

**Initial Study/  
Draft Mitigated Negative Declaration  
for**

**Yeung Oyster Farm**

**Lead Agency:**



**Humboldt Bay Harbor, Recreation, and Conservation District**  
601 Startare Drive  
Eureka, CA 95501

*December 2016*

**PROJECT TITLE:** Yeung Oyster Farm

**LEAD AGENCY:** Humboldt Bay Harbor, Recreation and Conservation District  
601 Startare Drive  
Eureka, CA 95501  
(707) 443-0801

**CONTACT PERSON:** George Williamson AICP, Humboldt Bay Harbor District Planner

**PREPARED BY:** Adam Wagschal, ICF

**PROJECT LOCATION:** Humboldt Bay, California

**GENERAL PLAN  
DESIGNATION(s):** Water / Conservation (WC)

**ZONING  
DESIGNATION(s):** Water / Conservation (WC)

**ASSESSOR  
PARCEL NUMBERS:** 501-241-04 and 501-251-03

## **INTRODUCTION**

This initial study (IS) and Draft Mitigated Negative Declaration (DMND) analyzes the environmental effects of the proposed Yeung Oyster Farm (Project) in Humboldt Bay California. This IS/DMND was prepared pursuant to California Environmental Quality Act (CEQA) requirements, and in compliance with CEQA Guidelines (Title 14, California Administrative Code, § 1400 et seq.).

The Humboldt Bay Harbor, Recreation and Conservation District (District) is the lead agency under CEQA. The District must evaluate the environmental impacts of the Project prior to considering Project approval. This IS serves as an informational document to be used in local planning and decision-making, and does not recommend Project approval or denial.

## **PROJECT SUMMARY**

Mr. Jerry Yeung proposes to establish a 64 acre oyster farm in northeast Humboldt Bay. The same oyster species currently cultured in Humboldt Bay would be cultured at this site (Kumamoto oysters [*Crassostrea sikamea*] and Pacific oysters [*C. Gigas*]). An off-bottom culture method known as basket-on-longline is proposed. This method is used in other parts of Humboldt Bay. In addition to proposed cultivation, the Project proposes permanent conservation status for 22 acres of tidelands, where no shellfish culture or other commercial activities would be allowed.

## PROJECT LOCATION AND ENVIRONMENTAL SETTING

Humboldt Bay encompasses about 62.4 square kilometers (approximately 15,400 acres) at mean high tide in three geographic segments: South Bay, Entrance Bay, and Arcata Bay (or “North Bay”). As California’s second-largest natural bay and the largest estuary on the Pacific Coast between San Francisco Bay and Oregon’s Coos Bay, Humboldt Bay is a complex ecosystem and valuable resource for California and the nation because of its natural resources, aesthetic appeal and recreational opportunities, ecological services, economic benefits, and vital transportation links. Visitors and Humboldt County residents value Humboldt Bay for its natural and anthropogenic attributes. Humboldt Bay biota is diverse and ecologically important locally and globally, with local fisheries, oyster farms, and habitat for long-distance shorebird and waterfowl migrants.

The Humboldt Bay area hosts more than 400 plant species, 300 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. Portions of the diked former tidelands around Humboldt Bay, particularly in the Arcata Bottoms, are used for agriculture, primarily livestock grazing. The largest nearby urban concentrations are in the cities of Arcata (approximate population 16,651) and Eureka (approximate population 25,866).

During the late nineteenth and early twentieth centuries, the bay was diked and filled, reducing salt marshes from an estimated 9,000 acres to the 900 acres present today. Habitat has been further impacted by discharges of agricultural and urban runoff, industrial and recreational activities, sedimentation from the bay’s watershed, colonization by *Spartina* (a non-native grass) and other stressors.

The oyster and clam culture industry in the bay produces about 70% of the oysters grown in California. Three species of mollusk are cultured in Humboldt Bay: Kumamoto oysters (*Crassostrea sikamea*), Pacific oysters (*C. gigas*) and Manila clams (*Tapes philippinarum*). There are six companies currently farming shellfish in the bay, using various methods to culture clams in subtidal areas and oysters in both subtidal and intertidal areas. There are approximately 70 raft type structures currently culturing shellfish in subtidal areas. Additionally, there are approximately 301 acres of intertidal areas cultured.

There are several other permitting efforts underway in Humboldt Bay that may also allow for expanded shellfish culture operations. The District’s Humboldt Bay Mariculture Pre-permitting Project (Pre-Permitting Project) would result in approximately 54 new culture rafts to mature Kumamoto oyster, Manila clam, and Pacific oyster seed. The Pre-Permitting Project would also permit up to 266 acres of intertidal area for culture of Kumamoto and Pacific oysters.

Additionally, Taylor Mariculture and Hog Island Oyster Company are implementing efforts that would collectively add a total of 21 culture rafts (15 floating upwelling systems (FLUPSY) and 6 nursery rafts). Some of these permits may already be obtained, with culture currently being

implemented. Additionally, Coast Seafood Company is pursuing permits for intertidal culture of Kumamoto and Pacific oysters on up to 622 acres, which would be implemented in phases.

Mr. Yeung owns two parcels, totaling approximately 200 acres, in northeast Humboldt Bay (Figure 1). The 64 acre proposed Project is within these parcels (Figure 2). The Project is approximately 0.3-0.4 miles from the eastern shore of north Humboldt Bay. Landside there is an unused rail line and Highway 101. Land uses are commercial, industrial and agricultural. The Project site itself is undeveloped. The nearest activity in the bay is shellfish culture approximately 0.9 miles to the southwest.



Figure 1. APNs 501-241-04 & 501-251-03 and 2005 aerial imagery (NAIP 2005).



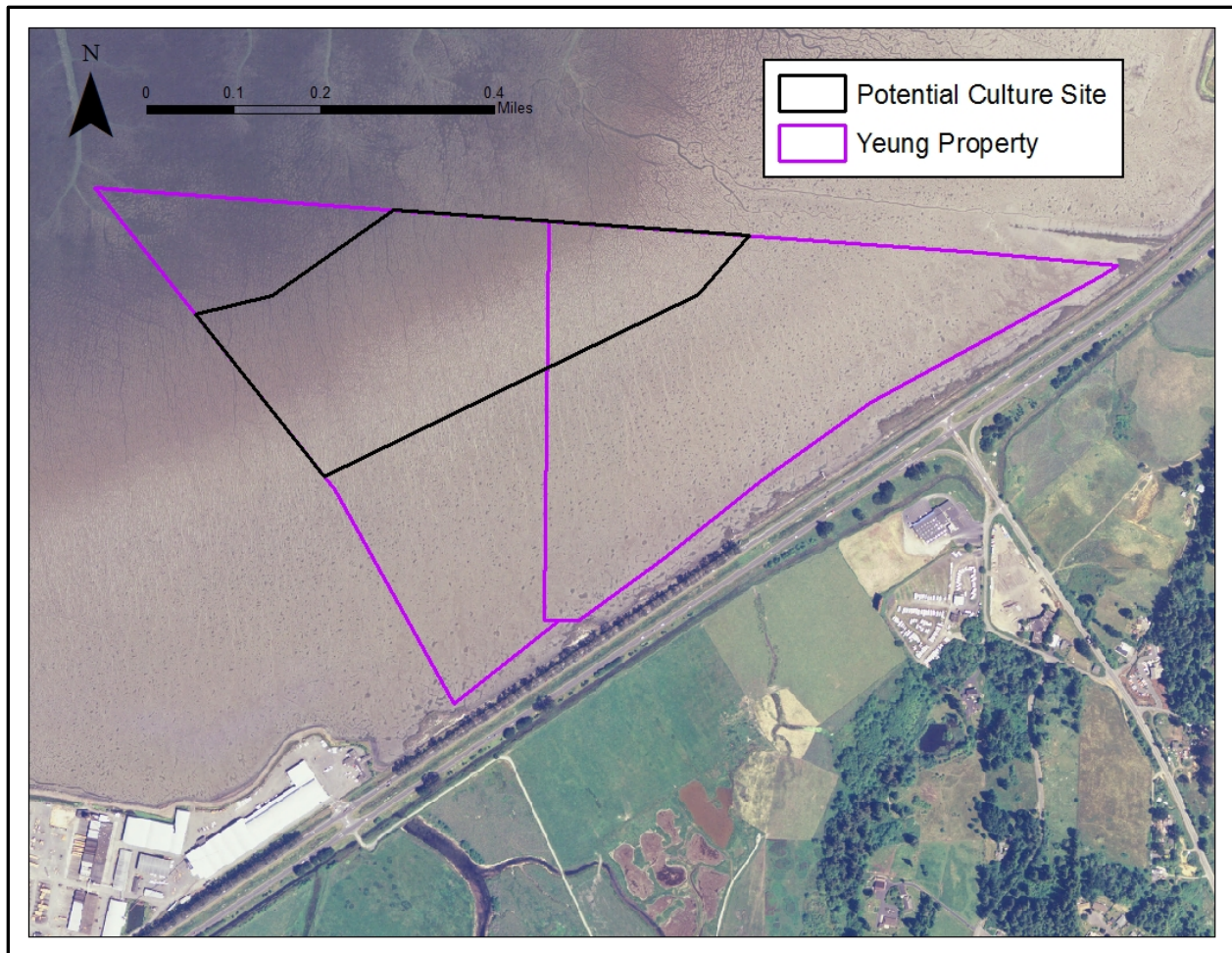


Figure 2. APNs 501-241-04 & 501-251-03, potential culture site and 2005 aerial imagery (NAIP 2005).

## PROJECT DESCRIPTION

Mr. Yeung's proposed Project would be located on two parcels in Humboldt Bay, California (APN 501-241-04 and 501-251-03) totaling approximately 200 acres (Figure 1). The Humboldt Bay Harbor, Recreation and Conservation District (Harbor District) included these properties in a shellfish culture permitting process known as the "Humboldt Bay Mariculture Pre-Permitting Project" or "Pre-Permitting Project". The Pre-Permitting Project is not complete and Mr. Yeung's parcels are no longer included. Rather, Mr. Yeung is independently pursuing shellfish culture permits on a portion of his property. Approximately 64 acres of the property have been identified as having potential for shellfish culture (Figure 2). This area was identified because:

- 1) It is generally less than 3.0 ft. MLLW elevation (Figure 3), an elevation which may be viable for shellfish culture. Areas greater than 3 ft. MLLW are likely not suitable for culture and the area between 1.5 - 3.0 ft. MLLW may be challenging.
- 2) It contains only patchy eelgrass and unconsolidated sediment, not dense eelgrass which is a particularly sensitive habitat (Figure 4).

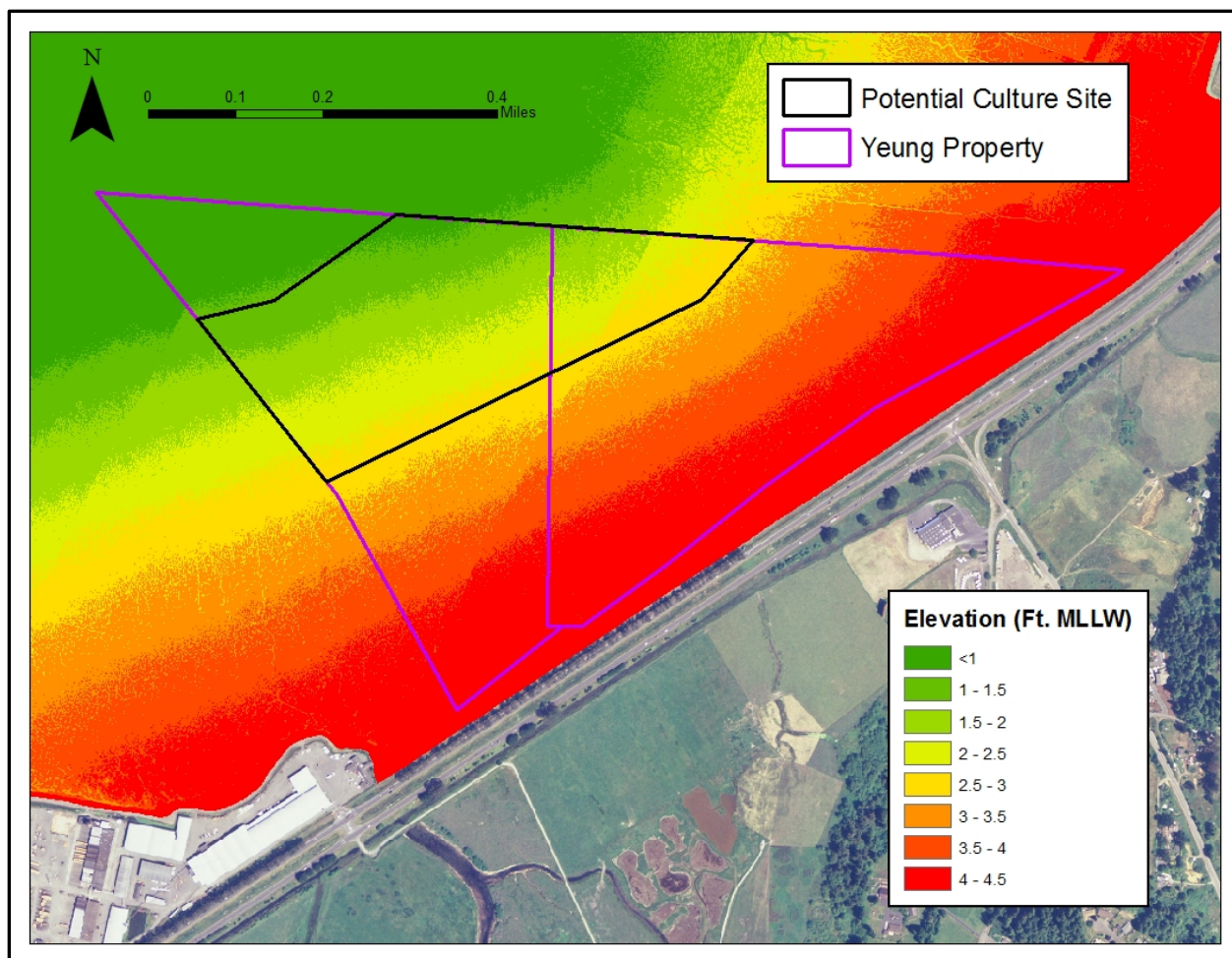


Figure 3. APNs 501-241-04 & 501-251-03, potential culture site and elevation data<sup>1</sup>.

