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STAFF REPORT: REGULAR CALENDAR

Application No.:	**9-17-0646**
Applicant:	**Coast Seafoods Company**
Agents:	Peter Weiner, Paul Hastings, LLP Billy Plauché and Robert Smith, Plauché and Carr, LLP Bonnie Neely, Nossaman, LLP
Location:	Intertidal and subtidal lands of Arcata Bay, County of Humboldt.
Project Description:	Carry out off-bottom oyster aquaculture operations on approximately 279 acres of tidal flats and maintain and use 30 existing floating shellfish cultivation rafts.
Staff Recommendation:	Approval with conditions.

SUMMARY OF STAFF RECOMMENDATION

In response to the Commission's June 7, 2017, denial of Coast Seafoods Company's (Coast's) previous permit application for a larger aquaculture operation in Arcata Bay, Coast proposes to continue its shellfish aquaculture cultivation operations in Arcata Bay but to reduce their overall size and consolidate them into three primary areas of the bay. Over the course of approximately two-and-a-half years, the total acreage of Coast's oyster cultivation beds would be reduced by roughly 21 acres (from 300 acres to 279 acres) and its estimated total operational footprint (the area including and surrounding the cultivation beds that is used for cultivation activities and vessel transit) would be reconfigured and reduced by nearly 1/3. At the same time, Coast is simultaneously proposing to increase its overall production levels by using cultivation techniques such as baskets on longlines that achieve more production per acre.

Although this project would substantially reduce the likelihood and magnitude of adverse impacts to coastal resources compared to Coast's current operation and past proposals, when considered outside of this relative standard, it still raises the potential to adversely affect Humboldt Bay's marine habitats (especially through the loss of eelgrass and tidal flat shorebird foraging areas) and the species they support (e.g., green sturgeon, migratory shorebirds and black brant). The project has additionally raised concerns about conflicts with water-oriented recreational uses, especially waterfowl hunting. To address these concerns, both Commission staff and Coast have spent a significant amount of time with other local, State and federal resource agency staff and stakeholders such as Tribal members, environmental organizations and waterfowl hunters to assess the project's impacts and develop restrictions to minimize and mitigate its projected adverse effects. Although a variety of comments have been provided (included within the **correspondence appendix**) that call for more extensive changes to the project – including relocation of all cultivation beds to within the western third of the bay – Commission staff believes that with implementation of the protective measures described within the recommended special conditions, the proposed project can be found consistent with the Coastal Act.

Specifically, the Commission staff is recommending a number of Special Conditions that memorialize the limited scale and consolidation of Coast's proposed operations and protect several thousand acres in Arcata Bay for an additional eight years from further development by requiring Coast to: (1) maintain its leases and limiting the footprint of its operations to no more than 279 acres; and (2) complete in a timely and thorough manner the removal activities needed to consolidate its operations within the bay to areas of lingering legacy impacts that would minimize the project's impacts on eelgrass habitat areas and reduce conflicts with water-oriented recreational users (**Special Conditions 2, 9, and 13**). These measures would ensure that the overall level and location of activity in Arcata Bay is limited and therefore minimize the project's potential to result in loss, injury, or disturbance to protected habitats and wildlife species – particularly black brant, a California Species of Special Concern, shorebirds, and eelgrass.

Additionally, **Special Conditions 5, 14, and 16** would also help ensure that adverse impacts to brant are minimized by requiring Coast to: (1) make consistent use of a vessel management plan that includes transit lanes that avoid areas of consistent brant use and provisions to prevent herding or flushing brant; (2) establish protective buffers around the primary sites brant use to collect sandy grit to aid in their feeding; and (3) avoid intentional disturbance of brant during on-water operations.

Protection of the bay's water oriented recreational uses would be provided though **Special Conditions 2, 9, 12, 13, and 14** which would require Coast to (1) carry out limited on-water daylight operations during the brant hunting season; (2) limit the overall footprint of Coast's cultivation operations to no more than 279 acres of its 4,313 acres of owned and leased intertidal land; (3) complete the timely consolidation of its operations more heavily around the most densely used areas of its existing operations through the removal of existing beds in the central and far eastern portions of Arcata Bay; and (4) implement a bed mapping and marking plan to more clearly communicate the location and extent of cultivation beds to recreational users.

With the inclusion of these Special Conditions and others described in the following report, the Commission staff believes Coast's proposed continuation of a smaller-scale, consolidated shellfish aquaculture operation in Arcata Bay would be carried out consistent with Sections 30230-30233, 30244, and 30210-30222.5 of the Coastal Act. The Commission staff therefore recommends **approval**, as conditioned, of Coast's coastal development permit application. The **motion** to implement this recommendation is found on **Page 4**. The standard of review for this project is Chapter 3 of the Coastal Act.

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APPENDICES

EXHIBITS

CORRESPONDENCE

I. MOTION AND RESOLUTION

Motion:

I move that the Commission approve Coastal Development Permit 9-17-0646 subject to conditions set forth in the staff recommendation specified below.

Staff recommends a **YES** vote on the motion. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution:

The Commission hereby approves the Coastal Development Permit 9-17-0646 for the proposed project and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS

1. **Notice of Receipt and Acknowledgment**. The permit is not valid and development shall not commence until a copy of the permit, signed by the Permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration**. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation**. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment**. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land**. These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

1. **Permit Term Limit.** This permit shall expire on September 7, 2025. If the term of Coast's submerged lands lease from the Humboldt Bay Harbor, Recreation, and Conservation District - currently also set to expire on September 7, 2025 - is amended or a new submerged lands lease is issued by the Humboldt Bay Harbor, Recreation, and Conservation District, Coast may submit an application for a permit amendment requesting an extension of the permit term.

2. **Operational Footprint.** Prior to the installation of any of the test plots or relocation beds shown in **Exhibit 2**, Coast shall complete the removal of equipment from an equal or greater area of cultivation beds. By December 31, 2019, the combined footprint of all of Coast's intertidal cultivation beds in Arcata Bay shall be limited to the approximately 279 acres of individual cultivation beds shown in **Exhibit 2**. Once attained, Coast shall not exceed this acreage for the remaining term of this permit. Additionally, Coast shall maintain in place its leases with the Harbor District, the City of Eureka, and the Karamu Corporation (approximately 3,800 acres). Coast shall exercise its renewal options, and satisfy its payments and other obligations in each of the aforementioned leases to ensure that all three leases remain in effect until at least September of 2025. Aside from the operational footprint established pursuant to this permit, Coast shall not conduct oyster harvesting activities on any of its leased or owned lands.

3. **Eelgrass Monitoring Plan.** PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, COAST SHALL SUBMIT, for Executive Director review and written approval, a revised version of its March 31, 2017 Eelgrass Monitoring Plan (included as **Exhibit 13**). The Eelgrass Monitoring Plan shall focus on quantifying any loss of eelgrass density or percent vegetated cover within the three relocated cultivation beds referred to as "test plots." Upon approval, the Eelgrass Monitoring Plan shall be implemented by a qualified, independent, third party approved by the Executive Director. Eelgrass performance shall be assessed on an annual basis over a 5-year monitoring term. Annual reporting of monitoring results, including raw sampling data, statistical analysis results, and a complete description of when and where sampling was carried out shall be provided as soon as possible after the completion of each year's data collection efforts.

4. **Brant Monitoring Plan.** PRIOR TO INSTALLATION OF CULTIVATION EQUIPMENT WITHIN RELOCATION CULTIVATION BEDS, Coast shall submit, for Executive Director review and written approval, a revised version of the April 21, 2017 Brant Monitoring Plan (included as **Exhibit 14**) capable of detecting and visually documenting and recording brant foraging activity on eelgrass beds within existing, relocated and converted cultivation beds (i.e. specifically feeding on eelgrass growing within beds rather than drift feeding) and determining how that level of foraging activity compares with foraging occurring on eelgrass growing outside cultivation beds. Survey techniques shall primarily rely on the use of remote cameras but may be augmented with other techniques, including field surveys and acoustic detection. The revised Brant Monitoring Plan shall include, at a minimum, surveys carried out during the appropriate seasons during baseline conditions and Year 1, 2, and 5 after installation of relocated cultivation beds or conversion of existing cultivation beds to configurations with wider spacing. The Executive Director's review of the Brant Monitoring Plan shall be informed by the results of a 30-day

independent peer review of the monitoring plan, overseen by the Executive Director and funded by Coast in an amount not to exceed $5,000 (not including administrative costs). Upon approval, the revised Brant Monitoring Plan shall be implemented by a qualified, independent, third party that shall be approved by and report to by the Executive Director.

5. **Vessel Management Plan.** PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, Coast shall submit, for Executive Director review and written approval, a Vessel Management Plan that includes: (1) a map showing the travel routes and landing or cultivation bed access sites that the Coast's vessels shall use to access the cultivation areas; and (2) procedures to limit herding or flushing of black brant or shorebirds within Arcata Bay.

6. **Intake System Design.** All intake systems used by Coast to supply water from Arcata Bay for maintenance cleaning and clam tray washing shall be designed with a screened intake with: (a) round or square openings of no more than 3/32 inches or slotted/wedge wire openings of no more than 1.75 millimeters, a screen area of at least 5 square feet per cubic foot per second water volume intake, a minimum open area of 27%, and a maximum intake water approach velocity of 0.2 feet per second if a self-cleaning device is installed that clears the entire screen face at least once every five minutes; or (b) round or square openings of no more than 3/32 inches or slotted/wedge wire openings of no more than 1.75 millimeters, a screen area of at least 20 square feet per cubic foot per second water volume intake, minimum open area of 27%, and a maximum intake water approach velocity of 0.05 feet per second if a self-cleaning device is not installed.

7. **Herring Spawn**. During the months of December, January and February, Coast shall visually inspect beds prior to planting and/or harvesting, to determine if Pacific herring (*Clupea pallasi*) has spawned on eelgrass, culture materials, or substrate. Visual inspections shall be conducted in accordance with the survey protocols developed by the California Department of Fish and Wildlife (CDFW). In addition, at the beginning of the three month herring spawning period, Coast shall provide staff of the CDFW Eureka Marine Region office a schedule of planting and/or harvesting activities anticipated to occur during the period. Further, Coast shall inform CDFW Eureka office staff with the proposed location of planned planting and/or harvesting activities no less than 48 hours prior to the activities.

   If herring spawning has been recently observed by Coast or CDFW staff on or in the immediate vicinity of planned planting and/or harvesting activities, Coast shall: 1) postpone planting and/or harvesting activities on any culture beds in those areas for two weeks, or until CDFW staff confirm herring eggs have hatched, and 2) notify the CDFW Eureka Marine Region office of the spawn within 24 hours. Coast shall keep records of when CDFW was notified of the spawning event, and those records shall be included with the annual report described in **Special Condition 8.**

8. **Annual Report.** By December 31 of each year, Coast shall submit to the Executive Director an annual report describing the status of each bed (including harvest date and planting date) within the operation footprint. The annual report shall also include information regarding the results of quarterly cleanup events carried out as described in **Special Condition 10**. In addition, the annual report shall include a report on the status and effectiveness of the system used by Coast to secure its cultivation baskets and prevent their

loss into the marine environment. This report shall include information on the number of baskets lost, replaced, and recovered throughout the course of the year as well as any design, management, or operational changes implemented to address issues that have arisen with the use of cultivation baskets.

9. **Plot Abandonment or Fallow.** Within 30 days of harvest on any cultivation bed or plot that is being discontinued, abandoned, removed, fallowed, or taken out of production for six months or more, Coast shall notify the Executive Director and propose a schedule to remove all piles of oysters and oyster shells, and all culture apparatus from that plot, including but not limited to stakes, racks, baskets, floats, rope, ties, wires, tags and pallets as soon as feasible and in any event within no more than an additional 60 days. This deadline may be extended in writing by the Executive Director if Coast can establish, to the Executive Director's satisfaction, that Coast cannot meet this removal deadline due to tides or other weather conditions. In addition, Coast shall commission an independent third party, reviewed and approved by the Executive Director, to inspect the cultivation bed or plot and report directly to the Executive Director within 14 days on the status and completeness of the removal work.

10. **Marine Debris Reduction and Management.** Coast shall carry out operations consistent with the following marine debris reduction and management practices:

    A. **Storm Damage and Debris**. As soon as safely possible following storm or severe wind or weather events, Coast shall patrol all active mariculture areas for escaped or damaged mariculture equipment. All equipment that cannot be repaired and placed back into service shall be properly recycled or disposed of at an appropriate onshore facility. In addition, Coast shall retrieve or repair any escaped or damaged mariculture equipment that it encounters while conducting routine daily and/or monthly maintenance activities associated with shellfish culture (e.g. bed inspections, shellfish grading and sorting). If the escaped gear cannot be repaired and replaced on the shellfish bed, it shall be properly recycled or disposed of on land.

    B. **Gear Marking.** Coast shall mark shellfish culture bags, baskets, floats, and basket label tags in an easily identifiable manner with its company name or other identification information. Markings shall be securely attached and robust enough to remain attached and legible after an extended period in the marine environment (e.g. heat transfer, hot stamp, etching, etc.). Existing culture bags, baskets, floats, and basket label tags currently in use in culture beds shall be marked or replaced with marked versions when replanted and all unmarked gear shall be replaced in this way within 18 months. In the event that shellfish culture gear or equipment becomes dislodged from culture beds, it shall be Coast's responsibility to retrieve the material from the shoreline, open water, eelgrass beds, mudflat, or submerged bottom with minimal damage to the resources affected. Such material shall be removed and properly disposed of, recycled, or returned to use.

    C. **Marine Debris Reduction Training.** WITHIN 30 DAYS OF ISSUANCE OF THIS PERMIT, Coast shall implement an employee training regarding marine debris issues, how to identify loose culture gear, proper gear repair methods and how to completely remove gear from out-of-production or fallow cultivation beds. Particular focus shall be placed on management and maintenance practices to reduce the loss of any gear type consistently found during bay cleanup and inspection activities. This training shall be

repeated on an annual basis throughout the term of the permit. During trainings, Coast's employees shall be encouraged to consider and implement field and management practices that reduce the amount of small plastic gear (such as zip-ties, tags and fasteners) and non-biodegradable material (such as PVC stakes and nylon or polypropylene rope) used in its operations.

D. **Cleanup Events.** Coast shall conduct quarterly baywide cleanups in coordination with other interested parties or organizations, which shall include walking different portions of the bay and shorelines to pick up escaped shellfish gear and other trash (regardless of whether it is generated by the Project). The volume and type of shellfish gear collected and the cleanup location (marked on a map) and duration of cleanup activity shall be recorded and documented in the annual report submitted to the Executive Director of the Commission. If consistent discoveries of certain gear types are made during cleanup events by Coast or the public, Coast shall evaluate (and if feasible, implement use of) alternative gear types or practices that would reduce these consistent sources of debris.

E. **Ongoing Operations.** Coast shall not leave or temporarily store tools, loose gear, or construction materials on its owned or leased tidelands or surrounding areas. All aquaculture gear installed in active culture beds shall be kept neat and secure and maintained in functional condition. Coast shall carry out regular bed inspections and maintenance activities to help ensure that broken, collapsed, fallen, or buried gear is fixed or removed in a timely manner.

F. **Bed Cleaning at Harvest.** At the time of harvest of each cultivation bed, Coast shall carry out a thorough inspection to locate and remove loose or abandoned equipment, tools, and accumulations of oysters from the surrounding substrate.

11. **Cultivation Area Mapping and Marking.** WITHIN 30 DAYS OF ISSUANCE OF THIS PERMIT, Coast shall submit for Executive Director review and written approval, an updated version of the Cultivation Bed Mapping and Marking Plan (Cultivation Area Plan) submitted to Commission staff on April 5, 2017 (included as **Exhibit 10**). This Cultivation Area Plan shall be revised to include all growing areas and cultivation beds approved by the Commission and include a consistent, standardized method of marking the location of Coast's growing areas and culture beds in a manner that is obvious, identifiable, and understandable by boaters and recreational users not familiar with Coast's operation. Unless a more effective approach can be developed by Coast and approved in writing by the Executive Director, the Cultivation Area Plan shall include the removal of all existing marking stakes and the use of uniform marking stakes or posts that (1) remain visible and above water during maximum tidal heights; (2) are topped with reflective material; (3) identify the side of the stake on which the culture bed is located; and (4) are placed every 200-feet along the outer sides and at each corner of each of Coast's active culture beds. In addition, the Cultivation Area Plan shall include a method for Coast to develop, consistently update, and distribute digital and hard copy maps of Arcata Bay showing the location of its rafts and culture beds. Upon approval of the Cultivation Area Plan by the Executive Director, Coast shall implement the Cultivation Area Plan and complete the removal, replacement, and installation of marking stakes or posts within 90 days from the date of the Cultivation Area Plan's approval by the Executive Director.

12. **Brant Hunting.** Except for emergency situations, activities to ensure the safety of its operations or operations required for regulatory compliance, such as marine debris cleanup response after storm events, Coast shall avoid on-water operations within its leased and

owned areas depicted on **Exhibit 1** from one hour before sunrise until sunset on days that are designated by CDFW as brant hunting days on Arcata Bay, including season opening and closing days (typically brant hunting within the bay is limited to Wednesdays, Saturdays, and Sundays between early November and mid-December).

13. **Bed Removal.** All cultivation bed removal activities shall be carried out consistent with the requirements of **Special Condition 9**. Once the growth cycle for oysters is complete on a bed that is to be removed (including those cultivation beds referred to as EB 7-2, SI 1-1, SI 2-1, SI 2-2, SI-N, and GI 1-2/II 1-2) that area shall be harvested, not replanted, and all cultivation gear and equipment, including all stakes, posts, lines, ropes, tags, wires, and fasteners, shall be permanently removed. This removal work shall also be carried out consistent with the requirements of **Special Condition 9** and shall be completed no later than December 31, 2019.

14. **Protection of Brant Grit Sites.** Between the months of November and June, no vessel transit or cultivation activities shall be carried out within 384 meters of the black brant grit site at Sand Island shown in **Exhibit 8**. Marine debris collection efforts and water quality sampling required by the California Department of Public Health shall be exempt from this requirement.

15. **Longline Spacing.** During its next harvest, Coast shall convert of all of its cultivation beds with 2.5-foot spacing throughout (including those culture bed referred to in the December 23, 2016 "Annual Report for CDP E-06-003" submitted to the Executive Director as BI W k, EB 2-3, MR 10, MR 2, MR 5-1 k, MR 5-2, MR 8-2, and MR 9 and excluding beds that will be converted to greater spacing or removed) to a configuration that includes a five foot wide channel between each group of five lines and a ten foot wide channel between the end of one 100-foot line and the beginning of the next line, as represented in the diagram included in **Exhibit 3**.

