5	4,005	12,015	24,103		NR/MG
LS-4	1.1	1,762	5,287	25,973		NR
Sub-Total	***35.2***	***56,390***	***169,171***			
SMR-LS-1	21.7	34,763	104,290	11,004		WC
SMR-LS-2	15.1	24,190	72,571	14,037		WC
SMR-LS-3	2.6	4,165	12,496	15,962		WC
SMR-LS-4	22.7	36,365	109,096	20,525		NR
SMR-LS-5	82.2	131,684	395,053	21,963		AE/STATE
SMR-LS-6	20.4	32,681	98,042	24,764		NR
SMR-LS-7	102.0	163,404	490,212	20,629		STATE
SMR-LS-8	6.9	11,054	33,161	9,271		WD
SMR-LS-9	27.0	43,254	129,762		1,055	MC
SMR-LS-10	26.6	42,613	127,840		12,231	AE
SMR-LS-11	4.2	6,728	20,185		12,275	AE
SMR-LS-12	6.1	9,772	29,317		12,725	AE
SMR-LS-13	6.8	10,894	32,681		13,279	AE
SMR-LS-14	10.1	16,180	48,541		13,279	AE
SMR-LS-15	10.8	17,302	51,905		13,288	STATE
SMR-LS-16	6.7	10,733	32,200		14,905	STATE
Sub-Total	***371.9***	***595,784***	***1,787,351***			
TOTAL	**407.1**	**652,174**	**1,956,523**			

Land Use: WC = Waterfront Commercial; NR = Natural Resources; MG = General Industrial; AE = Agricultural Exclusive; State = State Jurisdiction; WD = MC = Coal Dependent Industrial.
CY = cubic yards; ft = feet

Two of the LS sites (LS-1 and LS2) (Figure 15) are presently mudflats that present opportunities to create living shorelines to protect Highway 101, which is vulnerable to 1.0 meter of sea level rise at these locations. Two SMR-LS sites (SMR-LS 2 and SMR-LS3), in combination with the two LS sites, could create a broad living shoreline that would protect vulnerable shoreline segments and at-risk assets as well as restore historical salt marsh (Figure 15). Three SMR-LS sites (SMR-LS-1, 2 and 3) would help defend diked shoreline structures that are protecting valuable commercial property, the county's Murray Field Airport, Highway 101, and utility infrastructure.