### Proposed Culture Species

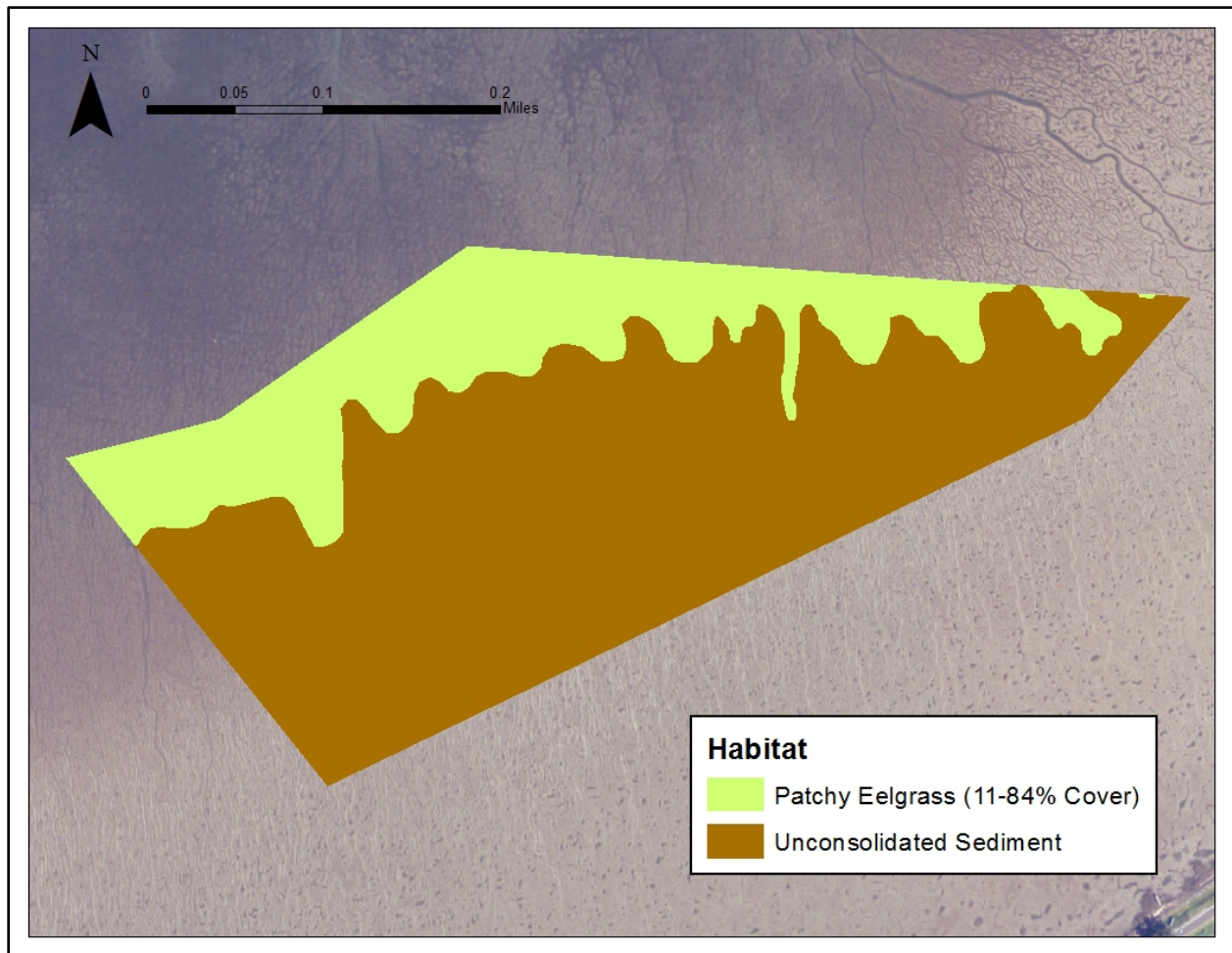
The same species currently cultured in intertidal areas of Humboldt Bay are proposed for culture at the site: Kumamoto oysters (*Crassostrea sikamea*) and Pacific oysters (*C. Gigas*).

### Proposed Culture Method: Basket-on-Longline

A basket-on-longline culture method is proposed. The following description of this method is adapted from the Humboldt Bay Mariculture Pre-Permitting Project Final Environmental Impact Report (SCH #2013062068).

<sup>1</sup> (PWA) Pacific Watershed Associates. 2014. Humboldt Bay Sea Level Rise Vulnerability Assessment: DEM Development Report, Final Draft. Prepared for Northern Hydrology & Engineering. Prepared by PWA, McKinleyville, CA. PWA Report No. 14100351, dated February 2014.





**Figure 4. Potential culture site and habitats as mapped by NOAA Coastal Services in 2009.**

Basket-on-longline culture is used to grow Kumamoto oysters and Pacific oysters as singles (i.e., the oysters are not attached to each other or to any other substrate). This method utilizes baskets that hang off a monofilament line suspended off the bottom using 2-inch schedule 80 PVC pipe. The monofilament line is 5mm in diameter and protected by a 3/8-inch polyethylene sleeve that the monofilament is slid inside. The baskets are approximately 24 inches (in) x 10 in x 6 in and are held on the line with plastic clips. A float, which is approximately 2.5 in diameter and 5.5 in long, is often attached to the baskets so that the baskets float up during high tides. Once the oysters reach a harvestable size, in approximately 1.5–2 years, the baskets are removed from the water, and the oysters are accessed through end caps on the baskets (see Figures 5 and 6). Installation of the culture equipment and periodic maintenance would be done on-foot at low tides. However, most access to the oysters for planting, grading and harvesting would be done from small boats.

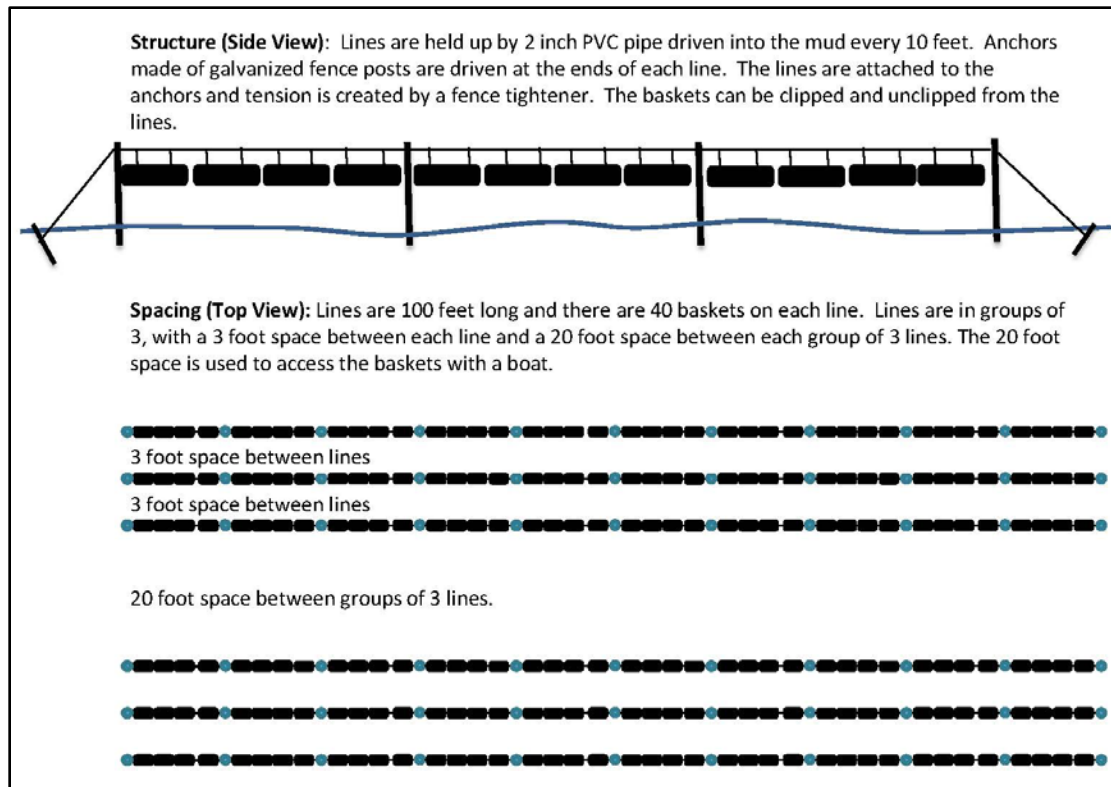


Figure 5. Proposed spacing of basket-on-longline culture equipment.



Figure 6. Basket-on-longline culture.



## REQUIRED REGULATORY APPROVALS

The Project may require the following regulatory approvals.

Agency	Regulatory Approval Type
Humboldt County Harbor, Recreation & Conservation District	Humboldt Bay Harbor District Permit
City of Eureka	Conditional Use Permit
United States Army Corps of Engineers	Department of Army Permit (Section 10 Rivers and Harbors Act)
California Coastal Commission	Coastal Development Permit and Coastal Zone Management Consistency Determination
North Coast Regional Water Quality Control Board	Clean Water Act, Porter Cologne Act

## IMPACT TERMINOLOGY

The following terms are used to describe the significance of impacts that could result from the Project:

- The Project is considered to have *no impact* if the analysis concludes that the Project could not affect a particular resource topic.
- An impact is considered *less than significant* if the analysis concludes that the Project would cause no substantial adverse change to the environment and that impacts would not require mitigation.
- An impact is considered *less than significant with mitigation* if the analysis concludes that the proposed Project would cause no substantial adverse change to the environment with the inclusion of mitigation measures identified by the lead agency.
- An impact is considered *environmentally significant* if the analysis concludes that the proposed Project would cause substantial adverse change to the environment that could not be reduced to less-than significant levels by the inclusion of identified mitigation measures.

**ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:**

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

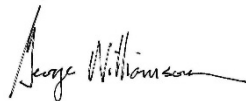
- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Aesthetics                        | <input type="checkbox"/> Greenhouse Gas Emissions      | <input type="checkbox"/> Population/Housing                            |
| <input type="checkbox"/> Agricultural & Forestry Resources | <input type="checkbox"/> Hazards & Hazardous Materials | <input type="checkbox"/> Public Services                               |
| <input checked="" type="checkbox"/> Air Quality            | <input type="checkbox"/> Hydrology/Water Quality       | <input type="checkbox"/> Recreation                                    |
| <input checked="" type="checkbox"/> Biological Resources   | <input type="checkbox"/> Land Use/Planning             | <input type="checkbox"/> Transportation/Traffic                        |
| <input checked="" type="checkbox"/> Cultural Resources     | <input type="checkbox"/> Mineral Resources             | <input type="checkbox"/> Utilities/Service Systems                     |
| <input type="checkbox"/> Geology/Soils                     | <input type="checkbox"/> Noise                         | <input checked="" type="checkbox"/> Mandatory Findings of Significance |

**DETERMINATION**

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature



Date: December 30, 2016

George Williamson, AICP  
Printed Name

Harbor District Planner

## ENVIRONMENTAL CHECKLIST

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>AESTHETICS:</b> Would the project:				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

### AESTHETICS DISCUSSION

**A. Less than Significant.** State Highway 101, along the eastern shore of Arcata Bay, is eligible for designation as a State Scenic Highway. Additionally, there are numerous scenic vistas from both the shores and surface waters of Humboldt Bay near the Project site.

The Project would increase mariculture operations in Humboldt Bay, thereby increasing the visibility of the operations. The Project would also increase the presence of people (culturists) and boats in the bay. Mariculture operations would be located in an intertidal area. As described above, the culture equipment consists of 24 in. x 6 in. x 10 in. baskets suspended of the bottom of the bay with 2-in. PVC and monofilament (Figure 6).

The operations are a minimum of 0.3 miles (app. 1,500 feet) from shore. For reference, this is greater than the length of four football fields. A keen observer may be able to discern that the culture is occurring in the bay. However, the effect on the scenic vista would be negligible. The operations would be visible by boaters in this part of the bay. However, the nearest navigable channel is over 1,700' to the north. At higher tides, boats could come closer to the culture operations. However, boating activity in this area is expected to be low.

The Humboldt County General Plan acknowledges that resource production areas add to the scenic value of Humboldt County (Policy SR-PX). No structures would be placed within 200 feet of a scenic road or viewpoint. Views of shellfish culture operations are common in Humboldt Bay and consistent with the current aesthetic character of the area. Because of the (1) low profile of the culture equipment; (2) long distance to shore; and (3) commonality of shellfish culture in the bay, the effect on the scenic vista would be less than significant.

**B. No Impact.** No scenic resources would be damaged. Hence, no impact is expected.



**C. Less than Significant.** See *Response A* above. Because of the (1) low profile of the culture equipment; (2) long distance to shore; and (3) commonality of shellfish culture in the bay, the effect on the existing visual character and quality of the site and its surroundings would be less than significant.