16. **Wildlife Disturbance.** During vessel transit, harvest, maintenance, inspection, and plating operations, Coast shall avoid approaching, chasing, flushing, or directly disturbing shorebirds, waterfowl, seabirds, or marine mammals.

17. **Non-native Clam Cultivation.** Coast shall implement management practices during grading and handling of non-native clams to prevent spillage, including by using screens during washing activities to contain all clams regardless of size during and by discarding all culls in appropriate onshore trash containers. All cultivated clams shall be removed from the clam cultivation rafts and bay prior to reaching 12mm shell size, at which size they are not sexually mature.

18. **Other Agency Review and Approval.** PRIOR TO COMMENCEMENT OF PROJECT CONSTRUCTION AND/OR INSTALLATION ACTIVITES, Coast shall submit to the Executive Director written evidence that all necessary permits, permissions, approvals, and/or authorizations for the approved project have been granted, including those from the North Coast Regional Water Quality Control Board (RWQCB) and U.S. Army Corps of Engineers. Any changes to the approved project required by these agencies shall be reported to the Executive Director. No changes to the approved project shall occur without an

amendment to this permit unless the Executive Director determines that no amendment is legally necessary.

19. **Cultural Resources Point of Contact**. Coast has designated its operational manager, Greg Dale, as its authorized point of contact (Cultural Resources POC) to be used in the event any cultural or archaeological resource, human remains, or Native American grave goods are discovered during its aquaculture operations. If this designated point of contact changes, Coast shall provide the name and contact information for its new Cultural Resources POC to the Executive Director, staff of the Humboldt Bay Harbor, Recreation, and Harbor District (Harbor District), and the Tribal Historic Preservation Officers (THPOs) appointed by the Blue Lake Rancheria, Bear River Band of Rohnerville Rancheria and Wiyot Tribe.

20. **Cultural Resource Discovery Protocols**. In the event an archaeological resource is discovered during ground-disturbing activities, Coast shall immediately notify the THPOs appointed by the Blue Lake Rancheria, Bear River Band of Rohnerville Rancheria and Wiyot Tribe. As soon as feasible after such a discovery, Coast shall retain a qualified archaeologist with local experience to consult with Commission staff, the Harbor District, the three THPOs, Coast, and other applicable regulatory agencies to employ best practices for assessing the significance of the find, developing and implementing a mitigation plan if avoidance is not feasible, and reporting in accordance with this Special Condition and Harbor District Protocol. If no such discovery is made, no reporting is required. In addition:

    A. Ground-disturbing activities shall be immediately stopped if potentially significant historic or archaeological materials are discovered. Examples include, but are not limited to, concentrations of historic artifacts (e.g., bottles, ceramics) or prehistoric artifacts (chipped chert or obsidian, arrow points, groundstone mortars and pestles), culturally altered ash-stained midden soils associated with pre-contact Native American habitation sites, concentrations of fire-altered rock and/or burned or charred organic materials, and historic structure remains such as stone-lined building foundations, wells or privy pits. Ground-disturbing aquaculture operations may continue in other areas outside the discovery locale.
    B. As soon as feasible after a discovery, Coast shall establish (e.g., tape off or mark with stakes) an "exclusion zone" where unauthorized equipment and personnel are not permitted around the discovery area and a 100-foot buffer zone.
    C. Coast shall secure (e.g., provide 24-hour surveillance) the discovery locale if directed to do so by the Harbor District or Executive Director, if either deems it necessary to avoid further disturbances.
    D. Coast's plant manager (located at 25 Waterfront Drive in Eureka) or party who made the discovery and initiated these protocols shall be responsible for immediately contacting by telephone the parties listed below to report the find:
        i. Commission staff;
        ii. The Harbor District's authorized point of contact; and
        iii. Coast's Cultural Resources POC
    E. Upon learning about a discovery, Coast's Cultural Resources POC shall be responsible for immediately contacting by telephone the POCs listed below to initiate the consultation process for its treatment and disposition:
        i. THPOs with Blue Lake Rancheria, Bear River Band and Wiyot Tribe; and
        ii. Other applicable agencies involved in Project permitting (e.g., U.S. Army Corps of Engineers, etc.).

F. In cases where a known or suspected Native American burial or human remains are uncovered, Coast's Cultural Resources POC shall also immediately notify the Humboldt County Coroner (707-445-7242), along with the property owner of the discovery site. In addition, the protocols established through **Special Condition 21** shall be followed.

G. Ground-disturbing project operations at the find locality shall be suspended temporarily while the Executive Director, the Harbor District, the three THPOs, a consulting archaeologist and other applicable parties consult about appropriate treatment and disposition of the find. Based on this consultation, Coast shall, within three working days of discovery notification, prepare a Treatment Plan and submit it for review and approval by the Executive Director, the Harbor District, and the three THPOs. Where the Project can be modified to avoid disturbing the discovery site (e.g., through project redesign), the Treatment Plan shall consider this as a preferred option. Should human remains be encountered, the provisions of State laws shall apply and **Special Condition 21** shall be followed. The Treatment Plan shall reference appropriate laws and include provisions for analyses, reporting, and final disposition of data recovery documentation and any collected artifacts or other archaeological constituents. If feasible, the field phase of the Treatment Plan shall be accomplished within five days after its approval (with the understanding that circumstances may require longer periods for data recovery).

H. 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 Commission's and Harbor District's authorized representatives shall be responsible for coordinating any requests by or contacts to the media about a discovery.

I. Coast shall immediately communicate these protocols to its field work force (including contractors, employees, officers and agents), and such communications shall be made and documented at safety briefings.

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

K. The plant manager or party who made the discovery and initiated these protocols, shall make written notes available to the Executive Director and Harbor District describing: the circumstances, date, time, location and nature of the discovery; date and time each point of contact was informed about the discovery; and when and how security measures were implemented.

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

M. Final disposition of all collected archaeological materials shall be documented in a final Data Recovery report and its disposition determined in consultation with Tribal representatives.

N. Coast shall file Final Data Recovery Reports, along with updated confidential, standard California site record forms (DPR 523 series), at the Northwest Information Center of the California Historical Resources Information System, with report copies provided to the three identified THPOs.

21. Discovery of Remains. In the event human remains or Native American grave goods are discovered during ground-disturbing activities, work at the discovery locale shall be halted immediately, Commission staff, the Harbor District and County Coroner shall be contacted, and, consistent with State law, the following protocol shall be followed (in addition to the protocol described under **Special Condition 20**).

A. 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.
B. Violators of Section 7050.5 of the California Health and Safety Code may be subject to prosecution to the full extent of applicable law (felony offense).
C. In addition, the provisions of California law (Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the California Public Resources Code) shall be followed:

i. 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 in Sacramento at (916) 653-4082.
ii. The NAHC is responsible for identifying and immediately notifying the most likely descendant (MLD) of the deceased Native American.
iii. Within 48 hours of their notification by the NAHC, the MLD shall be granted permission by the property owner of the discovery locale to inspect the discovery site if the MLD so chooses.
iv. Within 48 hours of their notification by the NAHC, the MLD may recommend to the owner of the property (discovery site) the means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The recommendation may include the scientific removal and non-destructive or destructive analysis of human remains and items associated with Native American burials. Only those osteological analyses (if any) recommended by the MLD may be considered and carried out.

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

22. Indemnification by Permittee. By acceptance of this permit, Coast agrees to reimburse the Coastal Commission in full for all Coastal Commission costs and attorney's fees -- including (1) those charged by the Office of the Attorney General, and (2) any court costs and attorney's fees that the Coastal Commission may be required by a court to pay -- that the Coastal Commission incurs in connection with the defense of any action brought by a party other than the applicant/permittee against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission. PRIOR TO ISSUANCE OF THIS PERMIT, Coast shall enter into a separate written agreement with the Executive Director agreeing to reimburse the Coastal Commission for all court costs and attorney's fees, consistent with the requirements of this condition.

IV. FINDINGS AND DECLARATIONS

A. BACKGROUND AND PREVIOUS PERMITTING

The proposed project site is located in the north and central parts of Humboldt Bay, California. Humboldt Bay encompasses roughly about 17,759 acres at mean high tide in three geographic segments: South Bay, Entrance Bay, and North Bay/Arcata Bay. Within the 7,354 intertidal acres of Arcata Bay, the project applicant, Coast Seafoods Company (Coast), leases approximately 3,800 acres. Coast's leased area is made up of nearly 3,300 acres of public trust land managed by the City of Eureka or Humboldt Harbor, Recreation, and Conservation District (Harbor District) and over 500 additional acres of privately owned lands primarily held by the Karamu Corporation. In addition, Coast owns an additional 514 acres of intertidal and submerged lands within Arcata Bay. Coast's combined 4,313 acres of owned and leased intertidal land is roughly half of the total intertidal area of Arcata Bay. **Exhibit 1** shows the boundaries of Coast's leased and owned area in Arcata Bay. Within this area, Coast maintains an approximately 300 acre intertidal shellfish aquaculture operation, nearly two-thirds of which is located on public trust land.

Coast has been carrying out oyster aquaculture in Arcata Bay since the 1950's and is currently owned by Pacific Seafood, one of the largest seafood companies in North America. Prior to 2006, Coast's intertidal oyster cultivation operations had occurred without benefit of a coastal development permit (CDP). While Coast agreed to seek a CDP for its operations in 2006, it also submitted a claim for a vested right and reserved its right to pursue a vested right in the future. In the late 1990s and early 2000s, both the Commission and U.S. Army Corps of Engineers (Corps) informed Coast that it would need additional state and federal authorization to continue operating. To satisfy these permit requirements, in 2003, Coast submitted a permit application to the Corps and a CDP application to the Commission for an approximately 300 acre oyster aquaculture operation within Arcata Bay. Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA) the Corps cannot issue an individual permit to Coast until the Commission either concurs or is conclusively presumed to concur in a federal consistency certification. Commission approval of a CDP application also constitutes concurrence under the CZMA.

In May 2006, the Commission approved Coast's CDP application (E-06-003) and Coast received a permit with conditions allowing it to carry out a maximum of approximately 300 acres of off-bottom oyster cultivation as well as several other related activities. This permit was term-limited and set to expire after ten years - in May of 2016 - consistent with Coast's primary leases. The Corps issued a permit to Coast shortly after. Through a series of permit amendments authorized by the Commission, Coast slightly modified its permitted operations and extended their term until August of 2017 – in part to provide Coast with an opportunity to seek a new longer-term authorization for its operations in Humboldt Bay. Coast had also previously received another permit from the Commission (CDP No. E-02-005) to install and operate a series of clam cultivation rafts in Arcata Bay.

As Coast's local, state, and federal authorizations approached expiration, it applied for a series of new permits to modify and substantially expand its operations within Arcata Bay. Initially, Coast proposed to more than triple its operational footprint from 300 acres to approximately 917 acres. The scale of its proposed expansion was subsequently reduced to roughly 490 acres by Coast in response to concerns about potential adverse environmental impacts that were raised during the Harbor District's CEQA review process. In February of 2017, the Harbor District certified a Final

EIR for the proposed project and found that this roughly 490 acre operation was the environmentally preferred alternative. Although certification of its Final EIR has been challenged through court filings by two organizations represented by Earthjustice (Audubon California and the California Waterfowl Association), the Harbor District also approved the issuance of a use permit for Coast's proposed expansion.

On June 7, 2017, the Commission denied Coast's application (9-15-1931) to expand its operations. The Commission found the project inconsistent with several Coastal Act policies because the expansion would result in adverse impacts to marine biological resources, water-oriented recreation and cultural resources. In August 2017, the Commission granted Coast short-term extensions to the CDPs for its existing operation so that it could continue that operation while it developed a revised proposal for longer-term operations. This revised longer-term proposal is the subject of this report.

Although Coast has been involved in two issues of Coastal Act compliance since 2006 - one resulting from unpermitted development and the other from a failure to comply with permit conditions - in both instances it has been responsive to Commission staff in seeking prompt resolution to them once they were discovered by Commission staff. The first issue was resolved by Coast seeking and receiving an after-the-fact permit amendment (E-06-003-A1) to install and operate a new type of oyster cultivation equipment (baskets on longlines) within an approximately 11 acre section of its operation. The second issue arose due to Coast's failure to meet a variety of submittal deadlines and to implement equipment maintenance, removal, and marine debris prevention requirements established under its most recent permit amendment (E-06-003-A5). Commission permitting and enforcement staff worked productively with Coast over the past several months and these requirements have now been met.

A. PROJECT DESCRIPTION

In this application, Coast Seafoods Company (Coast) proposes to continue its existing aquaculture operations but reduce the size of its roughly 300 acres of operations in Arcata Bay by roughly 21 acres while simultaneously increasing its overall production levels. Coast proposes to plant, grow and harvest Pacific oysters (*Crassostrea gigas*) and Kumamoto oysters (*Crassostrea sikamea*) for commercial sale to individuals, restaurants, and seafood suppliers, and plant, grow, and harvest juvenile Manila clams (*Venerupis philippinarum*) for sale and transport to other shellfish aquaculture operations elsewhere in the state and west coast.

Specifically, Coast proposes to:

- Remove densely-planted equipment from approximately 63 acres of existing oyster cultivation beds in the central and eastern areas of the bay;
- Abandon 21 of those 63 acres and relocate the remaining 42 acres into areas of historic dredging and shell deposition in the Mad River and Bird Island areas of the bay. Cultivation beds in these re-location areas would be installed with a wider spacing between cultivation gear of either ten feet between paired longlines or nine and 16 feet between basket lines (as described further in **Appendix A**).
- Convert 20 acres from densely-spaced longlines to widely-spaced basket lines; and re-permit roughly 216 acres of existing cultivation beds with their current spacing and configuration.

By implementing the above, Coast would reduce its existing intertidal oyster cultivation operation from approximately 300 acres to roughly 279 acres and consolidate it into three primary areas in

Arcata Bay – around Bird Island, Mad River, and the south-eastern area of Arcata Bay. Coast also proposes to continue growing clams (and to begin growing oysters) on 30 floating rafts located within one of the bay's subtidal channels. The proposal is described in more detail below and in **Appendix A**.

Clam Cultivation

Coast's proposed clam cultivation operation would continue the use of 30 existing rafts located in a roughly one acre area of submerged tidelands leased from the Humboldt Harbor, Recreation, and Conservation District (Harbor District) along the west side of the entrance to the Mad River Slough Channel opposite Bird Island, approximately ½ mile north of the Samoa/Highway 255 bridges (see **Exhibit 2**). Coast also proposes to use these rafts for oyster cultivation. Each clam raft is approximately 12 feet wide by 20 feet long, constructed from aluminum and using polyethylene encapsulated Styrofoam for floatation (see **Exhibit 3**). The rafts are moored in place with nearly two dozen 250- to 500-pound steel anchors placed in water depths of approximately 20 feet. Each raft has 24 tray wells and each well contains a stack of about 20 suspended plastic trays that would be used for growing clams. The rafts would be stocked with Manila clam seed (small immature clams) of approximately 0.05 inches in size imported from land based hatchery facilities in Washington and Hawaii. The seed would then be grown to approximately 0.14 inches over a period of one to six months in the cultivation trays. Once it reaches the appropriate size, the clam seed would then be harvested by hand, sold, and shipped out of Humboldt Bay to locations such as Willapa Bay, Washington for cultivation to adult harvest size. Coast proposes to grow up to 270 million seed clams per year on each raft for a combined total of up to 8.1 billion seed clams. Also as part of the project, Coast proposes to cultivate Pacific and Kumamoto oyster seed in the existing clam rafts. This would result in no change to the physical structure of the clam rafts.

The 30 rafts are divided into three sets of ten rafts. Each set of ten rafts is linked together in a line, separated and held in place by two 60 foot long steel cables between each raft and with eight anchors to keep the array of ten in place (see **Exhibit 3**). During operation, the clam rafts would be accessed by skiff and scow. Activities at the clam rafts would include regular washing, maintenance, harvest, and planting of clam seed. Washing and maintenance activities would be carried out on a daily basis and include the use of a pressure washer, an onboard water intake pump and hose system on the maintenance vessels. Twice each year the raft anchors and ground tackle would be examined and repaired as necessary by divers using scuba, skiffs and an oyster barge.

Coast holds a lease from the Harbor District for the submerged lands in which the rafts are located. Unless renewed, this lease would expire on September 7, 2025.

Oyster Cultivation

Since the early to mid-1900s, Coast and its predecessors have been commercially growing the non-native Pacific oyster (*Crassostrea gigas*) in Arcata Bay. Historically, these operations were spread across as many as 1,000 acres and used "on-bottom" methods that relied on the placement of loose oysters and shell directly on intertidal mudflats and their subsequent harvest through suction dredging and excavation. This style of aquaculture continued until the late 1990s when Coast began converting to the less destructive "off-bottom" techniques that it currently uses. The three "off-bottom" methods that are used by Coast include rack-and-bag, long-line, and basket culture. Rack-and-bag culture makes use of elevated metal frames that are used to support plastic mesh bags filled with oysters and long-line culture makes use of short notched PVC pipes embedded in rows and used to support 100-ft. long lengths of nylon rope that are seeded every several feet with clusters of

oysters. Basket culture makes use of rows of taller, larger diameter PVC posts to support a monofilament line on which rows of hard plastic enclosed mesh baskets are hung. Each basket is then filled with up to several dozen individual oysters. See more details in **Appendix A** and **Exhibit 4**.

FLUPSY (Floating Upwell System)
Coast also proposes to continue using a FLUPSY facility located on the west side of the bay entrance channel, south of the Simpson wood chip loading dock in Fairhaven, to nurse single-seed oysters immediately after arrival from the hatchery (approximately 1.4 mm) until they would be ready to be bagged and planted on racks for rack-and-bag culture (approximately 6 mm.) Coast also proposes to use the FLUPSY for clam seed, and to grade single-seed oysters by size. Coast also proposes to add eight upwell bins (three feet long by three feet wide by three feet deep) to the FLUPSY, resulting in a slight increase in the volume of water it occupies. The FLUPSY is tied to a dock at the Eureka Boat Yard 200 yards from the shoreline in 20 feet of water. See **Exhibit 5** for a graphic depiction.

Storage Floats
Coast proposes to use four 20-foot wide by 20-foot long wooden floats or rafts anchored in a channel with an average depth of roughly 20-feet. Bags and baskets of recently harvested oysters would be placed on these floats and held in a submerged area for short durations until they would be ready for transport by boat to Coast's onshore base of operations. Coast estimates that approximately 0.04 acres are occupied by these storage floats.