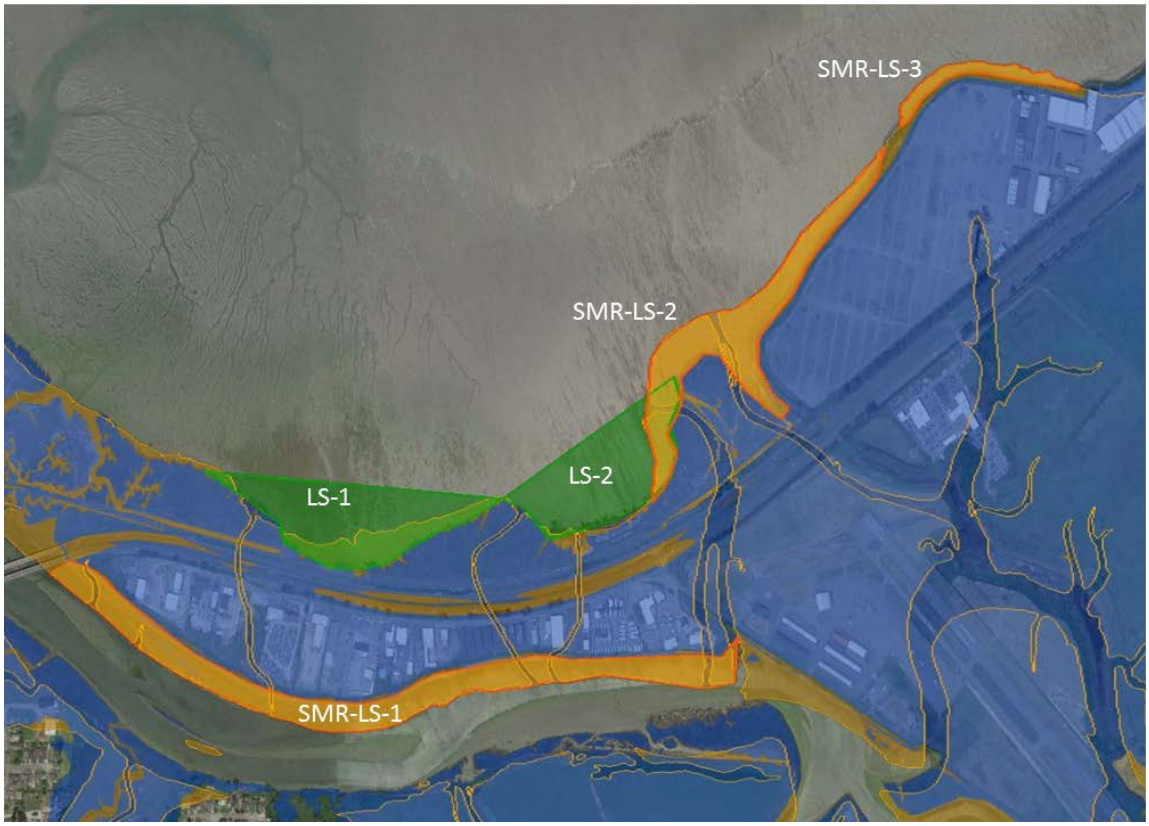

Figure 15. Living shoreline sites (LS; green) historical salt marsh mapped in 1870 (U.S. Coast Survey) (SLR-LS; gold shaded areas), and a vulnerable segment of Highway 101 inundated by 1.0 meter of sea level rise (blue shading).

SMR-LS-8 could both provide restored salt marsh habitat and help protect the City of Eureka's newly constructed Waterfront Trail (Figure 16). SMR-LS-9 also would restore salt marsh and help protect critical transportation infrastructure (Highway 101 and King Salmon Avenue) (Figure 16).

A cluster of sites (SMR-LS 10-16) would protect the Humboldt Bay National Wildlife Refuge and Highway 101 (Figure 14).