**D. Less than Significant.** The Project would involve increased lighting from boats and workers to enable occasional work at night. This lighting could be viewed by people on the shore of the bay, but because the lights would be distant from these viewers, the effect would be negligible. People on the bay (i.e., boaters) would be exposed to the lights at a closer distance, but the increased lighting would generally improve boating safety, and views would not be adversely affected. Additionally, night boating in this remote location of the bay would be uncommon (i.e., the site is not near any navigation channels or marinas).

The Project would create new sources of light during night time operations; however, this new source of light would not be substantial and would not adversely affect day or night time views in the area. Hence, this potential impact is considered less than significant.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>AGRICULTURE AND FOREST RESOURCES:</b> Would the project:				
a) 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?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) 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 forestland to non-forest use?				X

## AGRICULTURE AND FOREST RESOURCES DISCUSSION

**A through E. No Impact.** There is no agricultural land, forest land, Williamson Act contract, or area zoned as agricultural or forest land immediately adjacent to the Project site, but there is agriculturally zoned land on the shores of Humboldt Bay. The Project would have a beneficial effect on agricultural resources by increasing the footprint of shellfish culture in Humboldt Bay. There would be no negative impacts on agricultural resources, and the proposed land use is consistent with existing zoning, including zones designated by the City of Eureka Municipal Code (Section 156.065) and County of Humboldt Code (Section 313-5.4). The use is also consistent with policies pertaining to this part of the bay that are described in the Humboldt Bay Management Plan (HBHRCDC 2007) (Section 2.3.2). Hence, no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>AIR QUALITY:</b> Would the project:				
a) Conflict with or obstruct Implementation of the applicable air quality plan?		X		
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X

## AIR QUALITY DISCUSSION

**A through C. Less than Significant with Mitigation.** The Project area is located in the North Coast Air Basin and is under the jurisdiction of the North Coast Unified Air Quality Management District (AQMD). The Basin is in attainment of all federal and state air quality standards except for particulate matter smaller than 10 microns in diameter (PM<sub>10</sub>) under California regulations.

Small boats associated with mariculture operations have internal combustion engines that generate particulate matter. The proposed Project would involve the use of up to two such vessels. The vessel engines would contribute to a minor net increase in emissions of particulate matter. Given the small size and limited quantity of vessels, their contribution to PM<sub>10</sub> levels in Humboldt Bay is likely negligible, even without mitigation.

The AQMD regulates vessel engine emissions pursuant to several air quality plans. CEQA addresses circumstances such as this through reliance by lead agencies on the regulatory oversight of responsible agencies carrying out statewide policy. Specifically, State CEQA Guidelines § 15064(h) establishes a procedure that allows lead agencies, including the District, to rely on the environmental standards promulgated by other regulatory agencies, such as the AQMD, with respect to pollutant regulation. The AQMD has adopted several air quality management plan elements, including a “PM<sub>10</sub> Attainment Plan.”

The District finds that the Project would not contribute to a cumulatively significant air quality impact if farmers comply with the PM<sub>10</sub> Attainment Plan adopted by the AQMD and all attendant regulations established thereto. This conclusion is incorporated into the following MM Air-1. With implementation of this mitigation measure, potential air quality impacts would be less than significant.

**D through E: No Impact.** The Project would not create any substantial pollution concentrations or objectionable odors. Additionally, there are no sensitive receptors or a substantial number of people in the immediate vicinity of the Project site. Hence, no impact is expected.

#### Air Quality Mitigation Measures

**MM Air-1:** The project proponent shall consult with AQMD with respect to the requirements of adopted AQMD regulatory plans. The project proponent shall comply with the requirements of all adopted air quality plans, including plans covering particulate emissions, and shall implement required AQMD actions for the project proponent’s mariculture operations.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>BIOLOGICAL RESOURCES:</b> Would the project:				
a) 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 CA Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by CA Dept. of Fish & Wildlife or U.S. Fish & Wildlife Service?		X		



	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
d) 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?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

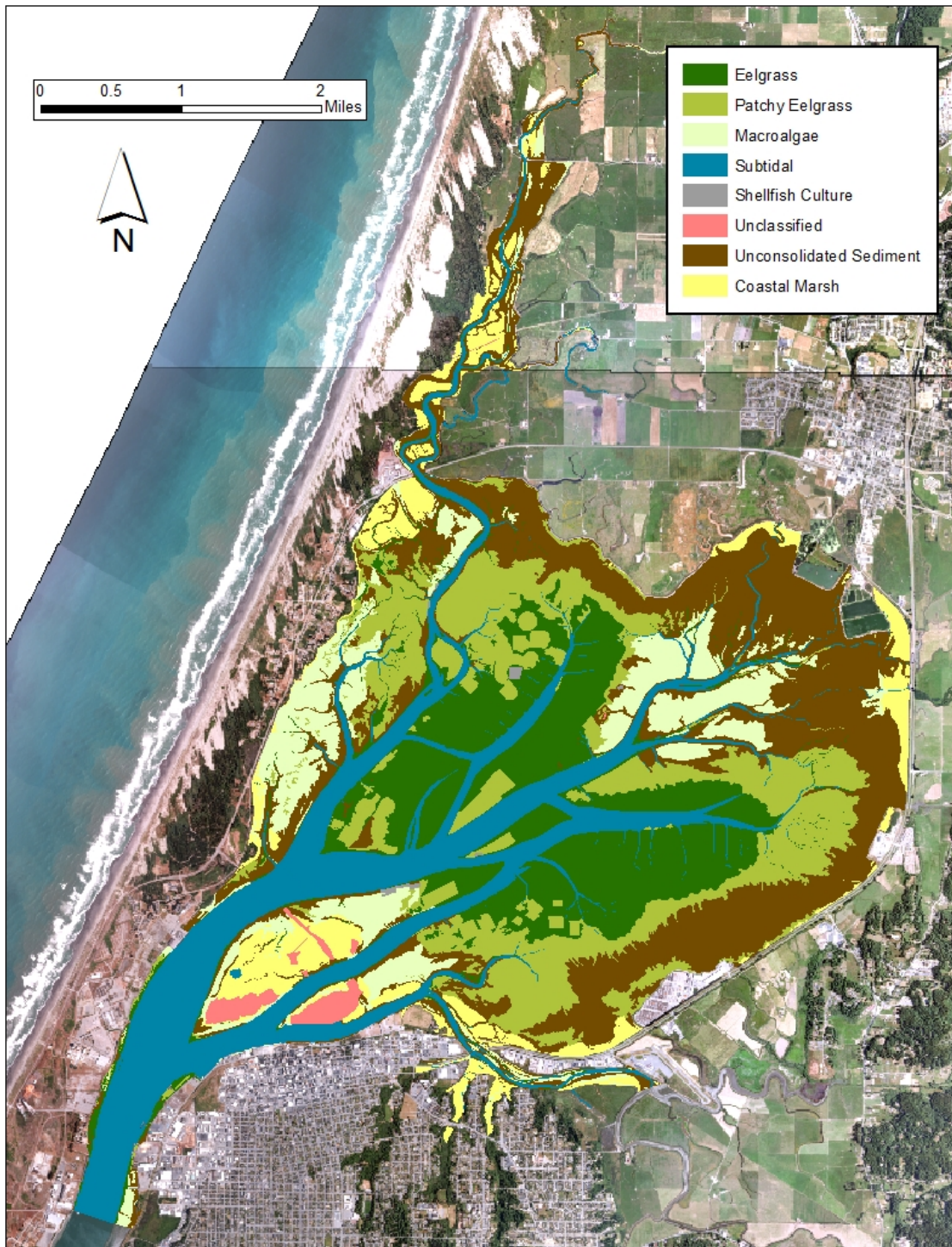
### Biological Setting

The Project will occur in and potentially affect intertidal habitats in Arcata Bay (Figure 4 and 7). Table 1 depicts the types and areas of intertidal habitats in Arcata Bay and the overlapping areas of existing shellfish culture and shellfish culture proposed by the Project.

**Table 1. Intertidal Habitat Areas in Arcata Bay and Overlapping Areas of Existing Shellfish Culture and Project Shellfish Culture.**

Habitat	Existing Culture				PROPOSED PROJECT	Existing and Project Culture	Total Habitat	% in Existing and Proposed
	Cultch-on-Longline	Rack-and-Bag	Basket-on-Longline	Nursery				
Unconsolidated Sediment	0.0	0.0	0.0	0.0	45.7	45.7	2,744.8	1.7%
Patchy Eelgrass (11-84% Cover)	242.7	5.6	10.4	1.6	18.4	278.7	1,879.9	14.8%
Eelgrass (85-100% Cover)	24.3	0.0	0.8	1.2	0.0	26.3	1,438.8	1.8%

\* Habitat types are based on mapping conducted by NOAA Coastal Services in 2009, with modifications to reflect actual footprints of active shellfish culture. - Note: The site also includes 0.3 acres of subtidal habitat.



**Figure 7. Arcata Bay and Arcata Bay Habitats as Defined by this Initial Study. (Habitat types are based on mapping conducted by NOAA Coastal Services in 2009, with modifications to reflect actual footprints of active shellfish culture.)**

### **Subtidal Community**

The proposed project site is intertidal. However, it is adjacent to and could potentially effect subtidal areas. The subtidal community in Humboldt Bay is comprised of plant and animal species that are always inundated by water. Due to the numerous aquatic species that occur in the bay and estuaries, “functionally related” species groups have been defined (HBHRCD 2007). Special status fish 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. These species are discussed throughout this Initial Study.

### **Intertidal Community**

The Project would occur in intertidal mudflats. Intertidal mudflats are exposed during lower tides and are submerged during higher tides. Channels cut across the mudflats. In some areas, eelgrass forms dense beds, and, in other areas, eelgrass is sparsely distributed or absent. Species of algae also occur on mudflats including red alga (*Polysiphonia*), rockweed (*Fucus* spp.) and sea lettuce (*Ulva* spp.). During high tides, fish, including special status fish species described in this Initial Study, can occur on mudflats and some may utilize them as foraging habitat. Various invertebrate species including the commercially and recreationally important Dungeness crab can also occur on mudflats, during high tides and low tides. Bird and marine mammal species also utilize intertidal areas. These species are discussed throughout this Initial Study.

### **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”. 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. The Project site is considered to be jurisdictional wetland.

### **California Coastal Act**

The Project area is within the California Coastal Commission’s area of retained permitting jurisdiction and the Project will require a Coastal Development Permit. The California Coastal Act (CalCA) contains policies to protect marine resources, coastal waters, estuaries, wetlands, water quality, and environmentally sensitive habitat areas.



### Special Status Species

The following species are identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS).

Common Name	Scientific Name	Status <sup>1</sup>
Green sturgeon, southern DPS	<i>Acipenser medirostris</i>	FT/CSSC. Designated critical habitat in Humboldt Bay.
Coho salmon, southern Oregon, northern California ESU	<i>Oncorhynchus kisutch</i>	FT/ST
Steelhead, Northern California DPS	<i>Oncorhynchus mykiss</i>	FT
Chinook salmon, California coastal ESU	<i>Oncorhynchus tshawytscha</i>	FT
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	CSSC
Pacific eulachon – southern DPS	<i>Thaleichthys pacificus</i>	FT
Longfin smelt	<i>Spirinchus thaleichthys</i>	ST
Black brant	<i>Branta bernicla nigricans</i>	CSSC
California brown pelican	<i>Pelecanus occidentalis californicus</i>	FP
Western snowy plover	<i>Charadrius nivosus nivosus</i>	FT/CSSC
Marbled murrelet	<i>Brachyramphus marmoratus</i>	FT/SE
Harbor seal	<i>Phoca vitulina</i>	Protected under the Marine Mammal Protection Act
Harbor porpoise	<i>Phocaena phocaena</i>	Protected under the Marine Mammal Protection Act
California sea lion	<i>Zalophus californicus</i>	Protected under the Marine Mammal Protection Act

Notes: DPS = Distinct Population Segment; ESU = Evolutionarily Significant Unit.

<sup>1</sup> Status abbreviations: FT = Listed as threatened under the federal Endangered Species Act; ST = Listed as threatened under the California Endangered Species Act; CSSC = California Species of Special Concern; FP = Fully protected in California.

These species are described below.

### Green Sturgeon

The green sturgeon is a long-lived, slow-growing fish species. Mature males range from 4.5 to 6.5 feet in fork length and they do not mature until they are at least 15 years old, whereas mature females range from 5 to 7 feet in fork length and do not mature until they are at least 17 years old. The maximum ages of adult green sturgeon are likely to range from 60 to 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 spend most of their lives in nearshore oceanic waters, bays (including Humboldt Bay), and estuaries. Spawning occurs in deep pools in large rivers. Currently, spawning is believed to occur in the Klamath River basin, the Sacramento River, and the South Fork of the Trinity River; however, the listed southern DPS is only known to spawn in the Sacramento River, but migrates northward to Canada along the coast and enters bays and estuaries. Spawning does not occur in creeks flowing into Humboldt Bay. Green sturgeon adults have been observed in channels within Humboldt Bay (Lindley et al. 2011) and Humboldt Bay is designated as critical habitat (74 FR 52300).

### Coho and Chinook Salmon, Steelhead, and Coastal Cutthroat Trout (Salmonids)

Salmonid life history is characterized by periods of ocean/coastal pelagic conditions, adult upstream migration, spawning and egg development, fry and juvenile development and rearing, and smolt outmigration. Channels in marsh habitats may be of particular importance to subyearling salmonids because they contain abundant insect and invertebrate prey resources and may provide refuge from predators (Bottom et al. 2005). Pinnix et al. (2013) found that in Humboldt Bay, juvenile coho salmon utilize deep channels, channel margins and floating eelgrass mats as they migrate offshore as smolts to the ocean. Juvenile coho salmon were less likely to occur in shallow channels with large intertidal mudflats and eelgrass meadows in Humboldt Bay (Pinnix et al. 2013).