Nursery Area
Coast proposes to continue using approximately 4.8 acres as an "oyster nursery" split between two areas. Within these areas Coast would stack oyster shell upon which young oyster larvae or "seed" have settled. The shell would be consolidated in mesh bags and placed on wooden pallets in order to prevent the bottom of the stacks from becoming silted in. See **Exhibit 4**.

After a period of time, which varies due to seasonal conditions (usually 2-3 months) the seeded shell would be removed from the nursery in small batches daily and brought to Coast's onshore processing plant. At the plant, individual pieces of shell would be braided into long-line ropes and re-bagged. Once the shell has been braided into the rope and bagged it would be put into the bay and placed on either a bed or on the Arcata Channel nursery area (shown in **Exhibit 4**) to await planting.

The seed shell would be transported by boat to nursery areas located in Humboldt Bay on mudflats north of Gunther Island and along Arcata Channel. At these nursery areas the seed would be allowed to grow to a less fragile size and age. This process, called beach hardening, is needed to allow the seed to gain size and strength prior to planting. The seed would be allowed to beach harden for 3 to 8 months depending on time of year, growth and condition of the seed.

Vessel Operations
To support its aquaculture operations, Coast would use a fleet of six small watercraft and three larger vessels. These vessels would operate between the culture beds and rafts in Arcata Bay and Coast's onshore plant on the shoreline in Eureka. The combined total vessel operations for the proposed project would include an estimated 72 vessel trips and 278 hours per week on Arcata Bay (approximately ten trips and 40 hours per day). This represents an approximately 28%

increase over the operational levels used by Coast for the past 11 years. However, since the footprint of Coast's operations in Arcata Bay would be consolidated significantly, this use would be concentrated into fewer areas. For example, cultivation activities would be eliminated from the central and far eastern portions of the bay once Coast's proposed relocation and removal of cultivation beds is complete.

Phasing
As shown in the table below, Coast proposes to carry out the modifications to its existing operation over the course of approximately two-and-a-half years. The exact timing would be somewhat flexible due to weather and market conditions and shellfish growth rates but Coast has committed that at no time will its relocation or reconfiguration efforts exceed removal (in other words, the total footprint of the operation would never exceed the current acreage). This commitment is memorialized in **Special Condition 2**.

The following estimated schedule (further detailed in **Exhibit 12**) is based on Coast's estimates of oyster growth rates and harvest conditions.

During the fall of 2017, Coast would remove existing cultivation equipment from approximately 38 acres. Once this removal activity is completed, Coast would initiate efforts to relocate 12 acres of cultivation beds and convert four acres. During the summer and fall of 2018, Coast proposes to remove existing cultivation beds from approximately six more acres and covert five acres of existing densely-spaced longline beds to widely-spaced baskets on longlines. In the winter, spring, and summer of 2018, Coast proposes to install roughly 28 acres of relocated cultivation beds. Finally, in the spring, summer, and fall of 2019, Coast would remove the remaining 20 acres of the 63 acres of existing cultivation beds it proposes to take out of production and in the fall and winter of 2019 would covert the final five of the 20 acres of cultivation beds to wider spacing and relocate the final 12 of the 42 acres of beds proposed to be relocated and consolidated. These activities would be carried out incrementally over time due to the effort and personnel they require and to minimize production losses by allowing for the harvest of oysters currently planted within cultivation beds proposed for removal or relocation.

	Year 1	**Year 2**	**Year 3**
Removal	38.2 acres	5.7 acres	19.6 acres
Relocation	12.2 acres	27.6 acres	2.4 acres
Conversion	4.2 acres	4.7 acres	11.8 acres

B. OTHER AGENCY APPROVALS AND CONSULTATIONS

Over the approximately three years that have elapsed since Coast's initial proposal to expand its operations in Arcata Bay to over 900 acres, Commission staff have spent several hundred hours in meetings, conference calls, site visits, interagency coordination efforts, and consultations and feedback sessions with Coast, its legal and consulting teams, interested parties, representatives of the Wiyot Tribe, local government staff, and state and federal resource agency staff. At Coast's request, Commission staff have attended at least four formal day long interagency meetings with Coast's representatives and state and federal resource agency staff including those from the California Department of Fish and Wildlife, Regional Water Quality Control Board, U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, California State Lands Commission, and California Department of Public Health. Commission staff has also

met independently with these agency staff and have integrated the concerns, input, suggestions, and technical expertise of these agency staff into this recommendation.

Humboldt Bay Harbor, Recreation, and Conservation District
The majority of Coast's proposed operation in Arcata Bay would be carried out on tidelands that are owned and managed by the Humboldt Bay Harbor, Recreation, and Conservation District (Harbor District). In 2015, the Harbor District renewed and restated its lease to Coast for aquaculture operations in Arcata Bay. Unless renewed, this lease is set to expire on September 7, 2025. **Special Condition 1** sets the permit term to this lease expiration date. In addition, the Harbor District was also the lead agency for Coast's initially proposed expansion project under CEQA. At a special hearing on February 28, 2017, the Harbor District certified a Final EIR for that expansion project and issued a Use Permit to Coast for expanded operations in Arcata Bay.

Coast would carry out its operations in accordance with the parameters described in **Exhibit 6**, the Harbor District's Mitigation Monitoring and Reporting Program.

U.S. Army Corps of Engineers
In 2006, the U.S. Army Corps of Engineers (ACOE) issued Individual Permit No. 2002-26912N to Coast under Section 404 of the Clean Water Act of 1972 and Section 10 of the Rivers and Harbors Act of 1899. This permit authorized Coast to conduct oyster mariculture operations, over a ten year period, on approximately 300 acres in Arcata Bay. In 2016 and 2017, the ACOE modified this permit to extend the expiration date to December 31, 2017. If the Commission approves its CDP application, Coast is anticipating applying to the ACOE for a new permit that would authorize the proposed changes to its aquaculture operations within Arcata Bay.

Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act ("CZMA") the Corps cannot issue an individual permit to Coast until the Commission either concurs or is conclusively presumed to concur in a federal consistency certification. Commission approval of this CDP application constitutes concurrence under the CZMA.

National Marine Fisheries Service
As part of its review process, the ACOE must consult with the National Marine Fisheries Service (NMFS). In addition, Commission staff has worked closely with NMFS during the review of this permit application and the staff recommendation reflects and incorporates technical feedback received from NMFS staff.

California Department of Fish and Wildlife
Coast's aquaculture operations are required to be registered annually with the California Department of Fish and Wildlife (CDFW). Coast has a valid registration for 2017. In addition, CDFW is a resource agency with trustee responsibility over many of the biological resources of Humboldt Bay, including eelgrass, fisheries, and waterfowl. As such, CDFW staff were deeply engaged throughout the project's CEQA review in evaluating the project's potential to adversely affect these resources and they provided the lead agency (the Harbor District) with extensive technical comments, input, and suggestions regarding the project design and evaluation. Commission staff drew on this technical input and have coordinated closely with CDFW during the review of Coast's permit application. The staff recommendation reflects and incorporates a range of technical feedback received from CDFW staff.

North Coast Regional Water Quality Control Board
The North Coast Regional Water Quality Control Board (Regional Water Board) has permitting jurisdiction over Coast's aquaculture operation through both Section 401 of the Clean Water Act and the state Porter-Cologne Water Quality Control Act. In 2007, the Regional Water Board issued a section 401 certification to Coast for its aquaculture operation. In 2016 and 2017, this certification was extended and is now set to expire on December 31, 2017. Coast has applied to the Regional Water Board for a new section 401 certification to authorize its proposed reduction and consolidation of its shellfish aquaculture operations within Arcata Bay. The Regional Water Board is currently reviewing this application.

C. FILL OF OPEN COASTAL WATERS

Section 30233(a) of the Coastal Act states:

> *The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
>
> *(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
>
> *(2) Maintaining existing, or restoring previously dredged depths on existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
>
> *(3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*
>
> *(4) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*
>
> *(5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
>
> *(6) Restoration purposes.*
>
> *(7) Nature study, aquaculture, or similar resource dependent activities.*

Coastal Act Section 30108.2 defines "fill" as "earth or any other substance or material … placed in a submerged area." As part of its project, Coast proposes to place and maintain tens of thousands of PVC posts, longlines, and baskets on longlines, as well as wooden pallets and large mesh bags of oyster shell within intertidal mudflats. Additionally, Coast proposes to maintain several dozen anchoring devices within subtidal channels to support its cultivation rafts and FLUPSY. In total, Coast's proposed project would result in the placement of roughly three acres of fill within Arcata

Bay. Installation of this material constitutes "fill" of wetland waters, as that term is defined in the Coastal Act.

The Commission may authorize a project that includes filling of wetland waters if the project meets the three tests of Coastal Act Section 30233. The first test requires that the proposed activity fit within one of seven use categories described in Coastal Act Section 30233(a)(1)-(7). The second test requires that no feasible less environmentally damaging alternative exists. The third and final test mandates that feasible mitigation measures are provided to minimize any of the project's adverse environmental effects.

Allowable use

The purpose of the anchors, PVC posts, longlines, and other fill is to support Coast's aquaculture operations. Aquaculture is described as an allowed use in Coastal Act Section 30233(a)(7). Therefore, the Commission finds that the project meets the allowable use test for fill of wetland waters under Coastal Act Section 30233(a).

Alternatives

The Commission must further find that there is no feasible less environmentally damaging alternative to placing fill in coastal waters. Coastal Act Section 30108 defines "feasible" as "…capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors."

In addition to the proposed placement of floating rafts and longline cultivation equipment in Arcata Bay to support oyster and clam aquaculture, Commission staff also considered other shellfish cultivation methods and project configurations to determine if any of them would require less fill or be less environmentally damaging than the proposed project. Among the various techniques considered - placement of loose shell on tidal flats (bottom culture), placement of mesh cultivation bags filled with oysters on the tidal flats, installation of elevated racks, and use of additional floating cultivation rafts or barges – most would involve more fill in coastal waters when compared to the proposed project. Therefore, these alternatives were rejected as no less environmentally damaging.

Additionally, alternative project configurations were also considered. For example, Commission staff evaluated if it would be less environmentally damaging for the project to take additional steps to pursue installation of cultivation beds outside of sensitive habitat areas (such as eelgrass) and more consolidated configurations (cultivation beds concentrated in fewer areas within Arcata Bay).

The siting of cultivation areas outside of eelgrass habitat (specifically, at tidal elevations that do not support eelgrass, typically 1.5 feet or greater) was also evaluated by the Harbor District as part of its CEQA review of Coast's previous proposal to expand operations in Arcata Bay. The Harbor District's Final EIR includes a discussion of this alternative and a conclusion that it would be both infeasible and generate additional adverse environmental impacts:

> *The total amount of additional acreage available at the elevation that Coast believes is suitable for growing oysters (below +1.5-ft MLLW) is approximately 6.4 acres, which is primarily located on the southwest side of* [Indian] *Island, with a small amount of acreage available on Bird Island. There is an additional 50.4 acres available for cultivation between*

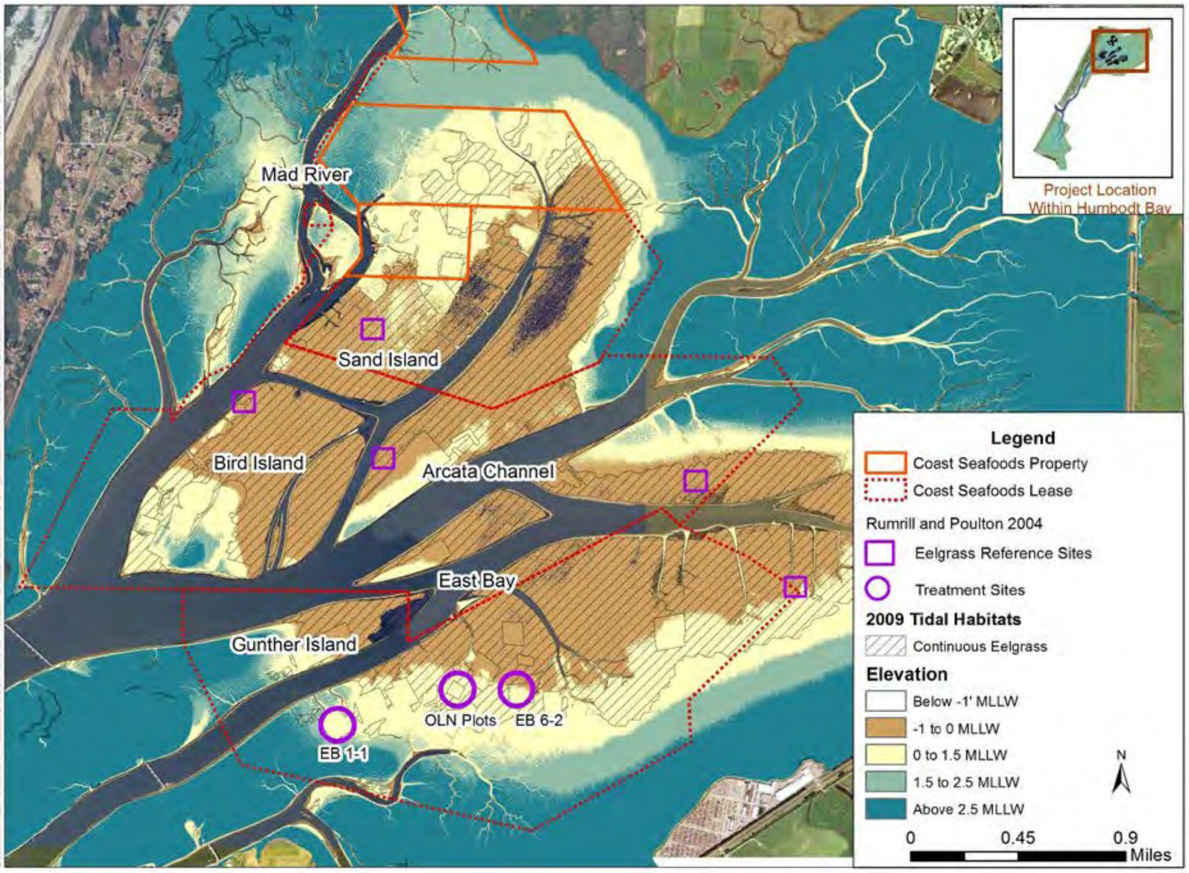
+1.5-ft MLLW and +2.0-ft MLLW although, as discussed below, such areas are not practicable for shellfish cultivation and have other limitations (including tidal elevation) that restrict their utility.

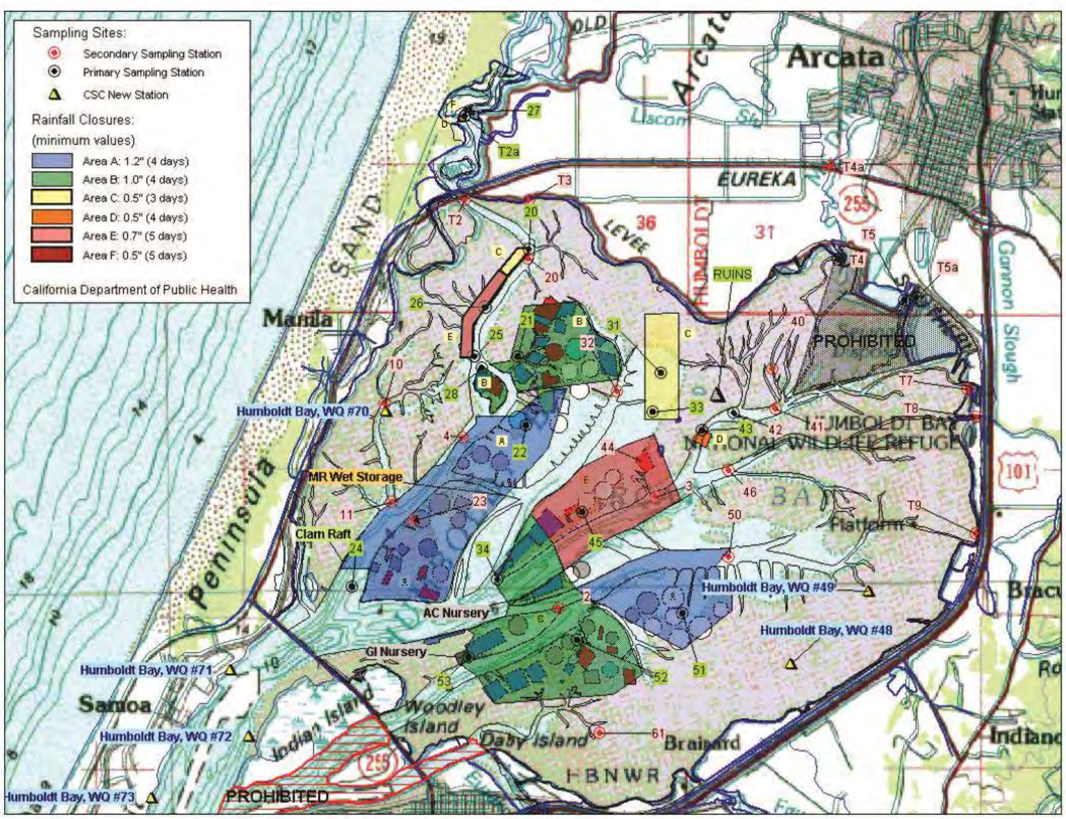
…

While a total of 56.8 acres could be planted below a +2-ft elevation in areas that do not include eelgrass, there are a number of operational concerns associated with the additional areas. First, the additional areas located on the eastern side of Coast's leased footprint are located in the [East Bay Management Area]. *Several commenters have requested that Coast avoid planting additional acreage within the EBMA (see, e.g., Comments 13-8 and 17-86) due to concerns regarding brant and herring impacts. In response to this concern, the FEIR incorporates discussion of an additional alternative that does not include any expansion of Coast's operational footprint within the EBMA. For additional analysis of this alternative, see FEIR Section 4, Revisions to the R-DEIR. Further, both potential areas located within the EBMA and east of the Mad River are extremely remote and would take hours for Coast workers to access the plots, given that they are not easily accessed by channels. These areas are also not currently certified for shellfish cultivation by the California Department of Public Health, which would require additional testing and certification of those areas prior to planting and cultivation.*

As noted in the Final EIR, one of the primary impediments to Coast's use of cultivation areas in the Mad River portion of the bay that are at higher tidal elevations and outside of eelgrass is that these areas are also not certified for shellfish cultivation. A comparison of the two maps provided on the following page demonstrates this point. The upper map is from the Revised Eelgrass Impact Analysis (Appendix D) of the Recirculated Draft EIR and shows the tidal elevations in Arcata Bay and the lower map is from the California Department of Public Health's most recent August 2017 Annual Report for Humboldt Bay and shows the certified shellfish growing areas. As one can see by comparing these maps, those areas with tidal elevations of 1.5 feet or greater - shown in blue on the upper map - are predominantly located outside of the borders of the certified shellfish growing areas – shown with the large red, blue, green, and yellow shapes on the lower map. While Coast could pursue the establishment of new certified shellfish growing areas beyond the borders of the existing areas, that would be a lengthy regulatory process with an uncertain outcome. Additionally, in some cases, the boundaries of shellfish growing areas are established in specific locations to exclude known or likely areas with lower water quality that would not safely support food cultivation.

