Humboldt Bay
Harbor, Recreation and Conservation District
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NOTICE OF PREPARATION
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT TITLE: Humboldt Bay Intertidal Mariculture Pre-Permitting Project and Yeung Oyster Farm

PROJECT LOCATION: North Humboldt Bay, Humboldt County, California

LEAD AGENCY: Humboldt Bay Harbor, Recreation and Conservation District

This notice announces that a Draft Environmental Impact Report (DEIR) will be prepared for the Humboldt Bay Intertidal Mariculture Pre-Permitting Project (Intertidal Pre-Permitting Project) and Yeung Oyster Farm project. The two projects will be evaluated in one EIR because they have many similarities including proposed timing, location, shellfish culture methods, culture species, and potential environmental effects. Both projects are within intertidal areas of north Humboldt Bay. The DEIR will identify, evaluate and disclose possible environmental effects of these projects. The Humboldt Bay Harbor, Recreation and Conservation District (Harbor District) is the project proponent for the Intertidal Pre-Permitting Project and Mr. Jerry Yeung is the project proponent for the Yeung Oyster Farm. The Harbor District is the California Environmental Quality Act (CEQA) Lead Agency.

Background: In January 2015, the Harbor District, as the CEQA Lead Agency, circulated a DEIR for the Humboldt Bay Mariculture Pre-Permitting Project (SCH#2013062068) (Pre-Permitting Project). The Pre-Permitting Project proposed intertidal shellfish culture in the same areas as are currently proposed by the Intertidal Pre-Permitting Project and Yeung Oyster Farm. However, the Pre-Permitting Project included additional intertidal areas and subtidal areas. The Final EIR for the Pre-Permitting Project was certified by the Harbor District in February 2016. At the time of certification, the Harbor District determined that the culture proposed in the intertidal portion of the project was not feasible because a large proportion of the area was on privately owned lands. As such, an alternative that only included the subtidal areas was certified (i.e., as certified, the FEIR did not apply to any intertidal areas). After certification of the FEIR, the Harbor District began working with private landowners to develop a feasible project for the intertidal areas. The Harbor District has secured agreements with landowners to permit shellfish culture at four sites in the bay. Additionally, Mr. Jerry Yeung is pursuing regulatory approvals for his property, which was also previously within the boundaries of the Pre-Permitting Project. In January, 2017 the Harbor District circulated a draft Initial Study / Mitigated Negative Declaration for the Yeung Oyster Farm (SCH#2016122066), but based on public comments the Harbor District has determined that an EIR is appropriate for this project. Hence, the Harbor District is developing one EIR for the Intertidal Mariculture Pre-Permitting Project and Yeung Oyster Farm.

Project Description:
The objective and purpose of both projects is to allow for an expansion of commercial mariculture activities in Humboldt Bay, create jobs and improve the local economy, while also increasing local and sustainable seafood production.

The projects will use the same culture methods and culture the same species (Kumamoto oysters [*Crassostrea sikamea*] and Pacific oysters [*C. Gigas*]). Both of these species are currently cultured in Humboldt Bay. Proposed methods and sites are included as Attachment A. After receiving regulatory approvals for Intertidal Mariculture Pre-Permitting Project sites, the Harbor District will grant leases to private shellfish growers ("Lessees") for discrete portions of these sites. Mr. Yeung will culture oysters on his property and may also lease portions of his property to other growers.

Possible environmental effects:
Because of the potential for significant impacts to the environment, the Harbor District has decided to prepare an EIR. The purpose of an EIR is to inform decision-makers and the general public of the environmental effects of a proposed project. The EIR process is intended to provide information sufficient to evaluate a proposed project and its potential to cause significant effects on the environment; examine methods of reducing adverse environmental impacts; and identify and evaluate alternatives to the proposed project.

Based on a preliminary review performed by the Harbor District of comments received during circulation of the Pre-Permitting Project DEIR, Yeung Oyster Farm IS/MND and other resources, the following environmental resources could be affected by the project:

- Aesthetics
- Air quality
- Biological resources
- Cultural resources
- Hydrology and water quality
- Recreation

Comments on the Notice of Preparation (NOP) must be received no later than 5:00 p.m. Monday, April 24, 2017 (or, if applicable, within 30 days after receipt of the NOP as indicated by certified mail).