### Pacific Eulachon – Southern DPS

The Pacific eulachon is a small, anadromous fish from the eastern Pacific Ocean (76 FR 65324). 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, 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 “dispersed by estuarine and ocean currents shortly after hatching” (76 FR 65324).

Eulachon have been documented in Humboldt Bay and spawn in nearby coastal rivers, such as Redwood Creek and the Mad River, although in local rivers, the species is thought to be extirpated (or nearly so). California Natural Diversity Database (CNDDB) records of the species contain no dates, specific locations, or other survey information. 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.

### Longfin Smelt

The longfin smelt is a short-lived species (generally living 2 years). Adults spawn in low-salinity or freshwater areas in the lower reaches of coastal rivers. The buoyant larvae are swept into more brackish waters, where they rear. Longfin smelt are known to occur in Humboldt Bay, but little is known regarding their distribution, abundance or life history there. Larval longfin smelt have been captured in the winter in bottom trawls in Humboldt Bay (Eldridge and Bryan 1972).

### Black Brant

Black brant breed in Alaska and over-winter in Baja California, Mexico. Humboldt Bay is an important spring staging site for black brant in the Pacific flyway. Brant rely exclusively on eelgrass during the non-breeding season and their distributions are strongly correlated with the distribution of eelgrass (Moore et al. 2004). Humboldt Bay is one of the most important spring staging areas in the Pacific flyway and represents the most important spring staging site in California (Moore et al. 2004).

### California Brown Pelican

The brown pelican was listed as endangered until 2009 when the California brown pelican population was determined to have sufficiently recovered to be delisted by both the federal (74 FR 59443) and state agencies. Pelican populations were decimated by the effects of DDT and the species began to recover after the chemical was banned in 1972. The California brown pelican ranges along the Pacific Coast from California to Mexico. Established breeding colonies occur on West Anacapa Island, Santa Barbara Island, and at the Salton Sea; communal winter roosts occur throughout the range (Shields 2002). Preferred winter roost sites are comprised of estuaries, sand bars, spits, or beaches that are close to aquatic foraging grounds, allow the birds to dry off after foraging, and offer shelter from predators and the elements (Jacques et al 1996, Shields 2002). Pelicans forage in relatively warm brackish and ocean waters where fish are close enough to the surface to be captured by plunge-diving birds (Shields 2002). Non-breeding brown pelicans occur in Humboldt Bay, most commonly in the fall, and often roost on artificial structures, particularly in areas that are isolated from human disturbance.

### Western Snowy Plover

The western snowy plover nests along the Pacific Coast from Damon Point, Washington to Bahia Magdalena, Baja California, Mexico (USFWS 2007). Degradation and use of habitat for human activities has been largely responsible for the decline in the snowy plover breeding population; other important threats to the snowy plover are mammalian and avian predators, and human disturbance (Page et al. 1995). 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 in Humboldt Bay, but mostly in the South Bay on sandier substrates rather than on softer substrates associated with mudflats in Arcata Bay.



### Marbled Murrelet

The marbled murrelet 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). In California, marbled murrelets nest in redwoods that are older than 200 years (Nelson 1997). They are also vulnerable to oil spills along the coast. Marbled murrelets can occur in Humboldt Bay as foragers, and are expected to primarily occur in the entrance portion of the bay.

### Harbor Seal

Harbor seals 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). In northern California, pupping peaks in June and lasts about 2 weeks; pups are weaned in 4 weeks (Burns 2008). Foraging occurs in a variety of habitats, from streams to bays to the open ocean, and harbor seals can dive to depths of almost 500 m (Eguchi and Harvey 2005). Harbor seals breed along the Humboldt County coast and inhabit the area throughout the year (Sullivan, 1980). Harbor seals use Humboldt Bay as a pupping and haul-out area; other nearby haul-out sites are located in Trinidad Bay and the mouths of the Mad and Eel Rivers.

### Harbor Porpoise

Harbor porpoises 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; Gaskin, 1984). Harbor porpoises from California to the inland waters of Washington have been divided into six stocks (Carretta et al., 2009), with three additional stocks occurring in Alaskan waters (Angliss and Allen, 2009). Porpoises from Humboldt County are included in the northern California/southern Oregon stock that extends from Point Arena to Lincoln City, Oregon (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.

### California Sea Lion

California sea lions 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 (Carretta et al., 2009; Lowry et al., 2008). 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 such as salmonids (*Oncorhynchus spp.*), Pacific sardines (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), Pacific mackerel (*Scomber japonicus*), Pacific whiting (*Merluccius productus*), rockfish

(*Sebastes spp.*), and market squid (*Loligo opalescens*) (Lowry and Carretta, 1999; Lowry and Forney, 2005; Lowry et al., 1991; Weise, 2000). California sea lions do not breed along the Humboldt County coast; however non-breeding or migrating individuals may occur in Humboldt Bay.

## BIOLOGICAL RESOURCES DISCUSSION

### A: Less than Significant with Mitigation.

A1. Effects of intertidal culture on black brant (*Branta bernicla nigricans*) as a result of loss of foraging habitat and alteration of food sources. The Project will expand Humboldt Bay shellfish culture in 64 acres. Forty-six acres would occur in areas mapped as unconsolidated sediment (NMFS 2009) where eelgrass is sparse. In these areas eelgrass can occur in depressions and channels. Eighteen acres are mapped as patchy eelgrass (11-84% cover) (NMFS 2009). In this area, eelgrass is more abundant. Areas under and between aquaculture will continue to be available for foraging brant, but the extent this species will continue to forage in areas with culture and associated human disturbance is unknown. Because they are a hunted species, brant are likely more sensitive to human disturbance than other species, including shorebirds.

Although it is unknown to what extent brant currently rely on and will continue to use eelgrass in the project area, it may be conservatively assumed that brant will avoid using aquaculture areas due to placement of infrastructure and increased human disturbance. Nonetheless, the project is sited to avoid what is considered the highest value eelgrass habitat for brant (dense eelgrass). Additionally, the potential loss of habitat represents a small proportion of foraging habitat available in Arcata Bay. Although eelgrass habitat in Arcata Bay represents important spring stopover habitat for the species, the potential loss of a small proportion of available habitat will not result in a significant impact per the criteria described above for CEQA and thus the impact is considered less than significant.

A2. Potential impact to marine mammals from the potential loss of foraging habitat and restrictions to movement due to placement of aquaculture equipment in intertidal areas.

Harbor seals breed along the Humboldt County coast and inhabit the region throughout the year (Sullivan 1980). Harbor seals will utilize Humboldt Bay as a pupping and haul-out area; other haul-out sites are located in Trinidad Bay and the mouths of the Mad and Eel Rivers. California sea lions do not breed along the Humboldt County coast; however non-breeding or migrating individuals can occur in Humboldt Bay. Harbor porpoises (*Phocoena phocoena*) 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.

When in Humboldt Bay, marine mammals may occasionally move through the project site, though the site is intentionally sited at a relatively high tidal elevation and away from channels, where marine mammals are less likely to occur. These species are expected to move through,

and forage in, the channels that occur between shallow intertidal areas rather than the shallower areas where intertidal aquaculture beds will be located. If moving through intertidal areas during high tides, longline structures are not expected to restrict movements of marine mammals, as these species would readily navigate the culture equipment and move through spaces between equipment. The placement of off-bottom aquaculture infrastructure will not limit the species' ability to haul-out in Arcata Bay, as the Project area represents a small proportion of the potential areas that can be used for haul-outs and is not a known or likely haul-out site. Therefore, impacts to movement and foraging by marine mammals are considered less than significant.

A3. Effects of human disturbance (e.g., boat movement, presence of culture workers) on marine mammals and other wildlife. Aquaculturists will visit leased areas approximately every six weeks for installation, inspections, planting and harvesting, product grading, and other activities related to aquaculture practices. Noise will be generated from small vessels, movement and maintenance of equipment and communication among aquaculture workers. Noise from aquaculture practices will be similar to what occurs from other users of the bay including recreational users (e.g., hunters, fishermen, and paddle and motor boaters) and commercial users (e.g., shippers and commercial fishermen).

Shorebirds and wading birds (i.e., herons and egrets [Ardeidae]) frequently forage in intertidal areas during low tide and may occur within or adjacent to intertidal aquaculture beds. During higher tides, diving ducks and piscivorous birds, like western grebes (*Aechmophorus occidentalis*) and double-crested cormorants (*Phalacrocorax auritus*), will forage in channels near intertidal sites. Some birds, including cormorants, elegant terns (*Thalasseus elegans*), or California brown pelicans (*Pelecanus occidentalis californicus*) may roost on rafts or other structures associated with aquaculture. Marine mammals may also occur around raft structures and sea lions may occasionally loaf on structures if no humans are present. Marine mammals may also occur in channels near intertidal aquaculture sites and harbor seals may occasionally haul-out on mudflats in intertidal areas.

Human disturbance associated with visits to aquaculture sites has the potential to flush waterbirds that may be foraging or roosting within or near aquaculture areas. Such disturbance in close proximity to foraging or roosting birds can cause them to flush from the area. It is expected that many birds will become habituated to human disturbance and only flush to nearby sites (and quickly return after the activity is complete) whereas other individuals may flush greater distances if they are more wary of humans or noise. These disturbances have energetic costs associated with flight while birds search for alternative roosts or foraging sites, with larger birds experiencing higher energetic costs. Disturbance could also result in a reduction in foraging efficiency in nearby foraging areas (or alternative sites), increased movement, or altered activity patterns that reduce energy reserves and increase predation risk. An increase in energetic output to acquire foraging resources could ultimately result in lowered reproductive success for some individuals. It is expected that birds will locate to alternative roost sites when flushed from aquaculture areas. However, foraging areas are not likely limited for most species that use intertidal habitats. Although some species may experience reduced

foraging opportunities and increased energetic costs, activities at aquaculture areas will be similar to those already occurring in Arcata Bay and long-term population-level effects are unlikely to occur even for the most sensitive species.

Human disturbance could cause marine mammals to flush from their haul-out sites on mudflats. As described above for avian species, flushing of marine mammals may increase energetic demands on individuals if they are disturbed from resting areas and forced to relocate. However, haul-out sites and other loafing areas are not limited in Arcata Bay and sensitive species will likely utilize alternative sites that receive infrequent human disturbance. Additionally, the Project site is not a known or likely haul-out site. Also, MM BIO-1 below will require avoidance of marine mammals. Impacts to marine mammals and other wildlife associated with human disturbance are considered less than significant with implementation of MM BIO-1.

A4. Effects of artificial lighting on wildlife. The adverse effects of artificial night lighting on terrestrial, aquatic, and marine sources such as birds, mammals and plants are well documented (Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive and development rates, changes in foraging behavior and predator-prey interactions, altered natural community assemblages and phototaxis (attraction and movement towards light). For instance, when birds fly into lighted areas at night, they may lose their visual cues to the horizon and the lights then become the reference, resulting in disorientation (Herbert 1970). Also, there is evidence that floodlights on structures, such as buildings and bridges, will attract and kill migrant birds, especially on misty and cloudy nights during fall and spring (Overing 1938; Lord 1951; Baldwin 1965; Herndon 1973; Jackson et al. 1974). Fish are known to be attracted to lights as well and increased lighting can alter behavior and increase prey risk. For example, salmonid fry have been observed slowing or stopping out-migration, and thus subjected to increased predation when exposed to bright lights from the shoreline (Tabor et al. 2004). However, an increase in lighting from the boat traffic associated with the Project (i.e., from navigation lights) is expected to be insignificant, particularly because visits to the project site would only occur approximately every six weeks and typically during daylight hours.

A5. Effects to green sturgeon as a result of potential reduction in prey. Tributaries to Humboldt Bay do not provide spawning habitat for green sturgeon. However, adult green sturgeon are known to temporarily reside in deeper channels in the bay (Lindley et al. 2011). The project is sited at relatively high elevations and therefore avoids deeper parts of the bay where green sturgeon are most expected to occur. Beamis and Kynard (1997) suggested that green sturgeon move into the estuaries of non-natal rivers to feed; this is likely true for Humboldt Bay. Likely food sources for green sturgeon are small fishes and benthic invertebrates associated with silty/sandy substrates and benthic fauna. There are two potential processes by which the proposed mariculture operations could reduce these prey resources: by displacing prey and by causing ecosystem changes that result in reduced prey populations or availability. The first potential effect is discussed below. The second is discussed assessed in A-6, "Effects on the abundance of suspended organic matter and related effects to other native species."

The proposed intertidal mariculture areas are only temporarily inundated with tidal waters. Small fish that may be prey for green sturgeon likely forage in these areas. However, there is ample space for prey fish species to forage among the mariculture equipment and cultured shellfish. Additionally, cultured shellfish and mariculture equipment can benefit small fish by providing habitat and food resources (see review by Dumbauld et al. 2009). Hence, the Project's proposed culture is not expected to negatively affect small fish. Additionally, benthic invertebrates have been shown to occur at higher densities in intertidal areas with cultured shellfish than in intertidal areas without cultured shellfish (see review by Dumbauld et al. 2009). Based on available information, there is no reason to conclude that intertidal culture would reduce prey resources for green sturgeon.

Based on the above, the Project is not expected to have a significant effect on green sturgeon as a result of prey reduction and no mitigation measures are recommended. Hence, this impact is considered less than significant.