One of the other primary feasibility issues associated with Coast siting its operation entirely outside of eelgrass habitat and at higher tidal elevations is that this higher elevation habitat plays a critical ecological role in Arcata Bay as well. For example, the mudflats located at these elevations support extensive populations of wintering and migratory shorebirds. Placement of large shellfish cultivation beds in such areas would limit their use for shorebirds, introduce a source of disturbance that does not currently exist in these areas (associated with planting, harvest, and maintenance activities), and potentially result in changes to the abundance and community structure of invertebrate prey that may then negatively affect shorebird foraging activities.


Mad River
Sand Island
Bird Island
Arcata Channel
East Bay
Gunther Island
OLN Plots
EB 6-2
EB 1-1
Project Location
Within Humbodt Bay
Legend
Coast Seafoods Property
Coast Seafoods Lease
Rumrill and Poulton 2004
Eelgrass Reference Sites
Treatment Sites
2009 Tidal Habitats
Continuous Eelgrass
Elevation
Below -1' MLLW
-1 to 0 MLLW
0 to 1.5 MLLW
1.5 to 2.5 MLLW
Above 2.5 MLLW
N
0
0.45
0.9
Miles


Sampling Sites:
Secondary Sampling Station
Primary Sampling Station
CSC New Station
Rainfall Closures:
(minimum values)
Area A: 1.2" (4 days)
Area B: 1.0" (4 days)
Area C: 0.5" (3 days)
Area D: 0.5" (4 days)
Area E: 0.7" (5 days)
Area F: 0.5" (5 days)
California Department of Public Health
Arcata
Manila
Samoa
Humboldt Bay, WQ #70
Humboldt Bay, WQ #71
Humboldt Bay, WQ #72
Humboldt Bay, WQ #73
Humboldt Bay, WQ #49
Humboldt Bay, WQ #48
MR Wet Storage
Clam Raft
AC Nursery
GI Nursery
PROHIBITED
RUINS
Woodley Island
Daby Island
Indian Island
Brainard
HBNWR
Platform
Peninsula
SAND
LEVEE
EUREKA
Gannon Slough

As proposed, Coast's project would be consolidated into areas of Arcata Bay that support a lower diversity and abundance of sensitive habitats and wildlife species. Those areas that are proposed to be retained within the more ecologically rich eastern portion of the bay would be sited, managed, configured, and regulated (including through the mitigation measures discussed below) in such a way as to ensure that they are consistent with the Coastal Act. The Commission therefore agrees with the applicant that there are no alternatives to the proposed cultivation methods and project configuration that would be feasible and result in less fill of coastal waters than the proposed project.

For the reasons described above, the Commission finds that, with respect to fill of coastal waters, the proposed project is the least environmentally damaging feasible alternative and therefore the second test of Coastal Act Section 30233(a) is satisfied.

Mitigation Measures

The final requirement of Coastal Act Section 30233(a) is that filling of wetland waters may be permitted if feasible mitigation measures have been provided to minimize any adverse environmental impacts. The mitigation measures described in greater detail in the terrestrial biological resources and marine resources and water quality sections of this report will minimize the project's adverse environmental impacts. In particular those measures that would reduce the project's potential to result in the release of marine debris (**Special Conditions 8, 9, 10 and 13**); reduce the overall potential for the project to adversely affect the overall biological productivity of Arcata Bay by limiting the project scale (**Special Condition 2**); reduce the project's potential to disturb sensitive wildlife species and life stages throughout the bay by further consolidating Coast's operations (**Special Conditions 2 and 13**); and require careful monitoring to assess assumptions about the magnitude and likelihood of the projects adverse impacts to eelgrass and black brant (**Special Conditions 3 and 4**).

Thus, with the imposition of the conditions of this permit, the Commission finds that the third and final test of Coastal Act Section 30233(a) has been met.

Conclusion

Because the three tests have been met, the Commission finds the proposed project, as conditioned, consistent with Section 30233 of the Coastal Act.

D. MARINE RESOURCES

Section 30230 of the Coastal Act states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Coastal Act section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

The project area, Humboldt Bay, is one of the most biologically rich and significant marine ecosystems in California. Humboldt Bay alone supports the majority of the state's total amount of eelgrass habitat, including some of the largest and most dense continuous beds. Eelgrass beds are globally recognized as a rare and critically important marine habitat and are designated for protection by the National Marine Fisheries Service and Pacific Fisheries Management Council as Essential Fish Habitat and a Habitat Area of Particular Concern. The eelgrass beds of Arcata Bay support populations of a wide variety of sensitive and protected marine species including special status species of fish (such as those listed as threatened under the federal Endangered Species Act - green sturgeon, steelhead, and coho and chinook salmon), and migratory shorebirds and waterfowl such as the black brant, a State Species of Special Concern.

The full list of species know to occur within the project area includes the following ten species that are listed as threatened or endangered pursuant to the California Endangered Species Act (CESA) and/or the federal Endangered Species Act (ESA) or designated as a California Species of Special Concern (SSC). The California Department of Fish and Wildlife designates certain species as Species of Special Concern due to declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction:

- Black brant, *Branta bernicla nigricans*, State SSC;
- Chinook salmon, *Oncorhynchus tshawytscha*, ESA-threatened (California Coastal ESU);
- Coastal cutthroat trout, *Oncorhynchus clarki clarki*, State SSC;
- Coho salmon, *Oncorhynchus kisutch*, CESA and ESA-threatened (Southern Oregon/Northern California Coho Evolutionarily Significant Unit (ESU));
- Eulachon, *Thaleichthys pacificus,* ESA-threatened (southern Distinct Population Segment (DPS));
- Green sturgeon, *Acipenser medirostris,* ESA-threatened (southern DPS); State SSC (northern and southern DPS);
- Tidewater goby (Eucyclogobius newberryi) CESA-Endangered;
- Longfin smelt, *Spirinchus thaleichthys*, CESA-threatened;
- Pacific lamprey, *Entosphenus tridentatus*, State SSC;
- Steelhead, *Oncorhynchus mykiss*, ESA-threatened (Northern California ESU); and
- White sturgeon, *Acipenser transmontanus*, State SSC.

Additionally, Humboldt Bay also includes large areas of open intertidal mudflats that attract such significant proportions of overwintering and migratory shorebird populations that the bay is recognized as a Site of International Significance by the Western Hemisphere Shorebird Reserve Network and an Audubon Society Important Bird Area with global recognition. Depending on the season, up to 100,000 shorebirds may reside in Humboldt Bay (Schlosser and Eicher 2012). At

least 24 species of shorebirds including American avocets, sandpipers, dowitchers, plovers, godwits and dunlin make use of Humboldt Bay's mudflat habitats for feeding, resting and/or roosting (Danufsky and Colwell 2003; Dodd and Colwell 1998; Evans and Harris 1994; Long and Ralph 2001). Of these shorebirds, two thirds are listed as shorebirds of concern, or on the U.S. Fish and Wildlife Service's Birds of Conservation Concern list[1] (US Fish and Wildlife Service 2008; .U.S. Shorebird Conservation Plan Partnership 2015).

As such, Arcata Bay includes both areas and species of special biological and economic significance that are required to be provided with special protection under Section 30230 of the Coastal Act. As discussed below, Coast's proposed oyster culture operations have the potential to adversely affect these species and areas as well as the biological productivity of coastal waters in Arcata Bay.

Pacific Herring

As part of its 2006 analysis and approval of CDP No. E-06-003 for Coast's 300 acre intertidal aquaculture operation, the Commission found that the project had the potential to adversely affect Pacific herring and herring spawning areas and established two special permit conditions to minimize those adverse effects. Those findings are incorporated by reference into this report. To summarize, the Commission found that within Humboldt Bay, herring appear to spawn almost exclusively on eelgrass and that much of the available information indicates that the most important areas of eelgrass habitat for spawning are located in the eastern portion of the bay. The conditions established by the Commission limited the amount of oyster cultivation within that eastern area (Special Condition 2 of E-06-003) and required Coast to carry out surveys to search for herring spawn prior to planting and/or harvesting during the months in which spawning activity is likely to occur (Special Condition 3 of E-06-003). If spawning activity is observed, Coast is required to limit its harvest and planting activities for two week and to notify CDFW.

In January 2017, as part of its review of Coast's request to extend by six months the expiration date of its coastal development permit, Commission staff considered newly collected information on Pacific herring spawning and the efficacy of the Special Conditions 2 and 3 of CDP No. E-06-003. This newly collected information included the results of Pacific herring spawning surveys carried out in 2014-2015 and 2015-2016 by CDFW staff. These survey results (shown graphically on **Exhibit 7**) indicate that although spawning can occur in several locations across Arcata Bay, the eastern portion of Arcata Bay - in particular the section known as the East Bay Management Area - continues to support consistently high levels of spawning activity. The recent surveys support the previous data, which indicate that the east bay, on average, has a much higher frequency of use and density of eggs at spawn sites than other areas and often accounts for the majority of spawn in Arcata Bay. This level of spawning activity has prompted CDFW staff to refer to the eastern portion of Arcata Bay as the core herring spawning habitat within the bay. Commission staff also considered the discussion included in the Recirculated Draft Environmental Impact Report regarding the herring monitoring and reporting requirement of Special Condition 3 from CDP No. E-06-003 and consulted with CDFW staff regarding potential modifications to improve the

[1] The US Fish and Wildlife Service's Birds of Conservation Concern list is made up of species, subspecies, and populations of migratory birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973. These species make up the USFWS' highest conservation priorities and their inclusion on the list is intended to stimulate coordinated and proactive conservation actions among the USFWS' Federal, State, Tribal, and private partners.

condition's intended effect – to help ensure that herring spawn is not lost or removed during oyster harvest activities.

Although Coast has not reported any observations of herring spawn since Special Condition 3 of CDP No. E-06-003 was established in 2006, a variety of anecdotal reports collected over the past several years indicate that herring spawning has been occurring on and around Coast's cultivation gear in the East Bay Management Area. Commission staff therefor considered a variety of potential explanations for Coast's lack of reporting. Among these are: (1) the limited planting and harvest activities carried out by Coast in the eastern portion of Arcata Bay during the winter months (when herring spawn); (2) a potential absence of herring eggs on aquaculture gear targeted for planting or harvest by Coast during this time; and/or (3) a potential inability for Coast's field personnel to effectively observe or identify herring eggs - particularly when focused on completing difficult and time consuming harvest or planting activities within the limited wintertime work windows. To address this latter issue, Special Condition 3 of CDP No. E-06-003 would be modified and integrated into the proposed re-authorization and expansion as **Special Condition 7** which requires Coast to make use of survey protocols developed by CDFW to aid in identification of herring eggs. Additionally, **Special Condition 7** would also facilitate greater communication and coordination between Coast and CDFW staff by requiring Coast to share its planting and harvesting scheduling with CDFW during herring season. This would allow information on spawning locations collected by trained CDFW scientists to be considered by Coast in planning its operations and would increase the likelihood that it would avoid activities in known or likely spawning areas.

However, despite the implementation of the protective measures provided through **Special Condition 7** to limit the removal or harvest of culture gear that may have herring eggs on it and the associated disturbance of adjacent or nearby eelgrass that herring may also have spawned on, the issue would remain of herring spawning on the artificial substrate of culture gear instead of their intended target - eelgrass. As noted by CDFW in several of its letters to the Harbor District on the proposed project, herring eggs on oyster longlines are not likely to survive and persist as effectively as eggs laid on eelgrass due to the different amounts of sun and air exposure between the two and the increased potential for desiccation and predation. As such, limiting the number and size of cultivation beds within areas of high use by herring - such as the eelgrass beds in the East Bay Management Area – is expected to provide an additional benefit for herring. CDFW acknowledged this in its discussion and recommendation regarding the East Bay Management Area included in its December 31, 2015 letter to the Harbor District:

> *While there is eelgrass available outside of this area, herring do not use it the majority of the time (CDFW data). The reasons for herring spawning site fidelity are not known; however, it is assumed that long term use of a site reflects selection of highly suitable environmental criteria. Given the lack of substantive information provided regarding possible long term impacts to herring in the core spawning area of Humboldt Bay, and the importance of this species as food for a variety of species from marine mammals to salmonids to birds (Bayer 1980; Hunt et al. 1999; Lassuy 1989; Lok et al. 2012; Moffitt 1933; Moffitt 1939; Willson and Womble 2006), the Department recommends that the Project avoid this area.*

This avoidance concept was also reflected in the Commission's action in 2006 through the requirement in Special Condition 2 of CDP No. E-06-003 that Coast limit the total footprint of its operations within the East Bay Management Area to the use of only eleven culture beds of limited

size. The Commission also called out particular concern for one of these beds, referred to as EB 7-2, and specifically required that the scale of operations on that bed be restricted. A review of the location and configuration of Coast's existing operation (**Exhibit 2**) shows that this cultivation bed is isolated from Coast's other operations and located near the center of one of the largest and most dense continuous eelgrass beds within Arcata Bay and the East Bay Management Area. As discussed in subsequent sections of this report, the location of this is associated with adverse impacts to the public recreational use of Arcata Bay and foraging by black brant, a California Species of Special Concern. In addition, bed EB 7-2 is also believed to negatively affect Pacific herring due to its over 11.6 acres of densely planted cultivation gear within the area of the bay identified as critical herring spawning habitat. To address these issues, Coast is proposing to remove cultivation bed EB 7-2 at the time of its next harvest (estimated as the fall of 2019). Once removed, the risk to herring from spawning on the densely planted aquaculture gear within this area would be eliminated and a significant natural recovery and expansion of eelgrass within the bed would be expected to occur, thus providing additional suitable spawning habitat for herring.

As some interested parties have noted, however, even with the removal of the EB 7-2 cultivation bed, Coast would still retain approximately 50 acres of cultivation beds (ten beds ranging in size between 10 acres and 1 acre) in the East Bay Management Area and roughly 82 acres within the area identified by CDFW staff as the core herring spawning habitat within Arcata Bay. While this is generally true, it should be noted that several dozen acres of the cultivation beds that Coast is proposing to retain in this area (for example, the southern-most cultivation beds and the nursery areas near Indian Island and the Arcata Channel) are in locations that are not surrounded by the dense eelgrass habitat targeted by herring for spawning; therefore they may not be able to provide high quality spawning habitat even if the existing aquaculture equipment were to be removed.

Further, one of the cultivation beds within the east bay that is surrounded by dense eelgrass, the nearly eight acre bed referred to as EB 6-1, is proposed to be converted from dense 2.5-foot spaced longlines to basket lines configured with nine and sixteen foot gaps between rows of cultivation gear. This proposed conversion and re-configuration would likely minimize potential adverse impacts to both eelgrass and herring by promoting eelgrass colonization and re-growth within the nine and sixteen foot gaps between lines. This eelgrass would, in turn, be available for herring spawning.

Additionally, although it would not be located within the core spawning habitat identified by CDFW staff, Coast is also proposing to remove all of the nearly 50 acres of cultivation beds from the central area of Arcata Bay. The data from the limited number of herring surveys carried out in this area (as shown in **Exhibit 7**) indicate that some herring spawning has been observed there in recent years. The complete removal of these beds would therefore additionally reduce the project's potential adverse impacts to herring by eliminating the chance for spawn to occur on artificial structures that may contribute to reduced survivorship, and by removing the limiting effect that the aquaculture gear may be having on eelgrass there. While much of the acreage that would be removed from the central area of the bay is proposed to be re-located, the proposed relocation areas have more limited eelgrass habitat and are within sections of the bay that have only been shown to support sporadic herring spawning activity.

Finally, it should also be noted that the area identified as the core spawning habitat is roughly 1,500 acres in size. While some of the 82 acres of this area that Coast is proposing to continue using for oyster cultivation may provide more limited spawning opportunity for herring, the vast majority of

the core habitat area – as well as most of the remainder of Arcata Bay – would remain unaffected by Coast's proposed operation and fully available for herring use.

As such, with the proposed removal of 63 acres of cultivation beds from within the central and eastern portions of Arcata Bay and re-configuration of cultivation bed EB 6-1 to wider spacing, as well as the updated herring monitoring protocols and enhanced coordination with CDFW fisheries scientists established through **Special Condition 7**, Coast's proposed project would minimize impacts to the Pacific herring population and its fishery, consistent with Coastal Act sections 30230 and 30231.

Green and White Sturgeon

Since the Commission first considered Coast's intertidal shellfish aquaculture operations, two rare and imperiled fish species known to be present within Arcata Bay have been provided with special status designations, the green sturgeon (*Acipenser medirostris*) and white sturgeon (*Acipenser transmontanus)*. The green sturgeon is listed as threatened under the federal Endangered Species Act and both species are also designated as Species of Special Concern in California. Additionally, in 2009 the National Marine Fisheries Service (NMFS) designated Humboldt Bay as critical habitat for the southern distinct population segment of green sturgeon. Although the Commission's authorization of Coast's approximately 300 acre operation in 2006 did not evaluate potential adverse impacts to these species, the presence of these species in Humboldt Bay was poorly understood at that time and their federal protected status had not been established. In the intervening years, however, a substantial amount of additional information has become available demonstrating both their presence, numbers, and use patterns in Humboldt Bay and their potential to be adversely affected by Coast's proposed intertidal operations.