Interested public agencies, organizations and individuals are invited to comment on the scope of the EIR. A scoping meeting will be held on Tuesday April 18, 2017. Your comments regarding the forthcoming EIR must be written and submitted to:

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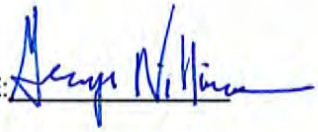
DATE: March 23, 2017

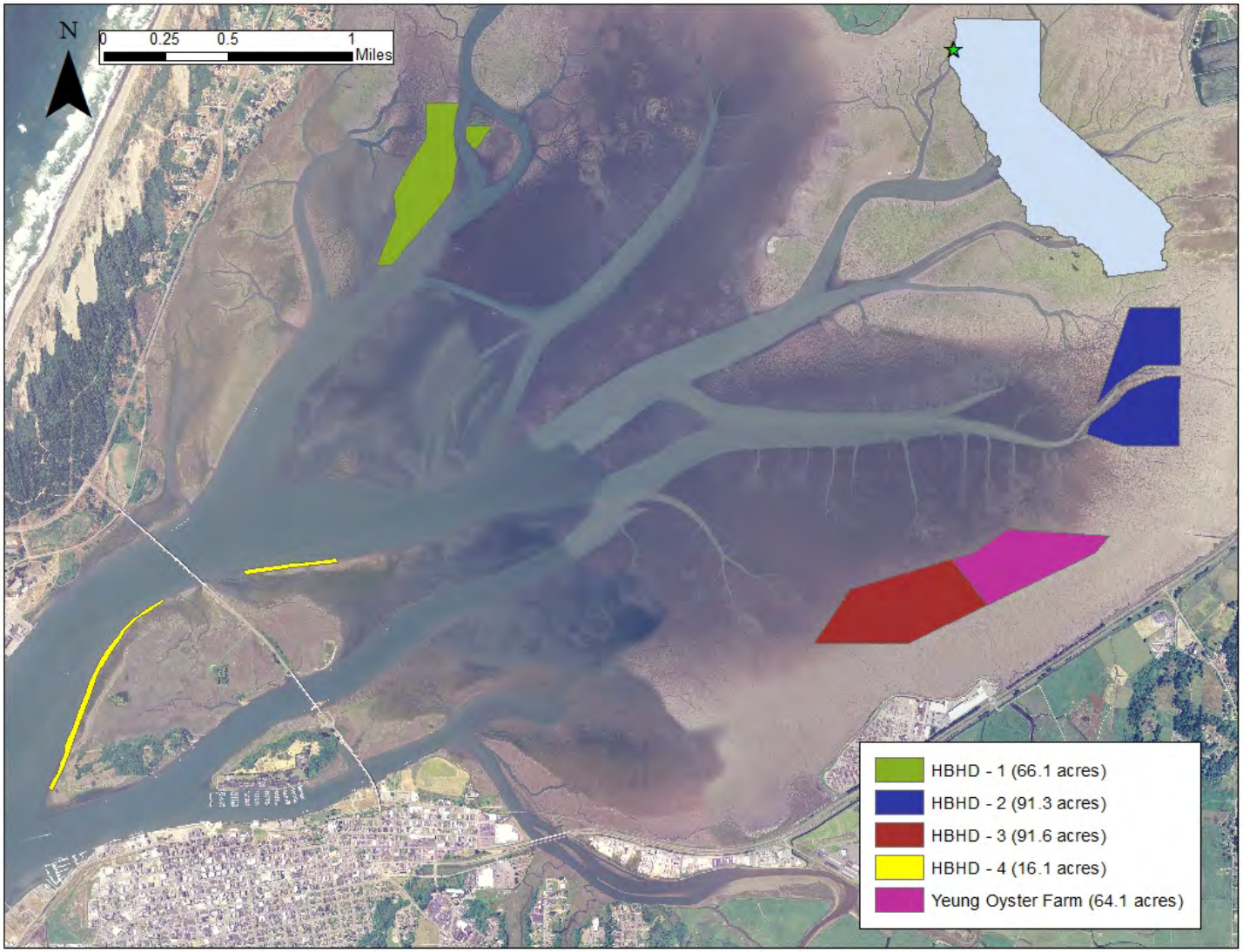
SIGNATURE: 

Attachment A

Proposed Sites and Methods for the Intertidal Mariculture Pre-Permitting Project and Yeung Oyster Farm

Sites

The Intertidal Mariculture Pre-Permitting Project includes four proposed sites. These sites and the Yeung Oyster Farm site are shown in Figure 1. The area of each individual site is also shown in Figure 1; the total area of all the sites is approximately 329 acres.