A-6. Effects on the abundance of suspended organic matter and related effects to native species. The certified Final EIR (FEIR) for the Humboldt Bay Mariculture Pre-Permitting Project (SC#2013062068) analyzed shellfish culture effects on suspended organic matter at the Project site. This analysis assumed higher cultured shellfish densities than proposed by the Project and therefore assumed a higher level of potential effects to suspended organic matter. Specifically, the analysis considered a rack-and-bag method which cultures higher densities of shellfish than the proposed basket-on-longline method. That FEIR, which is incorporated by reference, found that the effect is less than significant. The relevant analysis from the Humboldt Bay Mariculture Pre-Permitting Project FEIR is included as Attachment A.

A-7. Effects to green sturgeon as a result of habitat loss or degradation. As described under A-5 (Effects to green sturgeon as a result of potential reduction in prey), green sturgeon likely utilize Humboldt Bay for feeding and the Project is unlikely to have a negative effect on prey resources for green sturgeon. Green sturgeon habitat would also be affected by placement of culture equipment on the bottom, which can displace green sturgeon habitat. The Project would allow for approximately 75 ft<sup>2</sup> of additional benthic footprint from PVC posts that support the lines. Space between shellfish culture equipment would remain available for use by sturgeon because culture areas are permeable (sturgeon can freely move within the culture areas).

Based on the above, the Project is not expected to have a significant effect on green sturgeon as a result of habitat loss or degradation and this impact is considered less than significant without mitigation.

A-8. Effects to green sturgeon as a result of entanglement. As an anadromous species, sturgeon swim among diverse structures in rivers, embayments, and the ocean. They have the sensory ability to detect structures and the swimming ability to avoid them. It is expected that green sturgeon would not collide or become entangled with mariculture equipment or cultured shellfish. Shellfish culture has occurred for decades in West Coast embayments where sturgeon

occur, and there is no known record (anecdotal or otherwise) of a sturgeon ever becoming entangled in mariculture equipment. Additionally, the Project site is not near any major channels which would be expected movement corridors for green sturgeon. No impact is expected.

A-9. Potential for cultured shellfish to naturalize or establish self-sustaining populations outside of cultivation and the effects of this naturalization on native marine species and communities.

Successful spawning of Pacific oysters south of Willapa Bay, WA is believed to be rare (Carlton 1992). This is likely also true for Kumamoto oysters, as neither species has become well established in the Humboldt Bay outside of culture areas. The species proposed for culture by the Project have been cultured in Humboldt Bay for decades without evidence of propagation in the bay. Hence, no impact is expected.

**B. Less than Significant with Mitigation**

B-1. Impacts to Eelgrass. Humboldt Bay contains approximately 45% of California's eelgrass habitat (Gilkerson 2008) and eelgrass is one of the most abundant habitats in Arcata Bay, densely covering approximately 1,365 ac of Arcata Bay's 7,166 ac of subtidal and intertidal habitats (Table 1). According to Schlosser and Eicher (2012) "Past records suggest that eelgrass distribution in Humboldt Bay has retained the same general footprint over the last 150 years, with some year-to-year fluctuations" and "The year-to-year fluctuations noted by numerous investigators occur primarily at the upper margins of continuous eelgrass beds-i.e., in some years, eelgrass extends higher in the intertidal zone than in other years." Based on data reported in Schlosser and Eicher (2012), mapped eelgrass in North Bay (Arcata Bay) has ranged from a minimum of 840 ac in 1959 to a maximum of 3,577 ac in 2009. However, comparing mapped eelgrass between years may not be very meaningful due to (1) differences in mapping methods, and (2) the fact that eelgrass distribution varies seasonally and mapping was not necessarily done during the same season each year. In Humboldt Bay, eelgrass has critical ecological functions and is important to numerous fish and wildlife species including species listed under the state and federal ESAs. The ecological functions of eelgrass in Humboldt Bay are described well in the HBMP EIR (HBHRCO 2006) which is incorporated by reference to this IS.

Areas in Humboldt Bay that support eelgrass are considered special aquatic sites under the 404(b)(1) guidelines of the CWA (40 CFR 230.43). Under the Magnuson-Stevens Fishery Conservation and Management Act, eelgrass is designated as Essential Fish Habitat for federally-managed fish species within the Pacific Coast Groundfish and Pacific Coast Salmon Fisheries Management Plans. Also, under the Magnuson-Stevens Fishery Conservation and Management Act eelgrass is considered a Habitat Area of Particular Concern. In 2014, NMFS released a California eelgrass mitigation policy which contains recommendations for managing eelgrass in California (NMFS 2014).

The Project is designed to avoid impacts to eelgrass to the maximum extent possible. The Project site was identified with specific consideration towards its ability to support shellfish



culture without impacting eelgrass (i.e., it is at a relatively high tidal elevation where eelgrass is less abundant). Eelgrass that is present may be trampled by farm workers or accidentally come into contact with boat hulls and/or propellers. Additionally, the presence of culture equipment and cultured animals may have some effect on circulation patterns and sedimentation, which could have a negative or positive effect on eelgrass distribution. Culture equipment and shellfish could also reduce light availability and decrease eelgrass density. Notably, many areas of Humboldt Bay where eelgrass occurs have been cultured for decades and these areas retain eelgrass. Overall, Project impacts may result in some decrease in the density of eelgrass plants. However, with the eelgrass mitigation measures described below (MM Bio-2 and MM Bio-3), the impact would be minimized. Additionally, MM Bio-4 would require the permanent conservation of 22 acres of unconsolidated sediment habitat. This impact is considered less than significant with mitigation.

B-2. Effect on benthic habitat and communities from the shellfish culture. Shellfish culture will affect benthic habitat. Hosack et al. (2006) found that structured habitats (both eelgrass and oyster aquaculture) supported more diverse and dense populations of epibenthic and benthic invertebrates. Additionally, posts will displace benthic habitat used by animals, including polychaetes, crustaceans and mollusks. Benthic habitat that will be displaced by Project equipment is also used for foraging by bird and fish species. The Project would allow for approximately 75 ft<sup>2</sup> of additional benthic footprint from posts that suspend the lines. MM Bio-4 would offset this minor impact to benthic habitat by permanently preserving 22 acres of unconsolidated sediment habitat.

B-3. Potential impacts to submerged aquatic vegetation and benthic habitat resulting from bottom scour and outboard motor contact associated with support vessel operations and trampling by workers. The project site would be visited approximately every six weeks for maintenance, grading, harvesting and other activities. It is expected that there will be some impacts to submerged aquatic vegetation and benthic habitat resulting from bottom scour and outboard contact associated with support vessels and trampling by workers. However, effects are expected to be temporary (i.e., vegetation and benthic habitats are expected to recover after disturbance) and the spatial extent of the impact is expected to be small relative to the area of submerged aquatic vegetation and benthic habitats in Arcata Bay. Due to the low frequency of occurrence and small spatial extent this impact is considered less than significant.

B-4: Potential biological effects of the addition of shellfish culture structures due to potential changes in light transmission through the water column, water flow and sediment transport. To some extent, culture equipment will reduce light transmission through the water column. This could potentially affect primary productivity in the water column as well as benthic productivity. However, water clarity in Humboldt Bay is naturally very poor. Measurements by Barnhart et al. (1992) showed that in several areas the maximum depth to which 1% of surface illumination penetrates is less than an average of four feet. Culture equipment could also reduce water flow rates and result in sedimentation pattern changes; as sediment may seasonally accumulate and erode. This is not expected to have any significant ecological effects and sea level rise may (or may not) compensate for any net elevation increases by increasing

the depth of water in the bay. This is not expected to result in a substantial effect to ecological values of the bay or biological resources and this impact is considered less than significant.

B-5: Impact on the distribution and dispersal of non-native invertebrate fouling species. Hard substrate will be added by the Project in the form of lines, baskets and posts. This substrate will attract fouling organisms. During a study by Boyle et al. (2006) of fouling organism composition and succession at Woodley Island in Humboldt Bay, 34% of all species identified were non-native. It is expected that fouling organisms of shellfish and shellfish culture equipment will also be both native and non-native. This effect is considered neutral as it benefits both natives and non-natives in a similar composition as at other hard substrate. However, there is the potential for activities that involve removal of fouling organisms to further disperse non-native fouling organisms. Certain species such as didemnum may disperse with currents, reproduce and further spread their distribution. The extent that this may actually occur is unknown and warrants research. However, as a precautionary approach, MM Bio-5 will substantially reduce opportunities for dispersal and with this mitigation measure the impact is less than significant.

### **C. Less than Significant with Mitigation**

C-1. Effects on wetland functions. Wetlands, including in Humboldt Bay, provide numerous functions such as primary production, flood protection, nutrient removal/transformation, wildlife habitat and recreational opportunities. These functions are assessed separately throughout this section. In general, the addition of shellfish culture activities to a wetland does not preclude the functions of that wetland. For example, in areas with shellfish culture; plants grow, flood protection functions continue and nutrients are removed and transformed. However, wetland areas would be altered. As mitigation to this alteration, mitigation MM Bio-4 will be implemented, which will permanently conserve 22 acres of wetland habitat.

C-2. Conflicts with local policies, particularly those described in the HBMP which is a guidance document for the District and the LCPs of the County of Humboldt, City of Eureka and City of Arcata. The Project is consistent with these policies. This area of Humboldt Bay is identified as suitable for mariculture in the HBMP. Additionally, the Project has many design components that limit its effect on ecological resources, consistent with Local Coastal Plans. Hence, there is not an impact.

### **D. Less than Significant with Mitigation**

D-1. Effects of intertidal culture on shorebird species as a result of loss of foraging habitat and alteration of food sources. Humboldt Bay is an important estuary for migrating and wintering shorebirds in the Pacific flyway, and the bay has been designated as an International site in the Western Hemisphere Shorebird Reserve Network. During bay-wide surveys, as many as 32 shorebird species and over 80,000 individuals have been recorded during spring migration (as observed in April 1991) although shorebird counts conducted during the 1990's reflect a decline relative to historic estimates (Colwell 1994). In Humboldt Bay, a suite of non-breeding shorebird species use intertidal mudflat areas for foraging, although their habitat use is differential based

on species' morphology, water depth (and thus tidal cycles), and substrate type. In general, shorebirds are very flexible and opportunistic in their diets, with considerable dietary overlap among species and foraging guilds (Skagen and Oman 1996). They often take prey in accordance with availability, concentrating where prey is most dense (Goss-Custard 1970; 1977; 1979). These birds often concentrate at the edge of the receding tideline, where worms, crustaceans, and bivalves occur close to the surface. Thus, the hydrologic regimes and ecosystem processes that maintain abundant invertebrate populations are more important than the specific invertebrate taxa available. Near the waterline, shorebird microhabitat use typically depends on each species' leg length, as well as the size and shape of their bills. For example, the very shortest-billed semipalmated plovers (*Charadrius semipalmatus*) and black-bellied plovers (*Pluvialis squatarola*) often feed on recently exposed mud, small sandpipers (*Calidris* spp.) such as western sandpiper (*Calidris mauri*) and least sandpipers (*Calidris minutilla*) forage on recently uncovered mud and shallow water, mid-sized birds such as dunlin (*Calidris alpina*), long-billed dowitchers (*Limnodromus scolopaceus*), and short-billed dowitchers (*Limnodromus griseus*) can forage in slightly deeper water, and larger shorebirds such as willets (*Tringa semipalmatus*), long-billed curlews (*Numenius americanus*), and marbled godwits (*Limosa fedoa*) are able to probe in deeper water (although these species will forage in exposed areas as well).

Shorebirds in Humboldt Bay also exploit other habitats, particularly agricultural fields, when intertidal mudflats are inundated (Colwell and Dodd 1997; Long and Ralph 2001). Shorebird use of pastures is correlated with rainfall, as shorebirds likely exploit increased prey availability when pastures are wet, or possibly their use of pastures is related to a decrease in prey availability on mudflats during rainfall (Colwell and Dodd 1997). In addition to bill shape and leg length, sediment type can dictate where shorebird species forage. Sediment particle size influences shorebird distribution in Humboldt Bay, for instance sanderlings (*Calidris alba*) tend to select areas with coarser sediments and American avocets (*Recurvirostra americana*) tend to occur in areas with finer sediments (Danufsky and Colwell 2003).

Aquaculture practices in intertidal areas may have the potential to reduce the amount of available foraging habitat for shorebirds through habitat modification (Colwell 1994) and a study on wintering shorebirds conducted in Tomales Bay suggests that some shorebird species can avoid aquaculture areas (Kelly et al. 1996), although those observed effects are likely related to bottom-culture techniques that are no longer used in Humboldt Bay (Kelly et al. 1996 didn't differentiate between the off-bottom and bottom-culture methods being studied). Foraging resources for shorebirds are affected in two primary ways by shellfish culture: (1) cultured animals and associated bio-fouling organisms can be a food source to birds (Caldow et al. 2007; Forrest et al. 2009), and (2) habitats, and thus food resources, below culture operations can be altered (Trianni 1996; Quintino et al. 2012). Under the Project, aquaculture would be permitted to occur on a total of 64 ac in Arcata Bay, with most (46 ac) occurring over unconsolidated sediment and 18 ac over patchy eelgrass (Table 1). Shorebirds may use any of these areas when exposed during lower tides.

The placement of basket-on-longline infrastructure within intertidal habitats in Arcata Bay could preclude shorebirds from entering all or portions of the project site, as some species may be wary of objects placed on mudflats. Human disturbance may also preclude shorebirds from using intertidal sites, at least temporarily, due to human disturbance. However, disturbance would be infrequent (approximately every six weeks). Some birds may avoid aquaculture beds entirely, or avoid walking or foraging only under lines. In such cases birds may utilize rows between aquaculture beds. Alternatively, shorebirds may be attracted to aquaculture areas due to an increase in foraging resources associated with cultured oysters or other organisms that grow on the infrastructure. The presence of shells and disturbance of substrate from site access during maintenance and harvest also increases substrate heterogeneity which may attract or deter shorebird species, depending on foraging techniques used.