The project's Final EIR includes a description of both species and their use of Humboldt Bay:

> *The green sturgeon is a long-lived, slow-growing fish species, listed as threatened under the Federal ESA (NMFS 2016a) and as a CDFW species of special concern (CDFW 2016b). Mature males range from 4.5 ft to 6.5 ft and they do not reach sexual maturity until about 15 years, while mature females range from 5 ft to 7 ft and do not mature until they are 20 to 25 years (Kelly et al. 2007). Maximum ages of adult green sturgeon can range from 60 to 70 years. The southern distinct population segment (DPS) green sturgeon generally occur from Graves Harbor, Alaska to Monterey, California (Moser and Lindley 2007).*
>
> *Green sturgeon are considered the most marine-oriented of all the sturgeon species in North America (Moser and Lindley 2007). Juveniles enter bays and estuaries after only a year in freshwater and remain in marine waters until they return as adults to spawn. While green sturgeon are not expected to spawn in any of the Humboldt Bay tributaries, adults and sub-adults use the bay for foraging habitat. Green sturgeon typically access non-spawning estuaries in the summer and early fall months, and sturgeon have been documented in Humboldt Bay between April and October (Pinnix, pers. comm., 2015). Adults and sub-adults are regularly observed in deeper channels of Humboldt Bay, channel margins and mudflats when the tideflats are inundated during high tide, and around Sand Island in North Bay. Foraging sturgeon tend to frequent areas less than 33 ft deep, moving on and off mudflats with tidal fluctuations (Kelly et al. 2007)…*

Like the green sturgeon, white sturgeon is a long-lived, slow-growing anadromous fish species. It is a CDFW species of special concern (CDFW 2016b). Mature males range from 2.5 ft to 3.5 ft and they do not reach sexual maturity until about 10 to 12 years, while mature females range from 3 ft to 4.5 ft and do not sexually mature until they are 12 to 16 years (CDFW 2016b). Maximum ages of adult white sturgeon have been known to be nearly 100 years, although more commonly, fish collected in California are no more than 27 years (CDFW 2016b). White sturgeon generally occur from Cook Inlet, Alaska to Ensenada, Mexico (PSMFC 1996).

White sturgeon spend most of their lives in nearshore oceanic waters, bays (including Humboldt Bay), and estuaries, although they prefer estuaries of large rivers (PSFMC 1996). The only known self-sustaining spawning population in California is in the Sacramento River, although spawning is believed to also occur in the San Joaquin, Klamath, and Eel rivers (Israel et al. 2009). While white sturgeon are not expected to spawn in any of the Humboldt Bay tributaries, adults and sub-adults likely use the bay for foraging habitat. Similar to green sturgeon, burrowing shrimp are a key prey item for white sturgeon. Juvenile white sturgeon have been shown to prefer water greater than 12.5 meters (m) in the Columbia River (McCabe and Tracy 1994). Juvenile and adult white sturgeon prefer deeper water, although they are occasionally found foraging in shallower habitats (Israel et al. 2009, CDFW 2016b).

Due to their large size and the limited depth of the upper reaches of Arcata Bay – particularly those areas above tidal flats that become submerged at high tide and provide foraging habitat for sturgeon - both green and white sturgeon may be susceptible to entanglement in densely planted longline gear. Additionally, the presence of cultivation gear may also exclude these species from foraging within areas that would otherwise provide appropriate foraging habitat or negatively affect their ability to successfully forage (for example, by providing the sturgeon's target prey with refuge areas). These potential impacts are discussed in the comment letter submitted by NMFS to the Harbor District in response to its publication of the project's Recirculated Draft EIR (because the white sturgeon does not have federal protective status, this letter focuses solely on green sturgeon):

The District should evaluate potential harm, injuries, and stranding potential for individual green sturgeon caused by encounters or entanglement with suspended longlines and sharp oyster cultch adjacent to areas known to be frequently occupied by green sturgeon. Dense line spacing (2.5ft longline spacing) creates a high likelihood for harm, entanglement, and stranding as sturgeon are known to become stranded on mudflats even in the absence of longlines (Dumbauld et al. 2008). The statement in the R-DEIR that "…green sturgeon do not typically frequent shallow habitat where shellfish aquaculture is located" is not supported by the available scientific literature. Numerous publications and personal observations document green sturgeon use of shallow areas, as well as areas with shellfish aquaculture (Patten and Norelius 2016; Moser et al. in press; Pinnix, personal communication, 2016; Dumbauld et al. 2008; Kelly et al. 2007). NMFS designated critical habitat for green sturgeon in 2009 (74 FR 52300), which includes a primary constituent element, or physical biological feature (PBF), of estuary critical habitat [such as Arcata Bay] to be 'water depth.' The 'water depth' PBF indicates that a diversity of depths is important to support different life stages and habitat uses for green sturgeon within estuarine areas. Subadult and adult green sturgeon occupy a diversity of depths within bays and estuaries for feeding and migration (74 FR 52300). Tagged adults and subadults within

> *the San Francisco Bay estuary primarily occupy waters over shallow depths of less than 10m, either swimming near the surface or foraging along the bottom (Kelly et al. 2007).*
> …
> *The R-DEIR suggests that green sturgeon will avoid structured habitat, but there is no analyses of habitat lost to green sturgeon resulting from structured habitat (shellfish aquaculture) in Humboldt Bay. The existing and expanded project (~900 acres) represents a significant loss of habitat for green sturgeon if the assertion made in the R-DEIR is valid regarding sturgeon avoidance of structured habitat. The existing and expanded project either represents a significant loss of habitat for green sturgeon, or represents an increased likelihood of harm, injury, or mortality due to contact or entanglement with longline gear depending on whether sturgeon will avoid or utilize these areas.*

Commission staff has coordinated closely with NMFS staff to understand the issues raised in this letter and their relevance to Coast's currently proposed re-authorization and expansion project (the project evaluated in the Recirculated Draft EIR included approximately 620 acres of intertidal aquaculture, substantially more than Coast's current proposal for approximately 279 acres). Commission staff now understands that, as noted by NMFS staff and discussed above, the highest potential for adverse impacts to sturgeon from the proposed project is associated with cultivation operations in or around areas of particularly high use by sturgeon and cultivation beds planted at the highest density. With the proposed project, those high density areas are the existing longline cultivation beds that include 100-foot longlines placed every 2.5-feet across a bed. At this density, nearly three and a third miles of nylon ropes and PVC stakes would be concentrated within each acre of the cultivation bed (an example of which is provided in **Exhibit 4**). Coast is proposing to remove entirely or convert to a wider spacing four of these existing 14 densely planted cultivation beds.

High Use Area

As discussed in the Commission's findings for CDP Amendment No. E-06-003-A5, information collected in recent years from acoustically tagged green sturgeon indicate the presence of a potential high use area for green sturgeon in the upper reaches of the Arcata Channel near Sand Island. Specifically, approximately 30 individual tagged fish per year were observed in this area during fish surveys carried out in 2006 and 2007. Additional survey data from 2008 demonstrate a similar use pattern and field observations by researchers and NMFS staff in the late summer of 2016 indicates that high use of this area by green sturgeon continues. Although the great majority of Coast's existing operation is located to the south, north, or east of this area, the 11 acre SI-Nk culture bed is located a short distance from the channel in which many of the observations in this area were concentrated. During its summer 2016 survey of this area, green sturgeon use of the area within the immediate vicinity of this cultivation bed was observed, as recorded in the Field Note produced as a result of the survey:

> *At 1010 and 1016, tagged green sturgeon individuals were detected by the USFWS directional receiver inside the small channel adjacent to an existing aquaculture bed (detections made from the R/V while at the GS2 location on the map- see Table 2). While it is unclear if these individuals were within the aquaculture beds or immediately adjacent to the beds, it is clear that these individuals were using the smaller channel for migration and feeding. Based on the data received and the direction of the detections, it is possible these individuals were within the aquaculture beds. Sturgeon have limited access to higher elevation areas, as these areas can be dry during low tides and accessible during only*

higher tides. Because access to these higher elevations of the intertidal zone is temporally limited, sturgeon access must be opportunistic and quick.

At 1017, the individual that was observed in the smaller channel at 1016 had swam past the boat and turned in a northerly direction and swam up into the smaller western channel (GS5). In a short amount of time (1-minute), a tagged individual moved from a smaller channel adjacent to an existing aquaculture bed and into the main Arcata Channel and then swam up the Arcata Channel and into a smaller tributary channel (GS5 area). It appears that green sturgeon are using higher elevation areas of the intertidal zone as evidenced by these observations. Furthermore, it is clear the movements can occur quickly, as one individual passed through three different channels in ~1-minute of time.

Based on observations of Northern anchovies fleeing onto higher elevations (and into eelgrass habitat) as the tide was rising, it appears green sturgeon might be pursuing anchovies into areas of higher elevation from the deeper channels as the tidal elevations provide enough depth for their access. If green sturgeon are predominantly feeding on anchovies in Humboldt Bay during portions of the summer, it is likely that sturgeon would follow anchovies as they seek cover from predation in eelgrass habitats or within the structure provided by shellfish aquaculture beds.

This strong indication of sturgeon use and potential foraging behavior in the immediate vicinity of the SI-Nk cultivation bed emphasizes the concerns regarding potential habitat exclusion, reduced foraging effectiveness, entanglement, and injury raised by NMFS in its comment letter to the Harbor District and suggests that the location of this densely planted cultivation bed may be resulting in or potentially leading to adverse impacts to green sturgeon. Because it is the only cultivation bed known to be located in such close proximity to an area of consistently observed high use by green sturgeon, and because it may preclude or limit sturgeon movement and foraging in a portion of the high use area or potentially contribute to injury or entanglement of this species of special biological significance, the Commission adopted through Special Condition 13 of CDP Amendment No. E-06-003-A5 a requirement for Coast to phase out use of this bed and remove it completely at the time of its next harvest (estimated as Fall of 2017). While at the time Coast disagreed with the need for this bed to be removed in order to provide additional protection for green sturgeon and pointed to the absence of documentation of green sturgeon entanglement or injury in the bed - or exclusion from it - in support of this position, Coast has nevertheless included removal of the bed as part of its proposed project and does not object to the requirements of Special Condition 13 of CDP Amendment No. E-06-003-A5. Although direct evidence of harm to green sturgeon from this cultivation bed has not been collected, there is adequate information to establish the risk to sturgeon that the placement and use of aquaculture gear in this area presents. Given the protected status provided to green sturgeon as a threatened species under the federal Endangered Species Act and a California Species of Special Concern, it is also recognized under Section 30230 of the Coastal Act as a species of special biological significance. As such, it must be provided with special protection. Accordingly, Coast is proposing to remove all of the existing Sand Island cultivation beds near this high use area (cultivation beds SI 2-1, SI 2-2, SI 1-2A, SI-Nk, SI 1-2, SI 1-1) at the time of their next harvest (estimated to begin in the summer of 2017 and continuing through the summer of 2019). This is consistent with feedback provided to Coast during the planning stages of the project that cultivation equipment and activities be limited within an approximately one-mile radius of the high use area. Coast integrated this feedback into the proposed project by selecting and prioritizing these cultivation beds for removal. The Commission

therefore establishes **Special Conditions 9 and 13** to memorialize this aspect of Coast's proposal and to assure the complete and timely removal of existing cultivation equipment from the nearly 46 acres of cultivation beds in the Sand Island area.

Densely Planted Cultivation Beds
Based on the Annual Report for CDP E-06-003 Coast submitted to Commission staff in December 2016, 14 of Coast's 48 existing cultivation beds are densely planted with longlines spaced every 2.5-feet. The remaining ¾ of the operation makes use of a spacing configuration that includes periodic access corridors and channels between groups of lines. Specifically, these areas have five foot channels running parallel between each group of five lines, and ten foot channels running perpendicular between the end of one set of 100-foot lines and the beginning of the next set. In contrast to the more densely configured beds that are structured more as a solid, contiguous network of lines, these beds with a mix of five and ten foot channels provide a variety of opportunities for larger marine wildlife species, such as green and white sturgeon, to more safely pass among and through them. As such, the Commission adopted Special Condition 14 of CDP Amendment No. E-06-003-A5 to require Coast to develop and implement a plan for the conversion of its 14 longline beds with 2.5-foot spacing to the same configuration of its remaining beds that include five and ten foot wide access channels. As with the requirement of the previous condition (Special Condition 13 of CDP Amendment No. E-06-003-A5), it is the understanding of Commission staff that this removal activity has yet to be carried out by Coast. While Coast is proposing to remove entirely or convert to a wider spacing four of these existing 14 densely planted cultivation beds, it has not included as part of its proposed project the installation of access corridors in the ten that would remain in their current configuration. Therefore, **Special Condition 15** would carry forward this requirement. In combination with Coast's proposal to remove the cultivation beds located nearest to the area of high use by green sturgeon, this measure would help ensure that sturgeon movement, foraging, and health in other potentially lower use areas of Arcata Bay would not be adversely affected by the proposed project.

Conclusion
With implementation of **Special Conditions 9, 13 and 15** the Commission finds that potential adverse impacts to green and white sturgeon from Coast's proposed operation would be minimized.

Marine Debris
Coast's proposed shellfish aquaculture operation includes the placement and maintenance of several hundred thousand individual pieces of plastic and PVC in Arcata Bay associated with roughly 600 miles of nylon rope and monofilament line (up to 29,700 longlines and 2,300 basket lines of 100-feet long each) and up to 92,000 two foot long by one foot wide mesh plastic cultivation baskets (up to 2,300 basket lines with 40 baskets per line). This represents a proposed reduction of nearly 190 miles of nylon rope and line and a proposed increase of over 72,000 cultivation baskets compared to Coast's existing operation. As discussed in the RDEIR excerpt below, some of this material can disperse into the environment as debris:

> *The* [Coast operation] *may result in accidental loss of mariculture gear or other debris into Humboldt Bay. Because the equipment is placed in intertidal areas, it is subject to various natural forces including tide, wind, waves and ultraviolet radiation. As a result, there is potential for equipment to become loose, wash away or otherwise escape into the environment. Escaped mariculture gear may pose a hazard to biological resources and to other users of the bay, including boaters (kayakers, stand-up paddle boarders, canoers,*

wind surfers) and scuba divers. When encountered, marine debris associated with mariculture equipment may damage boat bottoms or engines, snag on trailing lines or otherwise impair navigation. Recreational users of the bay may encounter escaped mariculture equipment in shallow intertidal areas, which may make transit of these areas more hazardous, particularly if escaped equipment is wholly or partially buried in the substrate and thus hidden from view.

Longline oyster culture involves installation of PVC tubes in the substrate, which are strung with monofilament line and hung with oysters or oyster baskets (polyethylene sleeves). Coast inspects cultch-on-longlines during monthly maintenance work and during harvest. Any pipes disturbed during the harvest are re-secured or removed if damaged. Any identified loose pipes or debris are removed from the culture area. During replanting, pipes are straightened out and replaced as needed. Basket-on-longlines are inspected and maintained each time the oysters are inspected for grading. Baskets are lashed in bins during transport to prevent loss.

Rack-and-bag culture utilizes 3' x 12' rebar frames on which are placed polyethylene mesh bags full of oysters. The bags are attached to the racks using industrial rubber bands. Worn, strained, or damaged rubber bands are routinely replaced during daily inspection and maintenance of the rack and-bags. Any debris is removed during inspections. Coast also performs a monthly inspection of its owned and leased area for marine debris at both low and high tide and picks up any identified debris, regardless of the source of the identified items.

As noted above, Coast has a long history of carrying out marine and shoreline debris collection and removal events and other environmental stewardship activities aimed at improving the environmental condition of Arcata Bay and addressing the impacts of its operation and other current and historic practices. For example, Coast has invested considerable time and money over many years to improve water quality in the bay and fund waste and hazardous material collection and removal efforts. At the same time, information submitted to Commission staff over the past several years by Coast and others indicates that Coast's operation nevertheless continues to be a known and potential source of marine debris.

Coast's use of new culture practices and equipment (such as baskets on longlines) as well as traditional practices (such as cutting longline ropes into many small pieces during hand harvest) appear to continually generate plastic debris that escapes into Arcata Bay and can disperse throughout Humboldt Bay and beyond. Although Coast has not traditionally recorded or tracked the type and amount of gear and debris lost into the marine environment, it did provide Commission staff with limited data from one year of clean-up activity (10 dates between November of 2015 and November of 2016). This information indicates that during this period, an average of at least 18 baskets and three other pieces of gear were being lost per month from Coast's approximately 11 acres of basket on longline operations (which contain 493 basket lines and 19,680 baskets, as authorized by CDP No. E-06-003-A1). This is likely a significant underestimation of the total amount of loss because it was not a consistent practice of Coast's to document all the loose aquaculture gear and debris it recovered and reports from third parties have shown that Coast does not successfully recover all of the baskets that escape from its operation. However, information provided by Coast as part of the permit application for its proposed project (included as **Exhibit 9**) details the steps it has taken and proposes to take to further reduce this loss, including by

implementing the enhanced marine debris reduction and recovery efforts recommended by Commission staff and by working directly with the cultivation basket manufacturer on improvements to the design of the plastic clasp used to attach baskets to the longlines.

While these efforts are expected to successfully reduce the marine debris generated by Coast's operation, the loss of baskets is likely to continue to occur due to the relative newness of the basket-on-longline cultivation technique and gear and the stress that the marine environment places on materials. Additionally, the effectiveness of Coast's enhanced reduction and recovery efforts at minimizing debris is currently unknown.

If the current rate of basket loss continues, Coast's proposed addition of up to 46 acres of basket longlines (which, combined with the existing 11 acres of basket cultivation would contain roughly 2,300 individual lines and 92,000 individual plastic baskets) may result in over 70 additional plastic baskets per month released into Humboldt Bay. Assuming that each basket weighs two pounds, that would be nearly a ton of plastic debris released into the ocean each year from Coast's proposed operation. Although this estimate of plastic debris appears high, it represents an annual loss of barely 1% (872 baskets out of 92,000 total) of the baskets proposed to be placed in the bay at full build out (and as noted above, this loss rate is based solely on the number of bags recovered during cleanup events and therefore is likely to underestimate the current true rate of loss because it does not include baskets that escape detection and recovery[2]).

Plastic in the ocean is increasingly understood to pose a threat to a wide range of marine organisms as it slowly breaks into smaller and smaller pieces over time. At each step in this process, plastic debris can be ingested by, entrap, or entangle marine wildlife from whales, dolphins, and seals down to sea turtles, seabirds, and fish. Because it often relies on the placement of large quantities and numbers of plastic equipment pieces in the dynamic, challenging, and powerful marine environment, shellfish aquaculture operations are acknowledged in some locations as primary contributors to marine debris. While Coast's current operation in Arcata Bay is not an example of such an operation, the fact remains that it generates waste that eludes the existing waste prevention, management, and response measures that Coast has in place.