Methods

The continued success of mariculture in Humboldt Bay will require adaptation of culture methods as new technologies are developed. New methods can result in higher production, improved product quality and reduced environmental effects. To allow for adaptation of culture methods, the following process was used to develop the Project description:

1. For each site, a Project layout was developed based on the following culture methods. These methods represent the general types of culture that would occur under the Project.
    a. Rack-and-Bag
    b. Cultch-on-Longline
    c. Basket-on-Longline
2. The following culture characteristics were assessed. These culture characteristics are related to specific environmental effects of mariculture (Table 1).
    a. Levels of activity by farm workers
    b. Water surface area occupied by culture equipment and cultured organisms
    c. Volume of culture equipment and cultured organisms
    d. Area of culture equipment in contact with bay bottom (benthic footprint)
    e. Maximum biomass of shellfish soft tissue that could be present at any given time
3. Based on the culture characteristics of each method, thresholds were established for the Projects. Under the Projects, culture can occur within each site as long as it:
    a. Does not exceed these culture characteristic thresholds,
    b. Follows other terms and conditions established by the Project's regulatory approvals including the EIR, and
    c. Does not result in any environmental effects that were not considered under the Project.

If there are environmental effects that were not considered under the Project, then additional regulatory approvals may be required.

Table 1. Culture Characteristics and Related Potential Environmental Effects

Culture Characteristics	Potential Environmental Effect
Levels of activity by farm workers	Environmental effects by farm workers (e.g., trampling, wildlife disturbance)
Water surface area occupied by culture equipment and cultured organisms	Increased shading and overwater cover
Volume of culture equipment under the water line	Effects on currents and sedimentation
Benthic footprint	Reduction in habitat for benthic organisms
Biomass of cultured shellfish	Reduced particulate organic matter as a result of consumption by cultured shellfish

Example Culture Methods

The Project is designed to allow for flexibility in culture methods. The following culture methods were used to evaluate the potential environmental effects of mariculture and to establish thresholds for the mariculture characteristics presented in Tables 2 and 3.

Shellfish Culture Rack-and-Bag Method

This description was adapted from Coast Seafoods Company (CSC) (2007)[1]. Rack-and-bag culture is used for growing Kumamoto oysters and Pacific oysters. The oysters are grown as "singles", meaning they are not attached to any structure such as shells or to each-other (they are "loose" in the bags). Rack-and-bag culture uses polyethylene mesh bags and rebar frames. Each rebar frame is 3 feet (ft) x 12 ft and supports 3-6 bags attached to the frame via industrial rubber bands. Each bag is initially seeded with oysters and placed in intertidal areas. It takes 1–2 years for the seed to grow into oysters of market size, depending on tidal height and primary productivity, and then the bags of oysters are harvested by hand (lifted from the racks into a skiff), processed and brought to market.

Shellfish Culture Cultch-on-Longline Method

This description was adapted from CSC (2007)[1]. Cultch-on-longline culture is used for growing Kumamoto oysters and Pacific oysters. Prior to planting in the bay, oyster seed is attached to shells, which are attached to longlines. Planting is accomplished by placing seeded longlines on notched PVC stakes that are arranged in rows on the mudflats. The longlines are strung through notches on top of the PVC stakes, suspending the oyster seed approximately one ft above the bay bottom.