Due to variation in foraging technique, sensitivity to structures in intertidal habitats, and social structure (e.g., flocking vs. territorial behavior), it is likely shorebird species will be differentially affected by the Project. The relative importance of Humboldt Bay for migration or for extended non-breeding periods (i.e., as a resource for foraging) differs between shorebird species due to variation in migration strategies. For instance, small sandpipers arrive in Humboldt Bay in large flocks and can be observed numbering in the thousands (Colwell 1994), although their residency time in the estuary is short. A study on radio-marked western sandpipers found that the mean length of stay in Humboldt Bay was 3.3 days (Warnock and Bishop 1998), indicating this species uses multiple short flights and stopovers during migration. Contrary to this strategy, long-billed curlews spend long “wintering” periods (i.e., June through March) in Humboldt Bay and establish non-breeding low-tide territories and use agricultural fields, particularly during winter rain periods (Colwell and Dodd 1997; Colwell and Mathis 2001). Thus, territorial birds that reside in the bay longer are likely to be more affected by the Project than birds that reside in the bay for short durations and with little fidelity to specific foraging sites.

A study in Humboldt Bay comparing low-tide shorebird use of cultch-on-longline plots to adjacent tidal flats not used for aquaculture was conducted by Connolly and Colwell (2005). The results indicate greater bird species diversity on longline oyster plots than on the tidal flats without oyster culture (i.e., control plots), although there was variation in species use of longline and control plots. Where differences occurred, five species (willet, whimbrel [*Numenius phaeopus*], dowitchers, small sandpipers, and black turnstone [*Arenaria melanocephala*]) were more abundant on longline plots than control plots during the study (Connolly and Colwell 2005). The authors suggest that increased abundance of these shorebirds on longline plots was potentially related to increased foraging opportunity or an increase of prey density or diversity. One species (black-bellied plover) was more abundant only on control plots. The authors suggest that greater use of control plots by black-bellied plovers may be a result of greater abundance of their principle prey items occurring on control plots, or factors related to reduced foraging efficiency related to their visual foraging methods. For instance, prey may be less available to black-bellied plovers, due to higher concentrations of shorebirds attracted to the longlines, or prey may be less detectable due to visual obstructions in longline plots.

There are some limitations associated with the Connolly and Colwell (2005) study in terms of its applicability for impact assessment for the Project. First, the study plots were associated with cultch-on-longline beds, but not basket-on-longline that would be implemented. The basket-on-longline method could have the potential to deter shorebirds from using aquaculture beds, more so than cultch-on-longline, as suspended baskets are more likely to obscure visibility and predator detection for shorebirds. Also, the spatial scale of the Connolly and Colwell (2005) study may have been inadequate to appropriately assess aquaculture practices on long-billed curlews, as many individuals of this species will occupy non-breeding territories in Humboldt Bay (Colwell and Mathis 2001) and the study plots were established irrespective of curlew territories. Thus, although long-billed curlews may have shown no preference for longline or control plots in the study, use or avoidance of aquaculture areas is difficult to assess if few territories overlap with study plots (Connolly and Colwell 2005).

Based on the results of the previous study of aquaculture use by shorebirds in Humboldt Bay, some species (and possibly most species) may be unaffected by the Project or could benefit from increased prey abundance under aquaculture beds, while others may tend to avoid aquaculture beds. However, as noted above, no studies have been conducted in regards to shorebird response to the basket-on-longline method, and thus it is possible that some species that would forage under cultch-and-longline may avoid those areas partially or completely. For some species, complete avoidance of aquaculture areas may not result in adverse effects such as increased competition for food and reduced body condition, as many species (e.g., western sandpipers) demonstrate plasticity in selecting stopover sites, thus allowing for them to opportunistically exploit food resources when available and facilitating predator avoidance. This is evidenced by large flocks of small sandpipers that are routinely observed foraging on mudflats throughout Humboldt Bay for brief durations during migration. Because sandpipers are able to forage in various locations throughout the bay, demonstrating low site fidelity, foraging habitat is likely not limited during their brief stopovers. Although up to 64 ac of intertidal mudflats could be used for aquaculture, species exhibiting brief stopovers are unlikely to be affected by loss of habitat even if those areas are avoided.

Other species, long-billed curlews in particular, may be disproportionately affected, as they are large, territorial birds that rely on intertidal foraging areas for extended periods during the non-breeding season. It is unknown how long-billed curlews will respond to aquaculture, but it is possible that curlews may be displaced from those areas. Although curlews are known to use pastures as alternative habitats during wet periods, their territoriality on mudflats during low tides suggest those areas represent important foraging areas for meeting their energetic needs for migration and reproduction. Loss of available habitat could result in increased competition and reduced foraging efficiency in alternative foraging areas, such as pastures, or altered activity patterns that reduce energy reserves and increase predation risk. Further, if curlews do maintain territories in aquaculture areas, they could be periodically displaced approximately every six weeks by the presence of humans. Large birds, like curlews, experience higher energetic costs when forced to fly than smaller birds, like small sandpipers. In the context of their population size, the long-billed curlew range-wide population has been estimated to be 161,181 individuals (Jones et al. 2008). The potential loss of foraging habitat for curlews would

not result in habitat or population-level impacts that are sufficient to meet CEQA criteria for a significant impact. As described above, curlews (due to their territoriality) are more likely to be affected by the Project than other shorebirds, particularly small sandpipers that utilize the bay in large numbers but for short durations. Therefore, the Project is expected to have a minor impact. This impact would be mitigated through MM Bio-4 which would conserve 22 acres of unconsolidated sediment habitat. With this mitigation this impact is less than significant.

D-2 Potential impacts on Pacific herring spawning sites. Pacific herring spawn on eelgrass in Humboldt Bay and can spawn on shellfish culture equipment. Maintenance of shellfish culture equipment has the potential to disturb spawning herring and herring eggs. Additionally, there has not been research regarding survival rates of eggs deposited on shellfish culture equipment versus eelgrass or other structure and survival may be lower. The project is sited at relatively high tidal elevations in order to minimize overlap with eelgrass and spawning herring. MM-2 and MM-3 will further minimize impacts to eelgrass. Additionally, MM Bio-6 is designed to maximize reproductive success of herring in culture areas. The potential impact is further mitigated by MM Bio-4 which would result in permanent conservation of 22 acres. With these mitigation measures, the impact is less than significant.

## **E. No Impact**

E-1. Conflicts with adopted plans. In the vicinity of the Management Area, numerous riparian habitats and other sensitive natural communities have been identified by local governments, CDFW, and USFWS. These natural communities provide habitat for year-round and migrant species, recreation, environmental interpretation, and preservation of aesthetic resources. The City of Arcata's Marsh and Wildlife Sanctuary also provides wastewater treatment. Specific areas managed by local, state or federal entities protecting riparian habitats and other sensitive natural communities include:

- The Humboldt Bay National Wildlife Refuge Complex, owned and managed by the USFWS. <http://www.fws.gov/humboltdbay/>
- The Arcata Marsh and Wildlife Sanctuary, owned and managed by the City of Arcata. <http://www.cityofarcata.org/departments/environmental-services/water-wastewater/wildlife-sanctuary>
- CDFW Wildlife Areas, at the following locations <http://www.dfg.ca.gov/lands/wa/region1/index.html>: South Spit WA, Eel River WA, Fay Slough WA, Mad River Slough WA, Elk River WA

Plans protecting biological resources in the vicinity of the Project are Local Coastal Plans, the Open Space Element of the County General Plan, habitat conservation plans (HCPs), and recovery plans for listed species that are likely to occur within the Management Area.

Local Coastal Plans and other relevant documents include:



- City of Arcata Certified Local Coastal Program, <http://www.cityofarcata.org/departments/building-planning/regulations/certified-local-coastal-program>
- Humboldt Bay Area Plan of the Humboldt County Local Coastal Program, April 1995, [http://co.humboldt.ca.us/planning/local\\_coastal\\_plans/hbap/hbap.pdf](http://co.humboldt.ca.us/planning/local_coastal_plans/hbap/hbap.pdf)
- Eel River Area Plan of the Humboldt County Local Coastal Program, May 1995, [http://co.humboldt.ca.us/planning/local\\_coastal\\_plans/erap/erap.pdf](http://co.humboldt.ca.us/planning/local_coastal_plans/erap/erap.pdf)
- Local Coastal Plan Issue Identification Report, September 2003, [http://co.humboldt.ca.us/planning/local\\_coastal\\_plans/pdf/issueidentificationreport/issue.pdf](http://co.humboldt.ca.us/planning/local_coastal_plans/pdf/issueidentificationreport/issue.pdf)
- Humboldt Bay National Wildlife Refuge Comprehensive Conservation Plan 2009, <http://www.fws.gov/humboltdbay/ccp.html>

The County of Humboldt's Coastal plan policies call for providing maximum public access and recreational use of the coast; protecting wetlands, rare and endangered habitats, environmentally sensitive areas, tidepools, and stream channels; maintaining productive coastal agricultural lands; directing new development to already urbanized areas; protecting scenic beauty; and locating coastal energy facilities such that they have the least impact.

The County of Humboldt General Plan is currently being updated. The Biological Resources section of the Conservation and Open Space Elements describes the policies for preservation of natural resources, management of production of resources, outdoor recreation, and public health and safety.

In the general vicinity of the Management Area, HCPs, Natural Community Conservation Plans (NCCPs), and candidate conservation agreement and assurances plans have been written, but none geographically overlap the Project area.

The Project, with inclusion of mitigation measures, would not conflict with described policies. Hence, there would be no impact.

## **F. No Impact**

F-1. Conflict with HCP or NCCP. There are no adopted or planned Habitat Conservation Plans or Natural Community Conservation Plans for the Project Area. Hence, there would be no impact.

## **Biological Mitigation Measures**

**MM Bio-1. Marine Mammal Avoidance.** Farmers will observe the following practices to avoid impacts to marine mammals.

- Reduce speed and remain at least 100 yards from the animal(s), whether it is on land or in the water.
- Provide a safe path of travel for marine mammals that avoids encirclement or entrapment of the animal(s) between the vessel and the shore.

- If approached closely by a marine mammal while underway, the operator shall reduce speed, place the vessel in neutral and wait until the animal is observed clear of the vessel before making way.
- Avoid sudden direction or speed changes when near marine mammals.
- Never approach, touch or feed a marine mammal.
- Remove any gear and debris from the bay so as to avoid potential entanglement of marine mammals.

**MM Bio-2. Eelgrass avoidance by boats.** Boat traffic will be routed around eelgrass beds to minimize the potential for damage to eelgrass from propellers and hulls.

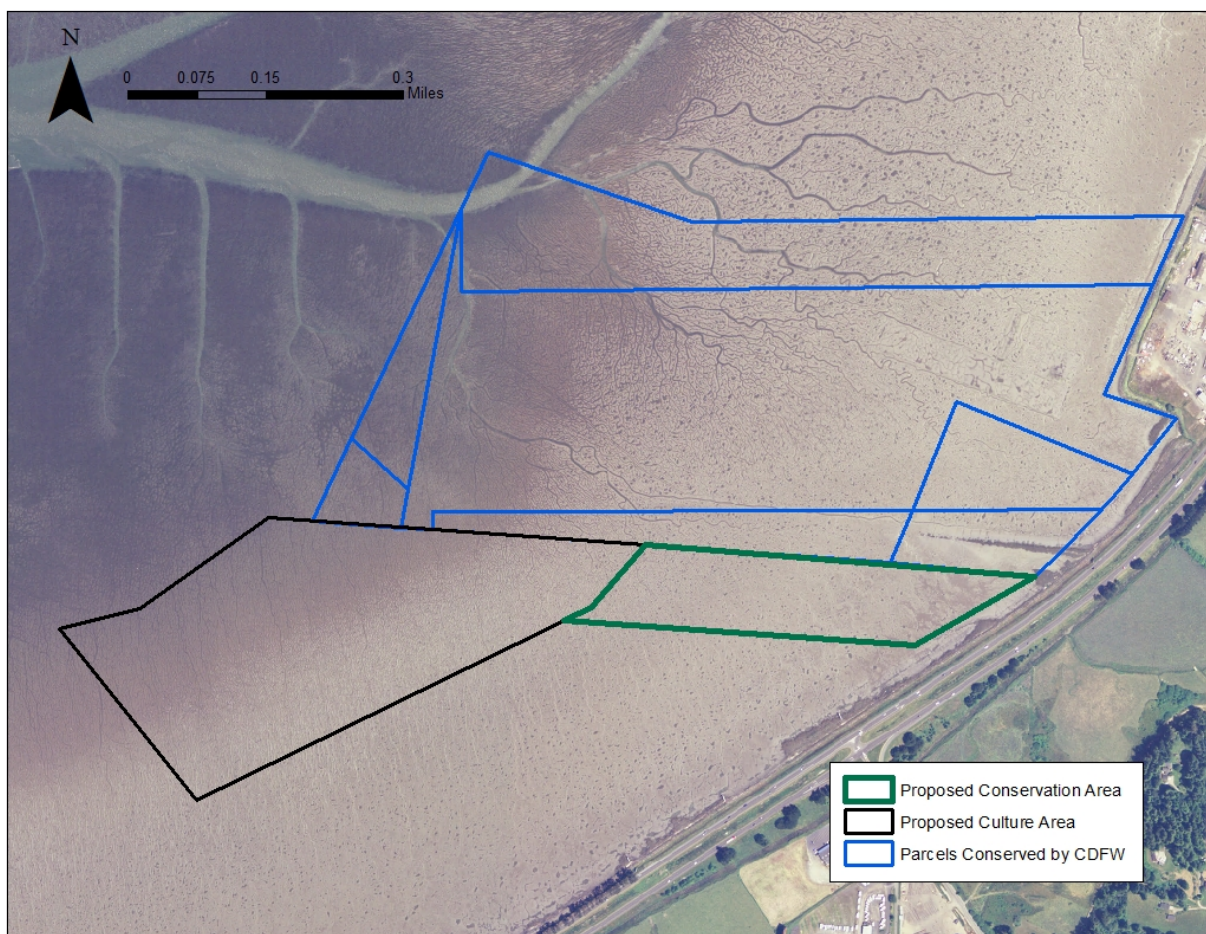
**MM Bio-3. Deposition of shells.** Shellfish farm operators will not intentionally deposit shells or any other material on the bay floor. Natural deposition of shells and other materials will be minimized to the maximum extent feasible.