To address the ongoing and potential release and distribution of marine debris resulting from Coast's existing aquaculture operations in Arcata Bay, the Commission adopted Special Condition 9 of CDP No. E-06-003-A5 to require the immediate collection and removal of cultivation gear that has been out of use on culture bed GI 1-2 for at least the past several years. This gear (in particular, PVC stakes) appeared not to have been subject to inspection and maintenance activities during this time and had fallen into disarray and was being lost and dispersed into the marine environment. While Coast has fully complied with this condition and effectively removed all of the cultivation gear from this area (as confirmed through an independent evaluation), to prevent similar situations from arising in the future, Special Condition 9 of CDP No. E-06-003-A5 was also modified by the Commission to require the removal of cultivation gear from any bed taken out of service for six months or more. Through a prior permit, the Commission had previously set this removal threshold at 12 months; however subsequent review of the efficacy of this condition at preventing the release

[2] Considering that Coast's is the only operation in the state to use oyster cultivation baskets and at least one has been found on an open coastal beach over 30 miles from Arcata Bay, a significant number of baskets may be escaping Coast's detection.

of marine debris and the absence or reduction in inspection and maintenance activities in out of service beds indicated that a shorter time period was needed to ensure consistency with the Coastal Act. To address concerns about marine debris, this six month removal requirement would be carried forward as **Special Condition 9** of this current action and it would be further strengthened to require third-party independent confirmation and reporting to the Executive Director that removal activities have been carried out.

Special Condition 10 of CDP No. E-06-003-A5 was also required by the Commission to address the prevention, response, and management of marine debris by requiring Coast to implement a variety of best practices, including those focused on inspections following storm events; debris reduction trainings for field employees; quarterly bay-wide cleanup events; gear marking; and field storage of tools and construction materials. These requirements would also be carried forward through **Special Condition 10** of Coast's new permit and would be modified slightly to add an additional requirement that comprehensive debris cleaning and removal activities be carried out on each bed at the time of its harvest. This addition would reduce the long-term accumulation of debris within cultivation beds.

However, as described above, the proposed expansion of Coast's use of plastic cultivation baskets (over three-and-a-half times the current level) and the gear loss rates that Coast has reported with its limited use of this technique in recent years indicates that unless significant corrective action is taken, the volume of marine debris that would potentially result from the proposed project may exceed the amount of reduction that can reasonably be expected through implementation of the requirements in **Special Conditions 9 and 10**. Given the challenging weather and marine conditions in Arcata Bay that may break or damage lines and lead to the loss of gear – as well as the potential for additional loss to occur through damage caused to lines from accidental contact with recreational boats or through vandalism – even the strictest adherence to Coast's voluntary best management practices and those in **Special Condition 10** would not prevent gear loss from occurring. The magnitude of this loss is expected to directly correlate to the amount of gear that is available to be lost (in other words, a 1% loss rate would result in a greater volume of marine debris if there were 100,000 baskets in the bay rather than 50,000). To address this, Coast has been consistently working with the manufacturer of the cultivation baskets it uses to improve their design and minimize their potential loss. These efforts are detailed in **Exhibit 9**. As a result of these efforts, the strength and robustness of the attachment mechanism used for the basket lines has been steadily increasing over the years and appears to be more effective now than it was initially. However, the latest designs have yet to be put in place and used in Arcata Bay and therefore their ability to effectively reduce gear loss is not known. Although gear loss with these new designs is expected to be lower than in the past, the amount of reduction is uncertain.

To address this uncertainty and to ensure that Coast's proposed expanded use of cultivation baskets occurs in a way that will not increase marine debris, the Commission is requiring in **Special Condition 8** that Coast include in its annual reports information about the effectiveness of the new basket attachment mechanisms that it has been helping design. In addition to the phased implementation of cultivation baskets that Coast is proposing over the first three years of the permit, these reports and any that may also be provided to Commission staff from resource agencies, the public, and other interested parties will assist in identifying issues that may be arising. In this way, Commission staff and Coast would continue working together to further ensure that the proposed expanded use of basket cultivation proceeds carefully and in a way that minimizes the creation and discharge of marine debris. For example, if the new basket clasp devices are not shown to be

effective in the initial year, Coast can work to further refine the design prior to expanding their use and to further enhance its marine debris recovery efforts as a way to more effectively manage and address gear loss and debris.

Migratory and Wintering Shorebirds

Along the Pacific coast flyway, Humboldt Bay is the largest and most important estuary for wintering shorebirds and waterfowl between San Francisco Bay and the Columbia River. In its report, "The Importance of Humboldt Bay to Shorebirds," Audubon California notes that:

> *In 1998, Humboldt Bay was designated as a Western Hemisphere Shorebird Reserve Network (WHSRN) site of International Importance for shorebirds and supports over 100,000 shorebirds annually. The relatively intact, productive intertidal mudflat and eelgrass habitats in Humboldt Bay attract large numbers of shorebirds (Figure 1). While currently classified as a site of International Importance, Humboldt Bay likely qualifies as a site of Hemispheric Importance, supporting over 500,000 birds annually and which account for more than 30% of the biogeographic population for a species.*
>
> *Compared with other Pacific coast sites, Humboldt Bay supports a rich shorebird community in terms of species diversity. Forty-six species have been recorded, including approximately 30 that may be encountered regularly.[10] In comparison, 24 species have been recorded at Grays Harbor; 38 species at San Francisco Bay; and 26 species at the Frazer River Delta in Canada. All three are designated as WHSRN sites of Hemispheric Importance.[11] The reasons for the higher diversity of shorebirds using Humboldt Bay are not well known, but suggested to be significantly correlated with substrate heterogeneity. This positive correlation suggests that tidal flats with more microhabitats (as represented by variation in substrate) support more taxa.[12] In addition to open mudflat, many shorebirds also forage in the bay's "leopard skin" mudflat characterized by patches of eelgrass in small depressions. Species commonly found in this habitat are black-bellied plover, semipalmated plover, marbled godwit, black turnstone, long-billed curlew, dunlin, whimbrel, willet, long- and short-billed dowitchers, sanderling, and lesser and greater yellowlegs.[13] In sum, a combination of diverse habitats optimally support shorebird diversity as well as abundance in Humboldt Bay.*

In its April 20, 2017, comment letter to the Army Corps of Engineers on the proposed project, Audubon California provides the results of a comprehensive analysis of existing scientific literature and survey results it carried out to estimate the population-level importance that Humboldt Bay provides for several shorebird species. This analysis suggests that during the winter, spring and fall, Humboldt Bay supports at least 23% of the global population of western sandpiper, 43% of the Pacific subspecies of dunlin, 10% of the global population of marbled godwit, and over 600 critically imperiled long-billed curlew.

While not all shorebird species that use Humboldt Bay are represented in the same levels of proportional abundance as the four noted above, at least 20 other species of shorebirds also rely on Humboldt Bay's mudflat habitats for feeding, resting and/or roosting (Danufsky and Colwell 2003; Dodd and Colwell 1998; Evans and Harris 1994; Long and Ralph 2001). Of these shorebirds, two-thirds are listed as shorebirds of concern, or on the U.S. Fish and Wildlife Service's Birds of

Conservation Concern list[3] (US Fish and Wildlife Service 2008; .U.S. Shorebird Conservation Plan Partnership 2015).

Although the importance and value of Humboldt Bay's intertidal habitats to shorebirds is unquestionable, the threat posed to these habitats from intertidal aquaculture, such as that proposed by Coast, is less clear. Unlike development that involves dredging, filling, or installation of massive structures that would result in a long-term or permanent loss of habitat, Coast's proposed installation and use of longline cultivation gear (as shown in **Exhibit 4**) would leave much of the underlying habitat intact. As a result, the impact mechanisms associated with the conversion of open tidal flats to cultivation beds are primarily ones that would result in a reduction of overall use or high-efficiency use rather than a complete loss of use. Such impact mechanisms may include altering the type or abundance of available prey for shorebirds and increasing their susceptibility to flushing. Although the consequences of these types of more incremental impacts are not as obvious as those from complete loss of habitat, they are no less important to consider. For example, changes in prey populations may negatively affect feeding efficiency and increased likelihood of flushing (particularly if it results in flight) would increase energy expenditure, both of which would likely cause shorebirds to need to forage longer, more frequently, or in less optimal - potentially dangerous - locations. Not only would these affect the health and fitness of the affected birds, but they would also run against some of their highest priorities for survival during the life stages (migration, overwintering) that bring them to Humboldt Bay - energy storage and conservation.

While few direct studies have been carried out to estimate the magnitude of the threat to shorebirds that intertidal aquaculture poses or to determine if some specific species with the suite of species generally referred to as shorebirds are more susceptible to adverse impacts than others, there is some scientific research to draw upon. Although sparse, existing research and analysis on the use of shellfish cultivation areas by shorebirds does indicate that adverse impacts to some species may occur as a result of the conversion of open tidal flats to areas with networks of cultivation structures. For example, work carried out by Kelly et al. (1996) in Tomales Bay comparing shorebird use of mudflats with oyster cultivation equipment and nearby areas of undeveloped mudflat indicated a significant decrease in total shorebird use in areas used for oyster culture, due largely to the absence of two common species from culture areas. Dr. John Kelly, lead author of the study, discussed his conclusions regarding the potential cause of this avoidance in his recent comment letter to the Harbor District:

> *Our observations strongly suggested that shorebirds avoid foraging near or under any structural features on the tide flats that interfere with their visibility of the surrounding area. As stated in Kelly et al. (1996), such interference is likely to delay their detection of approaching predators and disrupt associated antipredator flocking behavior. If so, oyster growing structures in Humboldt Bay are also likely to interfere with the escape behavior of cohesive, mobile shorebird flocks, forcing them to avoid oyster growing areas. With the occasional exception of Least Sandpipers, shorebirds did not generally forage on substrates immediately near or beneath artificial structures.*

[3] The US Fish and Wildlife Service's Birds of Conservation Concern list is made up of species, subspecies, and populations of migratory birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973. These species make up the USFWS' highest conservation priorities and their inclusion on the list is intended to stimulate coordinated and proactive conservation actions among the USFWS' Federal, State, Tribal, and private partners.

However, application of these results to Coast's operation in Arcata Bay is made difficult by differences in the type of cultivation gear used in the two areas and differences in the presence of eelgrass within and adjacent to cultivation beds between Tomales Bay and Humboldt Bay. Specifically, shellfish cultivation in Tomales Bay primarily relies on the use of low-profile mesh bags that are filled with shellfish and laid flat across mudflats whereas Coast's proposed operation would make use of much higher-profile networks of PVC posts installed vertically to support lengths of nylon lines hung with plastic baskets or clusters of oyster shell cultch (as shown in the photographs provided in **Exhibit 4**). These differences in the volume, configuration, and visual profile of cultivation equipment used in the two bays limits the relevance of study results from one bay to the other.

Although a variety of researchers have echoed Dr. Kelly's point above about shorebird avoidance of vertically structured areas on tidal flats, potentially due to the reduced ability to detect predators that birds would have in such areas, surveys carried out in Arcata Bay that evaluated shorebird use inside and outside several of Coast's cultivation beds provide mixed results. Specifically, as discussed in the RDEIR, the results of the study carried out by Connolly and Colwell (2005):

> *…indicated greater shorebird species diversity on cultch-on-longline oyster plots relative to control tidal flats lacking oyster culture. In addition, five taxonomic groups (willet, whimbrel, dowitchers, small sandpipers and black turnstone) were more abundant on the longline plots than control plots during the study (whereas black-bellied plovers were more abundant on control plots)…Connolly and Colwell conclude "Overall, birds did not appear to avoid longline areas compared with adjacent tidal flats. Rather, many species were more abundant and diversity was greater on longline plots."*

This study derived from previous work by Connolly-Moore (2001) that is described in the Adopted Findings for CDP No. E-06-003. This study examined the differences in shorebird and wader use of long-line oyster culture plots and tidal mudflat plots in Arcata Bay:

> *The study found that shorebird use of long-line plots increased for species with more generalized diets and varied foraging methods, whereas black-bellied plovers (Pluvialis squatarola) were exclusively more abundant on control plots. Foraging by plovers may have been impeded by long-lines because of interference, obstruction of visual foraging cues, or an altered prey base. Waders also responded to long-line presence, and may have foraged by different means or upon different prey when on long-line plots.*
>
> *The study concludes that, overall, birds did not appear to avoid long-line areas in favor of control mudflats. Instead, many species were more abundant and overall species diversity was greater on long-line plots. Although the mechanisms for these effects are not understood, the study concludes that any effects are transitory because the lines are removed every 18 to 36 months. In addition, the study concludes that benefits to birds may be compromised by long-term habitat impacts, such as increased sedimentation or loss of traditional mudflat infauna. The author of the paper cautions that the study represents only a small facet of how shorebirds might be affected by aquaculture.*[4] *It does not, for instance,*

[4] E-mail dated April 12, 2006, from Mark Colwell, Humboldt State University, to Audrey McCombs, CCC.

> *look at intake rates for birds on long-line plots. Although the results should be interpreted with caution, the study does not identify any negative effect on the suite of birds examined, except perhaps black-bellied plovers.*

In comments submitted to the Harbor District regarding the expansion project that Coast had formerly pursued, Dr. Mark Colwell, one of the two principal researchers and lead authors of the 2005 study, emphasized these final points about the high level of uncertainty that exists on shorebird use of Arcata Bay and the underlying drivers for their behavior and took issue with the use of his study's findings to support a conclusion that converting areas from undeveloped tidal flats to shellfish cultivation beds would not have a significant impact on shorebirds. He instead emphasized the need to carefully consider the importance of Humboldt Bay for migratory shorebirds:

> *The point is that we know very little about the abundance and availability of invertebrate populations that provide the essential resources to sustain wintering and migrating birds on the bay. To claim that loss and degradation of tidal flats (of whatever amount of area) would have "less than significant" impact on shorebirds and other waterbirds that rely on this habitat is, at best, premature and, at worst, a misrepresentation of current knowledge on the subject.*
>
> …
>
> *Lastly, the section on cumulative impacts misses the point. As I understand it, 7% of the bay is already in aquaculture production with unknown impacts on shorebirds. Mounting evidence indicates that, worldwide, populations of most shorebirds are in decline. Reasons for the decline are many but principal among them is the loss and degradation of habitats. Years ago, prominent ecologists (Myers et al. 1987. American Scientist 75:19-26) likened the annual cycle of shorebirds to an annual chain of events. The individual links in the chain were estuaries (like Humboldt Bay) where large numbers of individuals refueled for their next leg of their journey between arctic breeding and wintering sites that span hemispheres. The populations were vulnerable to the weakest link in the chain! Humboldt Bay is a relatively pristine estuary compared to others worldwide and it is likely a critical link in the chain for many species of shorebird because it provides essential food resources for millions of birds. Ironically, the DEIR mentions the 3.3 days in which spring migrating Western Sandpipers make use of the bay. A simple, back-of-the-napkin calculation[1] during the Spring period of peak passage of Western Sandpipers yields an estimated total population at Humboldt Bay that likely approaches a million birds – and this is for just 1 of 20+ species that are common migrants at that time of year! These sorts of numbers suggest that the value of Humboldt Bay and its tidal flats are unappreciated and certainly worthy of greater consideration in conservation decisions.*

These comments from one of the leading experts on shorebird use of Humboldt Bay are a strong indication of the importance of the bay's habitats and the need to manage them cautiously. Given the heavy reliance on Humboldt Bay's tidal flats by a wide diversity of shorebird species and significant proportions of several populations, Dr. Colwell and other commenters to the Harbor District during its CEQA process have been quick to draw attention to the sparse and inconclusive research that is available to support a conclusion that adverse impacts to shorebirds from the previously proposed expansion of Coast's operations will not occur or will be insignificant.

The California Department of Fish and Wildlife (CDFW) is one of those to have repeatedly echoed these concerns through its comments letters to the Harbor District during the CEQA process as well. CDFW's December 31, 2015 letter provides the following succinct summary of the more detailed discussion of this issue included in its previous letters:

> *Human disturbance and habitat destruction, specifically from oyster and shellfish farming, have been noted to have impacts to shorebird populations (Connolly and Colwell 2005; Hickey et al. 2003; Kelly et al. 1996; Pierce and Kerr 2004). Further, shellfish farming has been identified as a conservation issue for shorebirds in Humboldt Bay, and prohibiting further alteration of mudflats for oyster culture has been identified as a priority shorebird conservation goal for Humboldt Bay (Hickey et al. 2003).*

As noted by CDFW, available research indicates that the expansion of Coast's operations has the potential to adversely affect shorebirds in two primary ways – by increasing the number and duration of disturbance events and by altering critical important tidal flat habitats in a way that may preclude or modify shorebird use patterns, foraging behavior, and foraging success.

However, Coast is no longer proposing to expand its operations. As the Commission's recent findings in support of one of Coast's recent permit amendments (CDP Amendment No. E-06-003-A5 – six month permit term extension) noted, at its existing levels, there is no data demonstrating that Coast's aquaculture operation is resulting in significant adverse impacts to shorebirds. This finding was based primarily on the fact that Arcata Bay remains an incredibly important area for shorebirds – and, as described above, supports very high levels of use – even with Coast's existing 300 acre operation in place, rather than based on a conclusion that this existing operation was not affecting shorebirds. This distinction is relevant because it is not possible to know if Arcata Bay would support more shorebird use if the operation were not in place. Regardless, because the current proposal by Coast would include not only a roughly 21 acre overall reduction of cultivation beds but also a substantial consolidation of the remaining acreage (for example, the footprint of its operations would be fully eliminated within the center of Arcata Bay and pulled back approximately ½ mile in the eastern part of the bay), it would appropriately minimize both the likelihood and magnitude of potential adverse impacts that it may have on shorebirds.

Coast's proposal would also follow the recommendation in the Point Reyes Bird Observatory's 2003 "Southern Pacific Shorebird Conservation Plan" to "prohibit further alteration of tidal flats for oyster culture" because all of the proposed relocation areas would be located between and adjacent to areas that are already altered from existing or historic uses (such as hardened substrate, limited eelgrass, and dredge scarring) adjacent to areas that area proposed to remain in use.

As such, Coast's proposal for smaller scale operations consolidated primarily within areas of the western portion of Arcata Bay that provide a lower abundance of shorebird foraging areas would provide special protection for those areas of special biological significance – including shorebird habitat – located in other areas of the bay. To ensure that this smaller scale, consolidated operation is achieved, **Special Condition 2** would require Coast to maintain the limited footprint it proposes and help ensure that the implementation of the proposed project proceeds in a way that would not result in a net increase in cultivation areas at any time – by requiring that removal activities keep pace with or exceed relocation activities. Additionally, **Special Condition 2** would also require Coast to maintain its extensive lease-holdings – approximately 3,800 acres – for the next eight years and to only make use of the small fraction of them that it currently proposes. This would effectively

limit the possibility of other development in these areas and therefore protect them for shorebirds and other wildlife and habitats.