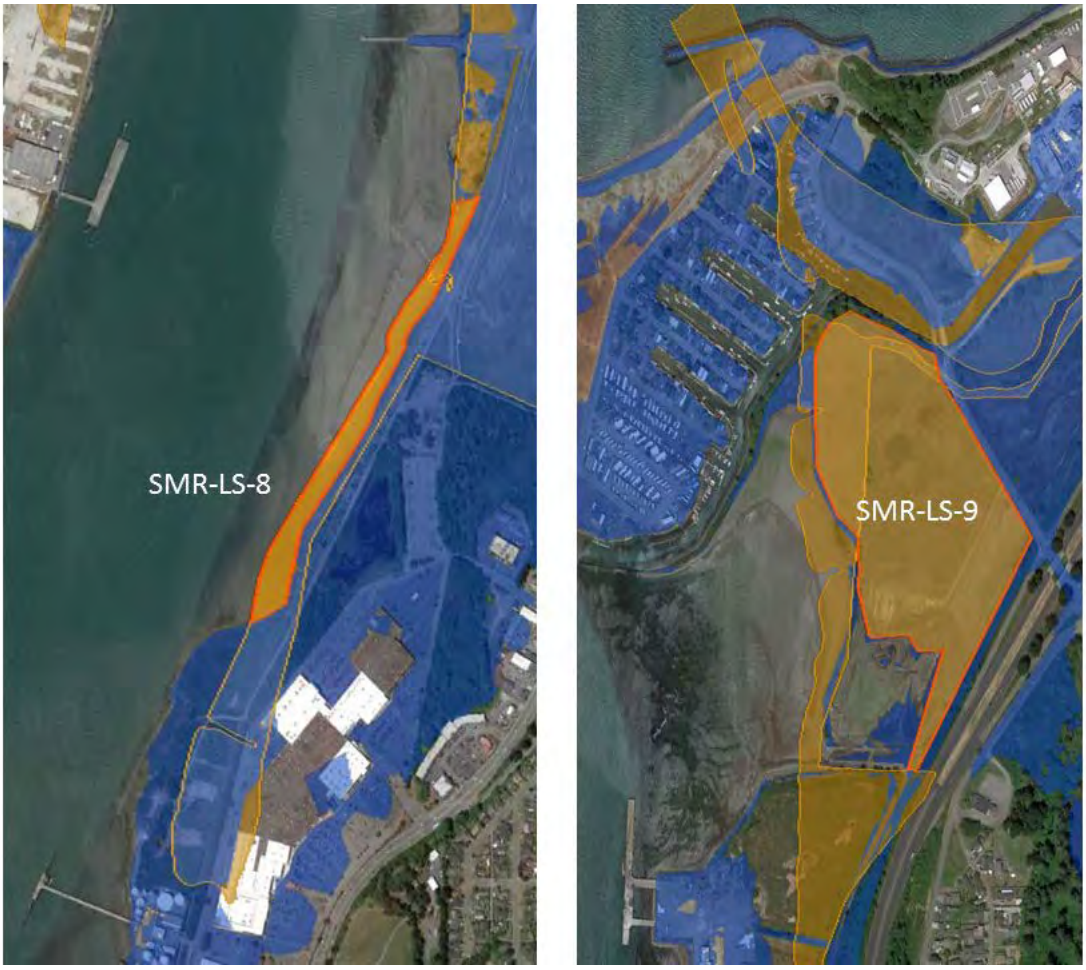

Figure 16. Historic salt marsh mapped in 1870 (U.S. Coast Survey) (SLR-LS; gold shaded areas), and a vulnerable segment of Waterfront Trail (left) and King Salmon Avenue (right), inundated by 1.0 meter of sea level rise (blue shading).

2.5 Salt Marsh Habitat

Salt marsh is a valuable inter-tidal wetland habitat that at one time occupied nearly a third of the tidal footprint of Humboldt Bay but has been reduced to less than 10% of its historic extent (Laird 2007). Both the CRSMP (2017) and SHN (2015) studies identified salt marsh restoration sites. There are 11 sediment sites identified here where salt marsh restoration (SMR) could occur to provide valuable habitat, independent of protecting vital shoreline infrastructure (Figure 17 and Figure 18, Table 5).

Figure 17. Salt marsh restoration sites in Arcata Bay.

Figure 18. Salt marsh restoration sites in Eureka Bay and South Bay.

Table 4. Salt marsh restoration (SMR) sediment use sites, area (acres), minimum and maximum volume (cubic yards) capacity, direct distance (linear ft) to dredging areas at Marinas or King Salmon Channel, dominant land use of site, coastal development jurisdiction, and Local Coastal Program covering the site.

Site	Area (Acres)	Min. Volume (CY)	Max. Volume (CY)	Distance to Marinas (ft)	Distance to King Salmon Channel (ft)	Land Use
SMR-1	40.2	64,400	193,201	8,104		NR
SMR-2	3.3	5,287	15,860	6,116		WC
SMR-3	11.2	17,942	53,827	7,808		WC
SMR-4	4.9	7,850	23,549	11,126		WC
SMR-5	30.4	48,701	146,102	33,687		AE
SMR-6	11.7	18,743	56,230		1,201	MR/CR
SMR-7	1.5	2,403	7,209		8,093	STATE
SMR-8	13.5	21,627	64,881		10,436	AE
SMR-9	92.8	148,666	445,997		17,294	STATE
SMR-10	73.9	118,388	355,163		19,633	NR
SMR-11	30.7	49,181	147,544		17,238	NR
TOTAL	**314.1**	**503,188**	**1,509,565**			

Land Use: WC = Waterfront Commercial; NR = Natural Resources; MG = General Industrial; AE = Agricultural Exclusive; State = State Jurisdiction; MR/CR= Resource Dependent/Commercial Recreation.
CY = cubic yards; ft = feet

Five SMR sites are associated with the marina dredging area and six with the King Salmon dredging area. SMR-6 is the only site within 1 mile of a dredging area, and six sites (SMR-1–3 and SMR-7–8) approximately 2 miles from a dredging area. The remaining four sites are more than 3 miles away. Of the seven sites within 2 miles of a dredging area, four are associated with the marina dredging areas and occupy 59.6 acres (potentially utilizing 95,500–286,400 CY of material). The three sites near the King Salmon Channel area cover 26.7 acres (42,800—128,300 CY). SMR-8 could serve as a living shoreline for the Bay Trail between Fields Landing and College of the Redwoods (Figure 19).

Figure 19. Salt marsh restoration site SMR-8 as surveyed in 1870 (U.S. Coast Survey) showing the tidal inundation area by 1.0 meters of sea level rise (blue shading).

3.0 References

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