**MM Bio-4. Tideland conservation.** Prior to any Project activities, the Project proponent shall establish a 22 acre conservation area consisting of the tidelands depicted in Figure 8. A conservation easement shall be placed over this area or it shall be gifted to CDFW. Under either scenario, there will be a perpetual requirement that no commercial activities, including but not limited to shellfish culture, shall occur in the conservation area.

**MM Bio-5: Bio-fouling organism removal.** All bio-fouling organism removal operations shall be carried out onshore or on a vessel. All bio-fouling organisms removed during these cleaning operations shall be disposed of at an appropriate upland facility.

**MM Bio-6. Spawning herring avoidance.** All shellfish farmers who supervise work on the tidelands shall be trained by a qualified biologist to conduct pre-work herring spawning surveys. During the herring spawning season (December, January and February) trained shellfish farmers will visually inspect shellfish culture equipment to be worked on prior to harvesting, planting or maintenance to determine if herring have spawned. If herring spawning has occurred then the harvesting, planting or maintenance will be postponed until all eggs have hatched and CDFW's Eureka Marine Region office will be notified within 24 hours.

**MM Bio-7. Pre-planting eelgrass survey.** Prior to Project implementation, eelgrass at the site will be mapped and eelgrass density across the site assessed by a qualified biologist. Any projected loss due to planting, culturing and harvesting shall be calculated and a mitigation plan prepared and submitted to the Harbor District for approval prior to commencement of planting activities. The approved mitigation shall become part of the mitigation monitoring and reporting program for the project.



**Figure 8. Proposed conservation area, culture area and CDFW conservation area adjacent to the proposed conservation area.**

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>CULTURAL RESOURCES:</b> Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
e) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074.		X		

## CULTURAL RESOURCES DISCUSSION

**A through D: Less than Significant with Mitigation.** Humboldt Bay is the ancestral heartland of the Wiyot Indians, whose native language is affiliated with the Algonquian language family and who had occupied the bay area for at least 2,000 years by the time the first European maritime explorers entered the bay and the first American towns were established in 1850. There are hundreds of known and undiscovered archaeological sites around Humboldt Bay that evidence Wiyot history and prehistory. Today, citizens of Wiyot ancestry are affiliated with three federally-recognized tribes located in the ancestral homeland: Blue Lake Rancheria; Bear River Band of the Rohnerville Rancheria; and the Wiyot Tribe at Table Bluff Reservation.

A number of State and Federal historic preservation laws, regulations and policies address the need to manage potentially significant and/or sensitive (e.g., human remains) archaeological and Native American resources discovered inadvertently and in “post-review” settings. These include:

- CEQA: Requires analysis by the Lead Agency, to determine if the proposed project will cause a significant impact to “historical resources” and “tribal cultural resources” including archaeological and Native American sites.
- Section 106 of the National Historic Preservation Act (NHPA): Requires analysis by the Lead Federal Agency (that provides funding or a permit for the “undertaking”) and consultation with the California State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), culturally affiliated Native American Tribes, and others, as appropriate, to “resolve adverse effects” on “historic properties” including archaeological and Native American sites.

Several laws and their implementing regulations spell out evaluation criteria to determine what constitutes a significant ‘site’ or a significant ‘discovery’ during construction:

- California Register of Historical Resources criteria (California Code of Regulations, Title 14, Chapter 3, Section 15064.5), for archaeological and Native American resources qualifying for consideration under CEQA.
- National Register of Historic Places criteria (36 CFR 63), qualifying for consideration under Section 106 review and NEPA.

State laws call for specific procedures and timelines to be followed in cases when human remains are discovered on private or non-Federal public land in California. It includes penalties (felony) for violating the rules for reporting discoveries, or for possessing or receiving Native American remains or grave goods:

- Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code (PRC) outline requirements for handling inadvertent discoveries of human remains, including those determined to be Native American and associated grave goods found on private or state lands (i.e., the Project area), and PRC 5097.99 (as amended by SB 447) specifies penalties for illegally possessing or obtaining Native American remains or associated grave goods.

Posts and stakes placed in the substrate to secure shellfish culture equipment could potentially disturb cultural and historical resources. Additionally, such resources could be discovered visually by culturists in the areas they work. Mitigation Measures CR-1 and CR-2 provide protocols for actions that will occur if cultural resources are discovered. With these mitigation measures the potential impacts to cultural and historic resources are less than significant.

**E: Less than Significant with Mitigation.** Biological resources at the site are an important cultural resource for citizens with Wiyot ancestry and these resources are part of an important cultural landscape. These resources include, but are not limited to, eelgrass, bird, fish and invertebrate species. The project is designed to avoid and minimize impacts to the cultural landscape and cultural resources. Potential impacts and mitigation measures related to these resources are described above in the biological resources section. This assessment made for biological resources is also applicable within the cultural context of these resources. As such, this potential impact is considered less than significant, with implementation of the biological resource mitigation measures described above.

## **Cultural Resource Mitigation Measures**

**MM CR-1. Protocols for inadvertent discovery of any cultural or archeological resource.** The following protocol shall be implemented if a cultural or archeological resource is discovered.

1. The party who made the discovery shall be responsible for immediately contacting by telephone the District.
2. Ground-disturbing activities shall be immediately stopped at the find locality 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.

3. An “exclusion zone” where unauthorized equipment and personnel are not permitted shall be established (e.g., taped off) around the discovery area plus a reasonable buffer zone by the District, or party who made the discovery.
4. The discovery locale shall be secured (e.g., 24-hour surveillance) as directed by the District if considered prudent to avoid further disturbances.
5. Upon learning about a discovery, Mr. Yeung shall be responsible for immediately contacting by telephone the contacts listed below to initiate the consultation process for its treatment and disposition:
  - a. Tribal Historic Preservation Officers (THPOs) with Blue Lake Rancheria, Bear River Band and Wiyot Tribe; and
  - b. Other applicable agencies involved in Project permitting.
6. In cases where a known or suspected Native American burial or human remains are uncovered, the Humboldt County Coroner (707-445-7242) shall also be notified immediately.
7. Ground-disturbing project work at the find locality shall be suspended temporarily while Mr. Yeung, the District, THPOs, a consulting archaeologist and other applicable parties consult about appropriate treatment and disposition of the find. Ideally, a treatment plan may be decided within three working days of discovery notification and the field phase of a treatment plan may be accomplished within five days after its approval, however, circumstances may require longer periods for data recovery. Where a Project can be modified to avoid disturbing the find, this may be the preferred option.
8. Any and all inadvertent discoveries shall be considered strictly confidential, with information about their location and nature being disclosed only to those with a need to know. The District shall be responsible for coordinating any requests by or contacts to the media about a discovery.
9. Ground-disturbing work at a discovery locale may not be resumed until authorized in writing by the District.
10. Final disposition of all collected archaeological materials shall be documented in a data recovery report and its disposition decided in consultation with Tribal representatives.

**MM CR-2. Protocols for inadvertent discovery of Native American remains and Grave goods.**

In the event of a discovery of Native American remains or grave goods, the following protocol would be followed, in addition to the protocol described under Mitigation CR-1.

1. If human remains are encountered, they shall 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 shall 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 shall be upheld. The preference of the Wiyot area tribes is to leave ancestral burials and remains in situ, and that no photographs or analyses will be made.
2. 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 NAHC at (916) 653-4082.



3. The NAHC is responsible for identifying and immediately notifying the most likely descendant (MLD) of the deceased Native American.
4. Within 48 hours of their notification by the NAHC, the MLD may recommend 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 District rejects the recommendation of the MLD and mediation between the parties by NAHC fails to provide measures acceptable to the District, the District shall cause the re-burial of the human remains and associated grave offerings with appropriate dignity at an appropriate nearby location not subject to further subsurface disturbance.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>GEOLOGY AND SOILS:</b> Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
i) 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.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?				X
c) 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 onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in UBC Table 18-1-B (1994), creating substantial risks to life or property?				X

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
e) 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?				X

## GEOLOGY AND SOILS DISCUSSION

**A. Less than Significant.** There are numerous fault lines near the Project area, as well as the intersection of three tectonic plates. As such, the area is highly susceptible to seismic activity. However, the Project would not add any fixed structures to the landscape that would be susceptible to seismic damage, nor would it put existing structures at greater risk. The Project area is level and lacks structures that could become unstable and injure culturists. The soil could be subject to liquefaction, which would pose a minor risk to culturists; however, the risk is considered very low, given that (1) liquefaction of the type that would be a risk to culturists is uncommon, and there is no historical evidence of liquefaction in Humboldt Bay; (2) culturists would be at the Project sites only temporarily, and no people would inhabit the Project sites; and (3) culturists would be in or near boats and have safety equipment, including personal floatation devices. Hence, impacts related to seismic risks are expected to be less than significant.

**B. No Impact.** Through a study of sedimentation at shellfish culture sites in Humboldt Bay similar to the proposed Project sites and facilities; Rumrill and Poulton (2004) found that “fine sediments were deposited and eroded in an inconsistent manner.” However, based on the study results, there appears to be a net increase in sediment accumulation, not a loss, at the mariculture operations. A minor amount of net sediment deposition, rather than erosion, is expected when shellfish culture equipment is placed in tidelands. Hence, no impact is expected.

**C. No Impact.** The Project would not involve the construction of any permanent structures, and is not expected to affect the potential for onsite or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse. Hence, no impact is expected.

**D. No Impact.** There may be expansive soils in the Project area; however, the Project would not add enclosed or habitable structures (buildings) to the landscape; therefore, there would be no substantial risk to life or property from Project development. Hence, no impact is expected.

**E. No Impact.** The Project does not involve the development of new waste water disposal systems. Hence, no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>GREENHOUSE GAS EMISSIONS:</b> Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				X

## GREENHOUSE GAS DISCUSSION

**A. Less than Significant.** Greenhouse gas emissions would result from the use of small internal combustion engines associated with up to two boats that would be used for the Project. Given that the project scale is relatively small, the amount of greenhouse gases generated by these activities would not have a measurable or considerable contribution to the cumulative GHG impact at the local, regional or state level and would be less than significant.

**B. No Impact.** State of California legislation (Senate Bill 375 and Assembly Bill 32) seeks to reduce greenhouse gas emissions through the practice of smart-growth or mixed-use development. The Project does not include any upland construction or mobile sources (other than the two boats described above) that could be a potentially significant source of greenhouse gas emissions. The County of Humboldt has prepared draft goals and policies related to GHG emissions as part of the General Plan update process, but has not yet adopted any formal GHG emission reduction policies in its General Plan or in a Climate Action Plan. Therefore, the Project would not conflict with plans, policies, or regulations on greenhouse gas emissions. Hence, no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>HAZARDS AND HAZARDOUS MATERIALS:</b> Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) 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?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

## HAZARDS AND HAZARDOUS MATERIALS DISCUSSION

**A through C. Less than Significant.** The only hazardous materials that would be associated with the Project are boat fuel and lubricants. Use of these materials is common in Humboldt Bay and does not represent a significant hazard to the environment or people. Project personnel would follow all current and standard safety and cleanup protocols for fueling and lubricating engines. Hence, these impacts are less than significant.

**D: No Impact.** The Project area is not known to be on any list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Because the Project sites are intertidal, it is unlikely that they supported historical uses that would have resulted in contamination. There are contaminated sites located on the margins of the bay, but hazardous materials are not expected to reach the Project sites at concentrations that would have any impact on the Project's culturists. Hence, no impact is expected.

**E through F: No Impact.** The only nearby airport is Murray Field, which is a public airport approximately 1.0 miles from the nearest Project boundary. Airplanes landing and departing from this airport are not expected to be a hazard for the Project's culturists. Hence, no impact is expected.

**G through H. No Impact.** The Project would not have any effect on an adopted emergency response plan or emergency evacuation plan, because it would not impede emergency response or evacuation routes or procedures. Also, because the Project area is in intertidal areas, there is no risk of wildfires. Hence, no impacts are expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>HYDROLOGY AND WATER QUALITY:</b> Would the project:				
a) Violate any water quality standards or waste discharge requirements?			X	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through stream or river course alteration, in a manner which would			X	

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
result in substantial erosion or siltation onsite or offsite?				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?				X
e) 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?				X
f) Otherwise substantially degrade water quality?			X	
g) Place housing within a 100-year flood hazard Area 1 as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X	
j) Inundation by seiche, tsunami, or mudflow?			X	

## HYDROLOGY AND WATER QUALITY DISCUSSION

**A. Less than Significant.** The Project would not involve waste discharge. No additives, feed, or chemicals will be used in project operations (other than fuel for the boats). Changes to water quality would be minor and would not violate any water quality standards. Such changes involve removal of suspended organic particulate matter by shellfish feeding and release of feces and pseudofeces. Hence, the impact is considered less than significant.