Further, the requirement in **Special Condition 15** would result in the creation of five and ten foot wide channels at regular intervals within all of Coast's most densely planted existing cultivation beds (the nine beds proposed to be retained that include longlines at 2.5-ft intervals throughout the bed). The addition of these channels may help address the potential loss of foraging habitat for shorebirds that would occur through conversion of undeveloped tidal flats to cultivation beds by increasing the likelihood that shorebird foraging occurs within more cultivation beds. However, the expected benefit to shorebirds from this change is expected to be minor at most.

Finally, to further help reduce potential adverse impacts to migratory birds from disturbance that may occur as a result of Coast's vessel transit or aquaculture operations, **Special Condition 16** would prohibit Coast personnel from approaching, flushing, chasing, or otherwise disturbing foraging or resting shorebirds or waterfowl. However, a requirement like this would is expected to provide only a limited ability to reduce disturbance.

This requirement is very similar to mitigation measure BIO-12 included in the project's Final EIR: "Coast will not intentionally approach or harass migratory birds that are actively feeding or resting within the project area." As noted in a number of comments submitted to the Harbor District (the CEQA Lead Agency) by CDFW and others, although well intentioned, this requirement should not be relied on as a fundamental part of a strategy to reduce disturbance to shorebirds from Coast's operational activities:

> *The Conservation Measure BIO-12 (Coast will not intentionally approach or harass migratory birds that are actively feeding or resting within the Project area) proposed in the RDEIR will not reduce impacts to shorebirds below the threshold of significance because it is unlikely "intentional" disturbance of shorebirds will occur.*

In other words, there is no reason to believe that Coast's field personnel are intentionally approaching, pursuing, chasing or flushing shorebirds or would do so as part of the proposed project. The more likely disturbance is that which would occur without the knowledge or intent of Coast's field personnel – for example, the dispersal of shorebirds away from tidal flats they are using for foraging or resting as Coast's field personnel or vessels pass by at distance or begin to approach before the presence of the birds is observed (several of the species in question are low to the ground, colored to blend in with the landscape, and are difficult to see even by trained observers in good conditions).

Nevertheless, in combination with Coast's proposed reduction and consolidation of its operations, **Special Conditions 2, 15, and 16** are expected to protect shorebirds from an unacceptable level of potential habitat loss and disturbance and maintain and enhance marine resources.

Longfin Smelt

The removal of seawater through intake structures is known to result in the impingement and entrainment of marine life. The type and quantity of marine life that may be adversely affected in this way is related to the size and velocity of the intake structures. Larger, high-velocity structures can cause the impingement and entrainment of larger organisms that can include adult fish while smaller low-velocity structures can typically only impinge and entrain smaller larval and juvenile

organisms. While impingement (capture of fish and marine organisms against an intake screen due to suction) can often result in the injury or mortality of the affected organism, adverse effects of entrainment (capture of fish and marine organisms in the intake stream) vary based on the type of intake system (configuration of pipes, pressure changes, temperatures) and ultimate use of the entrained water.

As part of its maintenance operations, Coast carries out a variety of washing and cleaning activities including the rinsing of the clam seed and cultivation trays as well as the well structures in which the trays are housed. Rinsing of the clams and cultivation trays would occur on a daily basis in order to remove any accumulated sediment or non-target organisms that may also be growing on the cultivation trays. Such non-target organisms may include native and nonnative algae, bryozoans, hydroids, tunicates, sponges, amphipods, and mysid shrimp that are present in Arcata Bay as adults and larvae. Coast proposes to use both a hose and pressure washer for these daily cleaning activities. Coast proposes to use Arcata Bay as a water source for these activities and initially proposed to use a coarsely screened intake system on its maintenance vessel with an intake capacity of 160 gallons per minute and a velocity of 12 to 16 feet per second. Coast proposes to use this system to collect approximately 10 million gallons of bay water per year for maintenance washing activities.

To protect against the impingement of fish, in particular listed species such as longfin smelt and juvenile salmon, the Commission required in Special Condition 9 of CDP No. E-02-005-A2 (approved in August of 2012) that Coast use intakes designed according to National Marine Fisheries Service and CDFW requirements as protective of fish – in other words, with intake velocities not to exceed 0.33 feet per second and 3/32 inch mesh screening. The Commission previously found these standards to reduce the potential impingement and entrainment of juvenile and adult fish because an intake velocity of 0.33 feet per second is not likely to exceed a fish's swimming ability and most juvenile and adult fish exceed 3/32 inch in size. Special Condition 9 required that the seawater intake velocity for Coast's maintenance and cleaning wash system not exceed 0.33 feet per second and that the screen openings for the intake point screen remain no larger than 3/32 inch. These screening requirements were primarily developed by the National Marine Fisheries Service (NMFS) based on research on the average size and swimming abilities of juvenile salmon.

However, the presence of state-listed, threatened longfin smelt in Arcata Bay (Cole 2004, Pinnix et al. 2005, CDFW 2009, Merz et al. 2012) means that specific intake limits and criteria that are relevant to this species must also be considered. Input from CDFW technical staff and analysis carried out by the Commission in 2014 (as discussed in the adopted findings for CDP No. 9-13-0500) on the application of the NMFS standards for other fish species, particularly the much smaller, state listed longfin smelt, suggests that a slower intake threshold would be more appropriate. Specifically, because of the more limited swimming abilities of smelt in comparison to salmon, as well as their smaller size, the Commission found that a lower approach velocity of 0.2 feet-per-second would be warranted with active intake screen systems and 0.05 feet-per-second is appropriate for passive systems in areas in which longfin or delta smelt are present. In addition, CDFW fish screening criteria establish a minimum screen size of five square feet per cubic foot per second of intake for active systems, and 20 square feet per cubic foot of intake for passive systems. Since 2014, the Commission has required these intake specifications in Humboldt Bay and found that these screening criteria reduce the potential impingement and entrainment of juvenile and adult fish, because an intake velocity of 0.2 feet per second is not

likely to exceed a fish's swimming ability and most juvenile and adult fish exceed 3/32 inch in size. Accordingly, the Commission included Special Condition 9 on CDP No. E-02-005-A6 to reflect these more appropriate screening criteria. Those criteria would be carried forward as **Special Condition 6** of this permit as well to effectively address the project's potential to adversely affect longfin smelt.

Carrying Capacity

Although Coast is proposing to reduce the size of its operation, it would also expand the use of the higher production basket on longline cultivation technique (from roughly 11 acres to approximately 56 acres) and may therefore increase the number of oysters grown in the bay beyond current levels. Because these clams and oysters are filter-feeders that would be sustained by directly removing phytoplankton from the water column, this modest expansion in production raises the possibility that Coast's operation may reduce the overall abundance of phytoplankton throughout the bay or around its cultivation beds and thereby negatively affect wild native species that are also filter feeders. This issue has been expressed both as a question of the overall carrying capacity of Arcata Bay as well as a concern specifically about populations of native clams that support recreational harvest activities.

This latter concern was raised on several occasions by the Wiyot Tribe to Commission staff during its review of Coast's previous proposal to expand its operations. As noted in the letter sent by the Chair of the Wiyot Tribal Council to the Army Corps of Engineers on May 2, 2017:

> *Central of the Wiyot Tribe's existence are the native mussels and clams many of which were harvested in the bay. These species include, but may not be limited to, geoduck clams, butter or Washington clams, mussels, and little neck clams. The importance of these species as a food resource can be seen in the volume of shells at most village sites, which are typically referred to as shell mounds or middens. They also serve as an important archeological marker for other archeological locations, such as fish camps or seasonally occupied locations. In addition to the dozens of shell mounds and other sites that encircle, or are within the environs of the bay, the shells were also used to decorate ceremonial regalia, clothing, jewelry, and other cultural items.*
>
> *They have also been an important protein source for Tribal citizens in the historic era. For example, they served as a readily available source of sustenance during difficult times, such as when Tribal citizens were held against their will at the North Spit Reservation. They remain a popular source of subsistence gathering, as well as recreational and cultural support for current Tribal citizens.*

Although there is no widely established methodology to use for evaluating carrying capacity for filter feeders within an embayment, the project EIR included an analysis (Appendix G of the RDEIR) of this issue and a modeling exercise based on several key variables including the tidal flushing rate for Arcata Bay (how long before the water is replaced), biomass of phytoplankton, filter feeding rates for cultured clams and oysters, and biomass of cultured shellfish. Because of the uncertainty surrounding several of these variables, the analysis used a range of values and provided the results for each step in that range.

However, at the time that this analysis was carried out, October of 2015, Coast was proposing to both substantially increase its acreage and overall production – many times beyond the increase in

production that may occur as a result of the current proposal. The result is that none of the scenarios modeled in the carrying capacity analysis perfectly represents the current project. However, the "Coast Existing" scenario discussed in the analysis provides a rough equivalent to the current project.

Under this scenario, the most conservative projection – the worst case, using the highest feeding rates and slowest rate of tidal flushing - was that the oysters in Coast's operation could filter over 16% of the water in Arcata Bay each day. Assuming the lowest feeding rates and fastest rate of tidal flushing, this fell to 1.8%. As the analysis acknowledges, however, it is not appropriate to assume that this simplistic focus solely on volume of water filtered is an accurate reflection of the biomass of phytoplankton lost to the shellfish in Coast's operation. For example, oysters are not able to remove 100% of the phytoplankton from the water they filter and their presence and the nutrients they deposit may serve to boost phytoplankton growth as well as reduce it. Nevertheless, these projections do provide an important metric to consider when evaluating the potential overall, cumulative effect of adding the proposed number of additional oysters to Arcata Bay.

Conservatively assuming that the actual loss of phytoplankton biomass in Arcata Bay that would result from the proposed project fell within the middle of the 1.8% to 16% range described above, it appears that the analysis provides little support for the concern about potential adverse impacts to wild native filter feeding shellfish in Arcata Bay. However, oysters are renowned for their ability to filter water and remove particulate matter from it and Coast's proposed operation – particularly due to the increased consolidation it includes - would result in many millions of oysters planted in the bay, some of them in dense aggregations. It is in these areas of dense aggregations that there may potentially be some level of elevated localized phytoplankton removal due to oyster filtration that could begin to affect surrounding populations of native shellfish species. This potential localized impact to carrying capacity around the cultivation areas was emphasized by Coast several times throughout the planning process for its expansion project because it repeatedly asserted that in some areas of its proposed operation - for example, the Mad River growing area – it was limited to considering the placement of its expansion beds to only areas adjacent to tidal channels where water movement and flushing is greater because of a concern that other areas farther from these channels would not support acceptable growth rates for oysters due to phytoplankton removal and competition for food with oysters in its existing cultivation beds. This is relevant because the same competition for food would affect native shellfish as well.

However, Coast is proposing extensive efforts to reduce the density of cultivation lines within the areas in which multiple cultivation beds would be sited. For example, all of the re-location cultivation beds would be planted with nine, ten, or sixteen foot wide rows between cultivatiuon lines. These open rows would increase water movement and tidal flow within cultivation beds to increase water exchange and bring in food resources for both cultivated and native shellfish and thereby limit the likelihood and magnitude of any localized effect on carrying capacity that Coast's proposal to consolidate its operations may have.

Black Brant

Identified in 2008 by CDFW as a California Bird Species of Special Concern, the black brant (*Branta bernicla nigricans*) is a migratory goose that winters along the eastern Pacific coast from Alaska to Mexico. In California, Humboldt Bay supports the majority of brant in the state, although it is more important for spring staging than for wintering. In fact, Humboldt Bay is the fourth most

heavily used staging area in the Pacific Flyway (Moore et al. 2004). Given its reliance on eelgrass as a forage source during wintering and staging, the importance of Humboldt Bay has only grown in recent years with the near total disappearance of eelgrass beds that were once common in Morro Bay (a decline of 96% between 2007 and 2015 – from 340 acres to 12 acres). Since Morro Bay is one of only four large coastal bay/estuary systems known to support black brant, its severely reduced ability to support brant increases their reliance on the other three areas. Peak counts of spring-staging birds totaled 20,000 to 40,000 from 1950 to 1977, declined to 10,000 to 15,000 in the 1980s, then increased to 20,000 to 25,000 in the late 1990s (Pacific Flyway Council 2002) before rising more recently to as many as 60,000 in 2000 and 2001 (Lee et al. 2007).

Potential impacts to black brant from Coast's operations primarily take three forms: loss of foraging opportunity due to reductions in the amount of eelgrass (the principal food for black brant) within cultivation beds; exclusion of brant from eelgrass beds where cultivation beds are installed due to brant's avoidance of structure; and disturbance from vessel and pedestrian activity associated with Coast's proposed planting, harvesting, and maintenance operations.

As described in the RDEIR:

> *Black brant feed almost exclusively on eelgrass (Ward et al. 1997, 2005; Moore et al. 2004), making them vulnerable to degradation of existing eelgrass habitat (Pacific Flyway 2002; Ward et al. 2005).*
>
> …
>
> *A large proportion of Pacific Flyway brant uses Humboldt Bay, likely due to its high eelgrass abundance and relative isolation from other suitable spring staging sites (Moore et al. 2004). Eelgrass varies in quantity and quality, and is unavailable to brant during two high tides per day, making the achievement of energy demands challenging for brant (Clausen 2000, Moore and Black 2006b). Brant have been documented repeatedly returning to eelgrass beds that are relatively high in quality (density, biomass, and nutrient content), and have been seen waiting over eelgrass beds until tides recede (Moore and Black 2006b), suggesting brant are making foraging decisions based on prior experience and performance. This observation also suggests that eelgrass quality in Humboldt Bay is important to the ability of brant to meet energetic demands for migration, and thus a reduction in quality and quantity could result in impacts to the flyway population.*
>
> *Surveys conducted in Humboldt Bay each February between 1976 and 2000 found a mean number of 5,049 brant in South Bay and 1,322 brant in North Bay. Otherwise stated, approximately 80% of the birds were observed in South Bay during that period (Moore et al. 2004). Based on comparisons with historical data (1931-1941), the relative proportions of brant using South Bay and North Bay have been similarly distributed (Moore et al. 2004). However, the most recent 2015 winter/spring annual surveys conducted by the Humboldt Bay National Wildlife Refuge detected a recent shift in brant population from South Bay to North Bay, estimating a total of 192,400 bird days for North Bay and 147,930 bird days for South Bay (Refuge, unpublished data). For example, an April survey estimated 3,650 birds occupying North Bay and 2,860 birds in South Bay.*
>
> *To better inform the impact assessment process, H. T. Harvey & Associates conducted surveys for black brant in North Bay in April 2015 (Table 6.5.9), representing the approximate period of peak abundance for the species during the 2015 spring migration*

> *period (HTH 2015). A memorandum explaining survey methods and results is attached to this R-DEIR as Appendix F. Surveys were conducted throughout the entire North Bay (as weather allowed) during high and low tides to record the abundance of brant using North Bay. Surveys were also conducted in North Bay to document the number of brant occurring within Coast's existing aquaculture beds and areas that are proposed for aquaculture expansion. Time-lapse camera monitoring was conducted to augment survey efforts with behavioral observations in aquaculture structure. The mean count during low tide in North Bay was 4,164 birds (range 3,120-5,559) and the mean count during high tide was 3,170 birds (range 2,2344,340). The observed differences in low and high tide counts reflect observations that brant would congregate in areas away from inundated mudflats during high tides, concentrating in areas including Eureka Slough, areas south of Samoa Bridge (i.e., along Indian Island), or on the lee side of marsh habitats. This occurred presumably because foraging opportunities were more limited during high tides in North Bay when eelgrass was inundated and brant were likely avoiding the windy conditions in the open bay that were more prevalent during afternoon spring high tide surveys.*

As these surveys indicate, the extensive eelgrass beds of Arcata Bay (North Bay) support a significant proportion of the population of black brant that winters and stages in Humboldt Bay. Aquaculture operations in Arcata Bay can present a significant risk to these black brant, through both disturbance and by potentially precluding foraging activity within shellfish cultivation areas. The Commission's findings in support of the denial of a coastal development permit for Coast's previous proposal to expand its operations in Arcata Bay (CDP No. 9-15-1931) , incorporated by reference in this report, extensively detail these impacts, including through excerpts from comments on that proposal from experts, interested parties, and resource agencies.

Considering that information, the Commission found that the proposed expansion of Coast's operation would result in a loss of forage sites and opportunities for brant as well as an increase in disturbance. The Commission further found that in light of these impacts, brant's protected status, and the importance of Humboldt Bay for its continued survival, a smaller scale and more consolidated project would be needed to provide protection for this species of special biological significance. Coast carefully considered these findings in the development of its revised project and decided not only to no longer propose an expansion of its operations but to reduce and consolidate them around some of the most densely used areas of its existing and historic footprint. These areas in the Mad River and Bird Island sections of Arcata Bay have been identified by numerous parties (environmental organizations, state and federal agencies, waterfowl experts, local members of the public, etc.) as locations that are likely to support limited brant use, potentially due to the sparser eelgrass habitat they contain and the high levels of ongoing and historic shellfish aquaculture activities concentrated within them. Accordingly, Coast's proposal to increase use of these areas by relocating approximately 42 acres of cultivation beds into them from the central portion of Arcata Bay is not expected to result in additional adverse impacts to black brant.

To confirm this assumption, Coast has committed to implement a brant monitoring program that would include the use of remote cameras to document brant foraging and use patterns within and outside of cultivation beds. **Special Condition 4** would memorialize this commitment and require Coast to submit, for the Executive Director's review and approval, a revised version of the brant monitoring plan that was developed for its formerly proposed expansion project (included as **Exhibit 14**). The monitoring plan was designed for Coast's prior project so would be revised to reflect the design of the currently proposed project, respond to critiques provided since its release,

and integrate appropriate survey and analytical techniques. This condition also requires an independent peer review of the proposed monitoring plan to allow for an expert in brant biology and monitoring design principles to verify that the monitoring plan includes an appropriate number and location of monitoring sites, evaluation of baseline conditions, duration of monitoring events, and comparison of cultivation beds and reference sites to allow robust and defensible data to be collected on brant foraging behavior within and outside cultivation beds. Integration of information from this peer review into the Executive Director's review process would help ensure that the data from the brant monitoring effort can be used to augment the Commission's review if Coast seeks an additional authorization at the conclusion of the permit term established through **Special Condition 1**.