Longline beds are harvested when they have oysters of a harvestable size and market conditions are right. It usually takes 1.5–3 years for oysters to reach a harvestable size. One of two methods is used to harvest longlines. The first, hand picking, involves placing around 20 bushel tubs on the bed at high tide using an oyster scow. The tubs are then filled at low tide by hand. The picking crew cuts the longline into manageable single clusters and places them in the picking tub. A floating ball is attached to each tub, and at high tide an oyster scow is used to pull the tub out of the water. The oysters are dumped on the deck of the scow, and the tub is placed back on the bed to be refilled.

The second method of harvest, the longline harvester, involves positioning a scow over the longline bed at high tide. Individual lines are then pulled onto the floating scow either by hand or by means of a hydraulically operated roller. If the lines are pulled by hand then the lines need to be cut into individual clusters, usually at the plant. If the lines are pulled mechanically they run through a breaker that strips the clusters from the line. The longline harvester does not come in contact with the bottom while harvesting longlines.

Shellfish Culture Basket-on-Longline Method

Basket-on-longline culture is used to grow Kumamoto oysters and Pacific oysters as singles. This method utilizes baskets that hang off a monofilament line suspended off the bottom using 2-inch

[1] Coast Seafoods Company. 2007. Coast Seafoods Application for Continued Mariculture Operations in Humboldt Bay, California. Draft Mitigated Negative Declaration. Prepared for Humboldt Bay Harbor, Recreation and Conservation District.

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.

Determination of Culture Characteristics

The following processes and assumptions were used to develop an understanding of mariculture characteristics, upon which thresholds for mariculture operations were based.

Environmental Effects by Farmworkers

Farmworkers may have environmental effects when they are working at the culture sites, for example by trampling vegetation or disturbing wildlife. Mr. Greg Dale (CSC operations manager) and Mr. Ted Kuiper (retired shellfish culturist) were interviewed to determine the type and number of visits for each method.

Surface Area

Cultured organisms and associated equipment can affect eelgrass (*Zostera marina*) and other habitat features by increasing shade over these features. Overwater structure can also provide habitat for organisms, including plants, birds, fish and invertebrates. The water surface area per acre (ac) occupied by culture equipment and cultured organisms was calculated based on the following assumptions:

For rack-and-bag culture:

- Racks are 12 ft x 3 ft and are elevated by six 5/8-inch rebar posts
- Racks are set in groups of 9, with a distance of 3 ft between subgroups of three racks
- Each group of nine racks is 10 ft apart from each other group of nine racks

For cultch-on-longline culture:

- Area is based on measurements of sampled cultch-on-longlines in 2012
- Lines are in groups of 5, with a distance of 2.5 ft between each line
- Each group of five lines is separated by 5 ft within a given row
- Rows are 10 ft apart
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines
- Lines are elevated by 2-inch PVC posts every 2.5 ft

For basket-on-longline culture:

- Baskets are 24 in x 10 in
- Basket floats are 2.5 in diameter and 5.5 in long

- Lines are in groups of 3, with a distance of 3 ft between each line
- Each group of three lines is separated by 20 ft on all sides
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines
- Lines are elevated with 2-inch PVC posts every four baskets and line ends are anchored with 1.5 in x 2 in wide galvanized fence posts

Volume

Cultured organisms and associated equipment can alter water currents and sedimentation rates. The overall volume of cultured organisms and associated equipment is a reasonable metric for assessing effects on currents and sedimentation. The volume of each culture method per ac was assessed based on the following assumptions.

For rack-and-bag culture:

- Rack dimensions are 12 ft x 3 ft x 0.7 ft
- Racks are set in groups of 9, with a distance of 3 ft between subgroups of three racks
- Each group of nine racks is 10 ft apart from each other group of nine racks

For cultch-on-longline culture:

- Volume of individual lines and associated shellfish is based on measurements taken in 2012
- Lines are in groups of 5, with a distance of 2.5 ft between each line
- Each group of five lines is separated by 5 ft within a given row
- Rows are 10 ft apart
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines

For basket-on-longline culture:

- Basket dimensions are 24 in x 10 in x 6 in
- Floats are 2.5 in diameter and 5.5 in long
- Lines are in groups of 3, with a distance of 3 ft between each line
- Each group of three lines is separated by 20 ft
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines

Benthic Footprint

The area of culture equipment in contact with the bay bottom was calculated based on the following:

For rack-and-bag culture:

- Racks are 12 ft x 3 ft and are elevated by six 5/8-inch diameter rebar posts
- Racks are set in groups of 9, with a distance of 3 ft between subgroups of three racks

- Each group of nine racks is 10 ft apart from each other group of 9 racks

For cultch-on-longline culture:

- Lines are elevated by 2-inch PVC posts every 2.5 ft
- Lines are in groups of 5, with a distance of 2.5 ft between each line
- Each group of five lines is separated by 5 ft within a given row
- Rows are 10 ft apart

For basket-on-longline culture:

- Each line holds 40 baskets
- Lines are in groups of 3, with a distance of 3 ft between each line
- Each group of three lines is separated by 20 ft
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines
- Lines are elevated with 2-inch PVC posts every four baskets and line ends are anchored with 1.5 in x 2 in wide galvanized fence posts

Biomass of Cultured Shellfish

Phytoplankton consumption by cultured shellfish is proportional to the number of shellfish cultured. The shellfish biomass calculations are based on the following:

For rack-and-bag culture:

- Each Rack-and-Bag unit contains six bags per rack, with 2 liters (L) of seed added per bag and periodic subsequent division of that stock into more bags
- Racks are set in groups of 9, with a distance of 3 ft between subgroups of three racks
- Each group of nine racks is 10 ft apart from each other group of nine racks

For cultch-on-longline culture:

- Each 100-ft longline contains 40-100 dozen oysters
- Lines are in groups of 5, with a distance of 2.5 ft between each line
- Each group of five lines is separated by 5 ft within a given row
- Rows are 10 ft apart

For basket-on-longline culture:

- Each basket is planted with 2 L of seed with periodic subsequent division of that stock into more baskets. Each line holds 40 baskets
- Lines are in groups of 3, with a distance of 3 ft between each line
- Each group of three lines is separated by 20 ft
- Lines are a maximum of 100 ft, but areas where a 100 ft line won't fit are filled by partial lines

Results and Thresholds

Based on the information describe above, culture characteristics are presented in Tables 2 and 3. Culture methods will not exceed the thresholds established in the shaded cells in these tables. The thresholds are based on the example methods described above, but are not specific to individual culture methods, they apply to every method.

Table 2. Type and Number of Visits by Farmworkers to Different Types of Intertidal Mariculture Operations

Method	Type of Visit	# Visits per Year	Note
Rack-and-Bag	Place racks	0.2	Once every 5 years
	Inspections	104	Range of 1–3 times per week, assumed average of twice per week
	Flip bags	26	Bags flipped on average every two weeks
	Grade oysters	6.4	Every 6–8 weeks in summer (Feb to Oct) and every 8–12 weeks in winter (Nov to Jan)
	Plant and harvest	1	Plant and harvest once per 2 years
Cultch-on-Longline	Staking lines	0.2	Once every 5 years
	Monthly inspection	12	
	Plant and Harvest	1	Plant and harvest once every two years
Basket-on-Longline	Stake lines	0.2	Once every 5 years
	Grade oysters	6.4	Every 6–8 weeks in summer (Feb to Oct) and every 8–12 weeks in winter (Nov to Jan)
	Plant and harvest	1	Plant and harvest once per 2 years

- "Shaded cells" depict the maximum values for each culture characteristic. These values represent the maximum level of effort that generally occurs for the various mariculture methods.

* The information provided is for individual culture units (i.e., a single bag, longline or basket). A group of units would generally be visited more frequently.

Table 3. Culture Characteristics of Example Intertidal Culture Methods

Method	Water Surface Area (ft^2) in Culture per Acre	Volume (ft^3) of Shellfish Culture Equipment and Cultured Organisms per Acre	Benthic Footprint (ft^2) per Acre	Biomass (kg) of Shellfish Dry Weight per Acre (6% of Live Weight)
Rack-and-Bag	13,068 (30%)	8,736	4.36	253
Cultch-on-Longline	4,792 (11%)	1,947	118.07	97
Basket-on-Longline	3,484 (8%)	1,623	11.80	207

- "Shaded cells" represent the maximum values for each culture characteristic. Under the Project, these maximum values are the culture characteristic thresholds that cannot be exceeded by shellfish culture operations.