**B. No Impact.** The Project would not involve the use of groundwater. Hence, no impact is expected.



**C. Less than Significant.** Oyster culture has a localized effect on sediment distribution and tidal circulation. As water is slowed by frictional effects of the culture structure, sediment deposition and organic content increases (Rumrill and Poulton 2004). A study of sedimentation at cultch-on-longline (a similar shellfish culture method) sites in Humboldt Bay (Rumrill and Poulton 2004), found that “fine sediments were deposited and eroded in an inconsistent manner.” The greatest elevation change was an increase of 95 mm. Localized changes of this magnitude would not have an adverse effect on the environment. Hence, this impact is considered less than significant.

**D. No Impact.** The Project will occur entirely in an intertidal area of Humboldt Bay. Therefore, the Project will not result in any surface runoff or flooding. Hence, no impact is expected.

**E. No Impact.** The Project would not create any runoff water. Hence, no impact is expected.

**F. Less than Significant.** Project activities will temporarily mobilize a minor amount of sediment. For example, when stakes are placed or a vessel comes in contact with the bay bottom, sediment may be mobilized. However, the amount of sediment mobilized during mariculture operations is likely very low compared to the quantities of sediment mobilized during stormy conditions (e.g., strong winds). There is also potential for release of hazardous materials from internal combustion engines. Furthermore, shellfish are filter feeders which have been found to have a positive impact on water quality. Ecosystem modeling and mesocosm studies indicate that restoring shellfish populations to even a modest fraction of their historic abundance could improve water quality and aid in the recovery of seagrasses (Newell and Koch 2004). While it is unknown if culture in Humboldt Bay is beneficial to water quality, the effect of culture on water quality is not adverse. Hence, the impact is considered less than significant.

**G through H. No Impact.** The Project would not involve constructing housing or structures susceptible to flooding impacts, nor would the Project facilities (e.g., upwelling bins) impede floodflows. Hence, no impacts are expected.

**I through J. Less than Significant.** The Project area is prone to tsunamis. The Project culturists working in the bay would be at greater risk of injury or death from a tsunami than people on land. However, the overall risk to the culturists is considered minor, because (1) tsunamis are infrequent, (2) culturists only temporarily work in the bay, and (3) there are warning systems in place in Humboldt County that would likely alert culturists of the potential for a tsunami so that they can evacuate the area. Hence, this impact is considered less than significant. No activities associated with the Project would result in a seiche, tsunami, or mudflow. Hence, the impact is considered less than significant.

**No Impact.**

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>LAND USE AND PLANNING:</b> Would the project:				
a) Physically divide an established community?				<b>X</b>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				<b>X</b>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				<b>X</b>

## LAND USE AND PLANNING DISCUSSION

**A. No Impact.** The Project involves expanding mariculture operations in Humboldt Bay. It would not divide a community. Hence, no impact is expected.

**B. No Impact.** The Project area is zoned as follows:

- The Project is within the City of Eureka's jurisdiction are zoned Conservation Water. Aquaculture is an allowable conditional use within this designation. The City's General Plan similarly permits shellfish farms in waters under the City's jurisdiction (City of Eureka General Plan, Chapter 6 § 6.A.14). A use permit from the City of Eureka will be obtained for the Project.
- The District's *Humboldt Bay Management Plan* designates the intertidal portion of the Project area for conservation and mariculture (Humboldt Bay Management Plan § 2.2). The Project is also consistent with the plan's goal of supporting commercial aquaculture and the plan's policy to identify additional aquaculture activities (Policy HFA-5). The plan recognizes the need to balance harbor, recreation, conservation and mariculture uses of the bay.

In summary, the Project would be consistent with zoning and adopted plans for the Project area as a permitted or conditionally permitted use. Hence, no impact is expected.

**C. No Impact.** There are no adopted or planned HCPs or NCCPs for the Project area. Hence, no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>MINERAL RESOURCES:</b> Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to regional and state residents?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

## MINERAL RESOURCES DISCUSSION

**A through B. No Impact.** The Project would expand mariculture operations in Humboldt Bay. It would have no effect on mineral resources. Hence, no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>NOISE:</b> Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

## NOISE DISCUSSION

**A through F: No Impact.** The Project would involve expanding mariculture operations on Humboldt Bay. Its primary noise effect would be caused by the addition of up to two small watercraft with internal combustion engines. These would generate noise similar to that generated by other small watercraft on the bay. The Project boats could not be heard from sensitive receptors. Because the Project's noise generation would be typical of what already occurs in Humboldt Bay, no noise impacts are expected.

	Potentially Significant	Less Than Significant with Mitigation	Less Than Significant	No Impact
<b>POPULATION AND HOUSING:</b> Would the project:				
a) Induce substantial population growth in the area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

## POPULATION AND HOUSING DISCUSSION

**A through C: No Impact.** The Project would involve expanding mariculture operations on Humboldt Bay. It is not expected to have any effect on population and housing. It may create as many as 10 new jobs, but those jobs are expected to be filled primarily by people who already live in the region. Hence, no impacts are anticipated.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>PUBLIC SERVICES:</b> Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?				X
b) Police protection?				X
c) Schools?				X
d) Parks?				X
e) Other public facilities?				X

## PUBLIC SERVICES DISCUSSION

**A through E. No Impact.** The proposed Project would not create increased demand for public services. Approximately 10 people would be employed; they would likely already live in the local community and so would not represent a new burden on public services. Hence, no impacts are expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>RECREATION:</b> Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				<b>X</b>
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				<b>X</b>

## RECREATION DISCUSSION

**A through B: No Impact.** The Project would not increase use of recreational facilities and does not include recreational facilities. Approximately 10 people would be employed by the Project, but they would likely already live in the local community and so would not represent a new burden on recreational facilities. The area may be used by waterfowl hunters. However, the nearest navigable channel is over 1,700' to the north and shore is over 2,500' to the east. This represents a challenge for hunters to access the site, which is expected to reduce hunting effort. Nevertheless, hunters likely access the site by boat at higher tides. Displacement of waterfowl hunters due to obstruction by culture equipment could potentially increase hunting at other sites, causing environmental impacts, including impacts to biological and aesthetic resources. However, the Project site is small (i.e., 64 acres) and a relatively low level of hunting at the site is expected. No environmental impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>TRANSPORTATION/TRAFFIC:</b> Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation systems, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.				<b>X</b>
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				<b>X</b>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				<b>X</b>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				<b>X</b>
e) Result in inadequate emergency access?				<b>X</b>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			<b>X</b>	

## TRANSPORTATION/TRAFFIC DISCUSSION

**A through E: No Impact.** The Project would not increase the local population or draw residents to a specific site such as a business; therefore it would not affect traffic levels or patterns. Up to 10 culturists employed under the Project would park at public parking spaces, which are readily available at multiple locations around the bay including Woodley Island Marina, City of Eureka Small Boat Basin and Samoa Bridge Boat Ramp. Hence, no impact is expected.

**F. Less than Significant.** The proposed Project's mariculture equipment could interfere with the movement of watercraft (e.g., boats, kayaks) in intertidal areas. This interference would occur

only when the tides are high enough for watercraft to move through the intertidal areas, but so low that that the vessels can't move readily over the equipment. Empty space among the equipment would allow smaller watercraft to move about, but in some cases only in two directions (e.g., parallel to rows of equipment). The Project site is not near navigation channels, boat launches or marinas. Because this impact would occur only during certain tide heights and is limited to areas outside of navigation channels (i.e., in intertidal areas where boating activity is limited), the impact is considered less than significant.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>UTILITIES AND SERVICE SYSTEMS:</b> Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				<b>X</b>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				<b>X</b>
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				<b>X</b>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				<b>X</b>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				<b>X</b>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			<b>X</b>	
g) Comply with federal, state, and local statutes and regulations related to solid waste?				<b>X</b>

## UTILITIES AND SERVICE SYSTEMS DISCUSSION

**A through E. No Impact.** The Project involves expansion of mariculture operations in Humboldt Bay. It does not involve waste or storm water discharge. Hence, no impact is expected.

**F. Less than Significant.** The Project would generate a minor amount of waste that would go to a landfill, such as broken equipment. Local landfills would have the capacity to accept this relatively small amount of waste. Hence, impacts are less than significant.

**G. No Impact.** The Project would maintain compliance with federal, State, and local statutes and regulations related to solid waste. Hence no impact is expected.

	Potentially Significant	Less Than Significant With Mitigation	Less Than Significant	No Impact
<b>MANDATORY FINDINGS OF SIGNIFICANCE:</b>				
a) Does the project have the potential to degrade the quality of the environment, 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, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?				<b>X</b>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)		<b>X</b>		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				<b>X</b>



## MANDATORY FINDINGS DISCUSSION

**A: No Impact.** With the mitigation measures described above, the Project would not degrade the quality of the environment, 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, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

**B: Less than Significant with Mitigation.** There are approximately 301 acres of existing intertidal shellfish culture in Arcata Bay. Additionally, there are two other permitting efforts underway in Humboldt Bay that may allow for expanded intertidal shellfish culture. The Humboldt Bay Harbor District's Humboldt Bay Mariculture Pre-permitting Project would result in expansion on up to 266 acres. Additionally, Coast Seafoods Company is pursuing approvals for up to 622 acres. All current and proposed intertidal culture in Humboldt Bay involves off-bottom culture of Kumamoto and Pacific oysters. Coast Seafoods Company recently distributed a Final EIR for their project. Cumulative effects for each environmental resource category are discussed below.

### Aesthetics and Visual Resources

The proposed project is a minimum of 0.3 miles (app. 1,500 feet) from shore and 1,700' from the nearest channel, making it difficult to see from land or boats (except boats travelling outside channels). Additionally, similar to other current and proposed culture in the bay, the culture equipment has a low-profile and is often submerged. Shellfish culture is an established aspect of the visual character of Arcata Bay and does not significantly affect aesthetics or visual resources. Therefore, the cumulative impact is less than significant.

### Agricultural and Forestry Resources

Shellfish culture in Humboldt Bay does not have any impact on agricultural or forestry resources. There is no cumulative impact.

### Air Quality

Existing and other proposed mariculture in the bay will have similar air quality impacts as the Project. These projects are also expected to comply with adopted air quality plans and AQMD regulations. Hence, with proposed mitigation, the cumulative impact is less than significant.

### Biological Resources

The proposed Project is purposefully sited at a relatively high tidal elevation to minimize effects to biological resources such as eelgrass, black brant and herring. The primary effected habitat would be unconsolidated sediment (46 acres), along with an additional 18 acres of patchy eelgrass habitat. Existing culture is primarily within patchy and dense eelgrass habitat (Table 1). The area that will be effected by the Coast Seafoods Company project is not certain, because there are a number of alternatives being assessed and ongoing discussions with stakeholders and regulatory agencies regarding project design. Additionally, the most likely Mariculture Pre-Permitting Project footprint is not known. However, a large majority of proposed culture would

also occur within patchy and dense eelgrass. Due to the Project's proposed mitigation measures and the small area of overlap between the Project and eelgrass, effects to eelgrass would be minor. As such, the Project's biological effects to eelgrass and associated species, considered cumulatively with current and proposed culture, are less than significant. Similarly, because there is minimal current and proposed culture in unconsolidated sediment, cumulative effects to this habitat and associated species are less than significant. However, effects to suspended organic matter and the bay's carrying capacity are more continuous throughout the bay, because suspended organic matter occurs throughout the water column. The carrying capacity analysis for existing and proposed mariculture in the bay, which gave consideration to culture within the Project's footprint, found this effect to be cumulatively less than significant. Overall, cumulative biological effects are less than significant with mitigation.

#### Cultural Resources

The Humboldt Bay Harbor District is the CEQA lead agency for all mariculture projects in the bay. As such, it is expected that all projects will be required to follow the same cultural resource mitigation measures as the proposed Project. With these mitigation measures cumulative effects will be less than significant.

#### Geology / Soils

The same analysis presented above for Project effects is applicable at a cumulative level. Hence, the cumulative effect is less than significant.

#### Greenhouse Gas Emissions

Existing and proposed culture in the bay will have similar generation of greenhouse gas emissions per area as the Project. However, these effects are minor and less than significant, particularly when compared to other forms of food production such as land based farming.

#### Hazards and Hazardous Materials

Existing and proposed culture will have similar effects as described for the Project. These effects are minor and less than significant at a Project and cumulative level.

#### Hydrology / Water Quality

Other culture operations in Arcata Bay are expected to have similar minor effects on hydrology and water quality. These effects are typically localized near culture operations. Due to the small magnitude of these effects at the Project and cumulative level they are less than significant.

#### Land Use / Planning

The nature of shellfish culture does not have a significant effect on land use / planning. There is no cumulative impact.

#### Mineral Resources

The nature of shellfish culture in Humboldt Bay has no impact on mineral resources at a Project and cumulative level.

### Noise

Existing and proposed culture uses boats that generate noise, similar to as described for the Project. This level of noise is typical in Humboldt Bay, where boating also occurs for recreational and other commercial activities and is less than significant.

### Population and Housing

Shellfish culture in Arcata Bay typically employs people that already live in the community. No impact on population and housing is expected.

### Public Services

No impact is expected from current and proposed shellfish culture in Humboldt Bay.

### Recreation

No impact to recreational facilities is expected from current and proposed shellfish culture in Humboldt Bay.

### Transportation / Traffic

The Project, with current and proposed culture would have some effect on navigation of water craft. However, intertidal culture does not occur in navigation channels and watercraft would only be affected at specific tidal heights. Hence, the effect is less than significant.

### Utilities / Service Systems

Current and proposed culture would generate a minor amount of waste, similar to the proposed project. This would have a less than significant effect.

**C: No Impact.** The Project involves the expansion of shellfish culture and no aspect of the Project is expected to cause substantial adverse effects on human beings, either directly or indirectly.

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## List of Preparers

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