The proposed project is expected to minimize potential adverse impacts to black brant by eliminating aquaculture equipment and activities from substantial sections of Arcata Bay (as shown in **Exhibit 2**) and potentially reducing its overall operational footprint (the area of vessel transit and area of potential disturbance that surrounds each cultivation bed) by as much as 1/3 – changes which would increase the amount of foraging habitat and eelgrass available for black brant use and reduce the potential for disturbance. However, a variety of parties have expressed concerns that Coast would be continuing its existing operations in the eastern part of Arcata Bay and would be relocating three acres of cultivation equipment into this area in order to evaluate eelgrass response to the installation of widely-spaced longlines and basket lines within areas of patchy eelgrass habitat. Much of the input provided by these parties has focused on the ecological value of the east bay and the biological resources it supports – including black brant - as rationale for further reducing or eliminating Coast's operations there. Although Coast is proposing to reduce the total acreage of its cultivation beds in the east bay by over 11 acres (from approximately 62 to 50 acres) through the removal of cultivation bed EB 7-2 (11.7 acres) and to consolidate the remaining use area by nearly a half-mile, concerns have been expressed that this would not provide an adequate level of protection.

At the same time, however, it is uncertain what level of adverse impacts to black brant may occur from Coast's proposal to continue using roughly 50 acres of its existing cultivation beds in the east bay. Approximately 25 of these acres (cultivation beds EB 1-1, 1-2 and 2-1) are in areas that continue to show the effects of Coast's historic dredge harvesting activities and are surrounded by patchy eelgrass habitat that may not be high quality productive forage areas for black brant. The remaining areas that Coast is proposing to continue using, roughly 26 acres comprised of cultivation beds EB 6-1, 6-2, 6-3, 2-3, 4-3 and EB-R&B, are more surrounded by areas of denser eelgrass that may be more valuable for brant foraging. The questions of whether the continued loss and reduction of foraging opportunities and increased disturbance potential within these areas would negatively affect brant or whether the pattern of increasing brant use of Arcata Bay seen in recent years would continue if these areas were to remain in use by Coast remain unclear.

Some of those arguing against Coast's continued use of these areas, including staff of the U.S. Fish and Wildlife Service, point to the possibility that although it has increased in recent years, the level of brant use in Arcata Bay may nevertheless remain below historic levels and below the level one would see if Coast's operation was not present. However, this is difficult to assess. Coast's operation has been present in Arcata Bay for many decades and it is difficult to speculate on conditions that might exist were this not the case. Furthermore, little is known about the spatial use patterns of black brant in eastern Arcata Bay, including the relative importance of the section of the

east bay in which Coast is proposing to continue its operation over other areas with dense eelgrass in which the operation would be removed from or does not currently exist in.

Additionally, Coast is proposing to convert the 7.8 acres of EB 6-1 from densely-spaced longlines – not shown to support bed-feeding on eelgrass during the 2015 brant survey commissioned by Coast – to the use of widely-spaced basket longlines that may allow some foraging to occur in the nine and sixteen foot wide rows between lines. Although brant's ability to forage in these rows has not been documented – no cultivation beds with this configuration exist in which brant use can be evaluated – the implementation of the brant monitoring plan required in **Special Condition 4** would provide this opportunity. In this way, more information will be available for the Commission to consider during any future amendment or extension of Coast's permit.

To additionally reduce the proposed project's potential to adversely affect black brant, **Special Condition 5** requires Coast to develop and implement a vessel management plan that includes consistent vessel lanes and limited use of open areas within the bay as much as possible. This requirement eliminates or reduces vessel use in areas that do not support cultivation gear and concentrate Coast's vessels within a limited number of access routes and channels – at least until they came within close range of their target cultivation beds. Additionally, **Special Condition 16** would prohibit Coast from disturbing wildlife during its operations.

The most critical requirements for ensuring that the proposed project provides special protection to balck brant, however, are those included in **Special Conditions 2, 9 and 13**. These conditions would require Coast to achieve and maintain the reduced and consolidated footprint it has proposed by carrying out the complete removal of approximately 63 acres of cultivation equipment from within the central and eastern areas of Arcata Bay and the relocation of approximately 42 of those acres into the Bird Island and Mad River areas that are expected to support limited brant foraging habitat.

Black Brant Grit Sites

The other key issue that has been raised regarding brant is its use of specialized sites within the bay for the ingestion of sandy grit. As discussed in the Project RDEIR:

> *Migrating brant feed almost exclusively on eelgrass and thus their ability to forage is restricted by the tidal cycle, but gritting sites are also very important areas that brant need to access to acquire sandy grit (Lee et al. 2004, Moore and Black 2006, Bjerre 2007, Spragens 2013). Gizzard grit is ingested by brant as an aid to mechanically breakdown eelgrass and provides an important source of calcium (Lee et al. 2004, Bjerre 2007). Brant tend to visit grit sites when they become available during retreating tides; grit sites occur relatively high in the intertidal zone and thus are available earlier than eelgrass beds (Lee et al. 2004, Moore and Black 2006). Brant then move from grit sites to eelgrass beds when tidal elevations are low enough for brant to access them (Moore and Black 2006). Although grit sites appear to be abundant in Humboldt Bay, brant have been observed preferentially selecting particular grit sites that provide supplemental calcium and include larger than average particle sizes (Lee et al. 2004, Bjerre 2007). In some cases, brant have been observed staging over the best gritting sites awaiting tides to recede, and brant continue to use gritting sites even when eelgrass (which occurs at lower elevations) was available for foraging (Bjerre 2007). Based on available literature, the primary grit sites in Humboldt Bay occur along the northern portion South Spit of South Bay (Figure 6.5.28). The South*

> *Spit is a large sandbar between the South Bay and Pacific Ocean where higher-elevation sandy substrate is available to brant on receding tides before eelgrass at lower elevations is available for foraging.*

In addition to these grit sites in South Humboldt Bay, the RDEIR also identifies two grit sites in Arcata Bay – including one at Sand Island near a cultivation bed that Coast is proposing to remove and discontinue use of as part of its proposed project.

In its comment letter provided in response to the RDEIR, the California Department of Fish and Wildlife (CDFW) discusses the presence of black brant grit sites in Arcata Bay as well as their importance and susceptibility to human disturbance:

> *The RDEIR recognizes two grit sites for black brant in North Humboldt Bay, one at Sand Island and one at Indian Island. Grit sites are rare and are a critical part of the feeding process (Lee et al. 2004; Spragens et al. 2013). Given the rarity and limited access to grit sites, anthropogenic disturbance and development of these sites have been cited as further limiting factors for black brant populations, with grit sites recognized as important areas for protection (Lee et al. 2007; Spragens et al. 2013). Black brant are also some of the most sensitive waterfowl to disturbance (Laursen et al. 2005; Pacific Flyway Council 2002).*

CDFW's letter also discussed recommendations for augmenting the protection of black brant grit sites in Arcata Bay, including by expanding the existing buffer area around Sand Island. This recommendation is consistent with the conservation measures provided in the account accompanying the designation of brant as a Species of Special Concern. These conservation measures include the need to "protect traditional gritting sites from excessive human disturbance and degradation from development and other causes."

In its response to the CDFW comment above, the Harbor District acknowledges that several researchers suggest the use of much larger buffers for black brant – from 2.5 to nearly 4 times larger:

> *There are some studies that recommend a greater buffer for human activity from brant and certain species of shorebirds. For example, Mathers et al. (2000) recommends a 250 m buffer from human activity for wigeon, which is identified as a particularly sensitive species. Borgmann (2011) suggests that a 250 m buffer from human disturbance impacts would likely lessen impacts on must sensitive waterfowl species. Laursen et al. (2005) recommends a 384 m buffer from brant; however, the recommended buffer may not be directly applicable given that it discusses a buffer from human approach on foot rather than boats. However, the frequency of disturbance in these studies was much greater than the proposed project; in Mathers et al. (2000), the mean interval of disturbance varied from every 7 to 68 minutes. In Laursen et al. (2005)'s study, observers experimentally approached and disturbed waterbirds over a thousand times (n=1,371) in spring and autumn in 1980-1984, which likely amounted to at least one disturbance per day during the study.*

Contrary to the Harbor District response, it is relevant to consider buffers established for on-foot disturbance since many of the maintenance, harvest, and planting activities carried out on a culture bed are done by personnel on-foot. Therefore, buffers established to protect brant grit sites should be based on either of the distances established through research - 250-meters or 384-meters. Given

the protected status of brant and the importance of their limited known grit sites within Arcata Bay, the Commission is requiring in **Special Condition 14** that when brant are most likely to be present in Arcata Bay (November to June), a 384 meter buffer be established around one of the two primary grit sites within Arcata Bay that were identified during the CEQA review process[5] (shown with blue circles in **Exhibit 8**). Although Coast is proposing to discontinue use of this site and fully removal all cultivation gear from it, as an additional assurance that it would be protected, **Special Condition 14** would prohibit Coast from operating or transiting through these buffer areas unless necessary to carry out water quality testing required by the California Department of Public Health. The other grit site identified on **Exhibit 8** – the one at Indian Island – is not included because it is in an area that supports higher levels of human use on a more constant basis – for example, both the Highway 255 bridge and the Arcata Channel are adjacent to the area and experience vessel and vehicle traffic on a regular basis. Implementation of a protective buffer that prevents activity within such an area would therefore be infeasible. However, it should be noted that Coast has fully removed all of its cultivation equipment from one of the three areas of its existing operation near this site and is not proposing to replace this equipment or further use this cultivation site.

Eelgrass

Eelgrass (*Zostera marina*) provides a variety of essential ecosystem functions, including primary production, predation refuge, nursery functions, physical structure, nutrient cycling, and forage. Eelgrass is a species of special biological significance under the meaning of Section 30230 of the Coastal Act, and as such the Commission is required to afford it special protection. The Commission's Adopted Findings for Coast's original CDP for its oyster culture operations (CDP No. E-06-003) summarize several of the critical ecological services and roles provided by eelgrass:

> *Habitat Value of Eelgrass Beds*
> *Eelgrass is a marine vascular plant indigenous to soft-bottom nearshore areas of the Northern Hemisphere, and occurs along the Pacific coast from the Bering Strait to lower Baja California. Morphological characteristics include horizontal rhizome structures within the sediment and at the sediment surface, with erect leafy shoots extending into the water column. Seagrass beds are critical to nearshore food web dynamics. Studies have shown seagrass beds to be one of the most productive ecosystems in the world, and many fishery resources ultimately depend on this high productivity.*
>
> *The organisms that use eelgrass blades as a substrate contribute a significant amount of biomass to the eelgrass bed, often equaling the standing crop of eelgrass. Epiphytes and epizooids, which are composed of various algae, bacteria, protozoa, and invertebrates (e.g., harpacticoid copepods), comprise approximately 10 to 50 percent of the total production associated with seagrass. Organisms that live on eelgrass blades are a fundamental component of eelgrass beds' nursery functions.*
>
> *Eelgrass epiphytes and epizooids are fed upon by larger organisms and are the dominant food of the fish in seagrass systems. Harpacticoid copepods are a unique component of eelgrass epiphyte assemblages in the Pacific Northwest, and serve as important prey items*

[5] Although Audubon California cites anecdotal evidence in its May 12, 2017, letter to Commission staff indicating the presence of an additional grit site near one of Coast's proposed expansion cultivation beds in East Bay (cultivation bed EB 1-3), Commission staff has been unable to confirm the use of this location as a grit site.

of juvenile salmon, Pacific herring (Clupea harengus pallasi), Pacific sand lace (Ammodytes hexapterus) and surf smelt (Hypomesus pretiosus). As eelgrass blades and their associated organisms slough away, organic matter is exported to other habitats and supports the secondary production of detritus-based food webs. The detritus is also transported outside of the eelgrass areas to the nearshore environment, where it may provide an important energy source for open-water species, including commercially-important fish species, and a source of production for coastal planktonic species.

Predation Refuge
Eelgrass provides structural shelter for a variety of marine organisms, reducing predation pressure. The protective value of eelgrass beds may vary with the structure of the bed, and is generally limited to smaller species, juveniles, or cryptic species. Eelgrass is thought to provide shelter for migrating salmonid smolts. When exposed to predators, juvenile Chinook salmon (Oncorhynchus tshawytscha) preferentially choose eelgrass habitat over oyster clusters in field experiments in an enclosure, as well as in mesocosm experiments involving exposure to a mock predator.

Nursery Function
One of the most notable roles of eelgrass beds is as a nursery for various marine fishes and invertebrates. Eelgrass provides abundant food and shelter, which may improve survival for some species. Eelgrass may also promote settlement and recruitment of planktonic larvae or early life stages of various species. Eelgrass beds also act directly as spawning areas, providing nursery grounds for numerous fish species. The commercially important species, Pacific herring, striped seaperch (Embiotoca lateralis), and chum salmon (Oncorhynchus keta) are all partially dependent on eelgrass for at least part of their life history.

Physical Structure
By slowing and retarding current flow and reducing water velocity near the sediment-water interface, eelgrass promotes the deposition of particles and inhibits resuspension of fine particles and organic materials. Eelgrass beds therefore help cleanse the water column of both sediment and water column nutrients. Dissolved nutrients are incorporated by eelgrass blades and their associated epiphytes and macroalgae into plant biomass, which can improve water quality. Sediment stabilization is enhanced by the presence of a root and rhizome mat, which bonds sediment and retards erosion. The sediment stabilization provided by eelgrass has been shown to be an important function for associated fauna; suspended material in the water column can limit the visibility and successful capture of prey by visual feeders.

Nutrient Cycling
In order for an estuary to incorporate oceanic and riverine inputs of carbon and nutrients into the food web, the estuary must have an efficient means of retaining these elements. Eelgrass plays an important role in the cycling of nutrients within estuarine and nearshore systems. Eelgrass and its associated epiphytic algae fix nitrogen, adding to the nutrient pool. Eelgrass also absorbs nutrients from the sediment and releases them into the water column from the leaves, acting as a nutrient pump. Decaying eelgrass also aids in the maintenance of an active sulfur cycle. In the absence of eelgrass, nutrients would accumulate in the sediment and/or be flushed out to sea.

Eelgrass as Habitat for Listed Salmonids
Adequate prey species and adequate cover associated with marine vegetation have been identified as important elements in estuarine and nearshore habitats for Pacific salmon. Phillips (1984) suggested Chinook salmon were "transient" users of eelgrass for feeding and cover. Murphy et al. (2000) however, did not observe a significant association of juvenile salmon with eelgrass. Murphy et al. (2000) reported that salmonid fry and smolts were generally smaller in eelgrass sites than non-eelgrass habitats, but suggested that the presence of salmon fry in eelgrass areas may be related to physical factors such as low exposure to currents, rather than the presence of eelgrass per se. In a study conducted in southeastern Alaska comparing fish use of kelp and eelgrass, the majority of juvenile coho salmon were collected in eelgrass beds (Johnson et al. 2003). Eelgrass drift habitat may also be a critical resource for Chinook salmon and coho salmon (Nightingale and Simenstad 2001). Within Humboldt Bay, coho salmon smolts have been captured under clumps of floating eelgrass (Shaw 2004).

Impacts to Eelgrass from Existing Operations
Coast's use of intertidal eelgrass habitat – both occupied and potentially occupied with eelgrass plants – for oyster cultivation was the primary coastal resource concern evaluated by the Commission in its consideration of Coast's initial CDP for its 300 acre operation (CDP No. E-06-003). Based on extensive analysis and technical review by Commission staff ecologist, Dr. John Dixon, the Commission found that Coast's operation would result in the loss of approximately 137 acres of eelgrass habitat. As described in the Commission's adopted findings for CDP No. 9-15-1931, the Commission re-evaluated this impact estimate in 2017 based on currently available information and concluded that it was appropriately precautionary and that none of the currently available information provides a clear indication that the Commission's 2006 impact estimate is inaccurate.

In response, a suite of restoration efforts and mitigation measures was developed that, in combination, was found to adequately address the 137 acres of impacts to eelgrass associated with Coast's 300 acre operation. This suite of mitigation measures is discussed in the Commission's Adopted Findings for CDP No. E-06-003, incorporated by reference into this report, and includes eight primary elements. These include requirements that Coast (1) maintain its leases with the Harbor District, City of Eureka and Karamu Corporation (approximately 3,645 acres) until 2015 while it maintains a fixed 300 acre footprint and protects the remaining acreage from development of any kind; (2) transfer 50 acres of the tidelands it owns to an appropriate entity to provide permanent protection from development; (3) continue efforts to identify and minimize or eliminate sources of water pollution in Humboldt Bay; (4) operate its shellfish harvesting vessel in a way that minimizes potential impacts to eelgrass habitat; (5) avoid the intentional deposition of shell into the bay; (6) avoid all hydraulic harvesting activities; (7) pay one hundred thousand dollars ($100,000) to the California Coastal Conservancy for the purpose of habitat enhancement and fish passage improvement for federally- and State-listed anadromous fish species within the Humboldt Bay watershed; and (8) carry out a feasibility study to evaluate oyster cultivation at higher elevations in the bay where eelgrass habitat is limited.

As discussed in the adopted findings for CDP No. 9-15-1931, the Commission also considered these mitigation measures and Special Conditions to evaluate the benefits they provided and determine whether they met the Commission's expectations. The Commission concluded there was no clear

indication of a mitigation deficit or surplus. However, this conclusion has been questioned by several parties that have also reviewed the available information and believe that it suggests the impacts to eelgrass from Coast's existing operation estimated by the Commission had not been adequately addressed by the mitigation the Commission has previously required.

One of the challenges with evaluating this critique is that the Commission's 2006 findings did not clearly quantify the expected benefits to eelgrass that each element of the suite of mitigation measures was intended to provide. Because several of these elements provided out-of-kind or indirect mitigation, it is also not possible to measure the amount of eelgrass they contributed to Arcata Bay. Commission staff has therefore worked closely with Coast to address some of these questions and uncertainties surrounding the eelgrass mitigation from 2006 and how much of it would be appropriate to apply to Coast's current proposal. The result of this effort is reflected in Coast's proposed project.

Specifically, Coast is proposing several project elements that would reduce the adverse impacts to eelgrass from its operation such that those elements of its mitigation efforts from 2006 (those eight elements summarized above) that continue to provide benefits - in particular, the McDaniel Slough restoration work carried out with the $100,000 in funding provided by Coast, the permanent protection of over 50 acres of Coast's tidelands, and maintenance of its public and private leases so that they are not available for development – would adequately mitigate the impacts to eelgrass that the proposed project may cause. Those project elements that would minimize its impacts to eelgrass include: (1) the removal of 63 acres of existing cultivation beds from within eelgrass habitat (particularly the approximately 11.7 acres of the EB 7-2 cultivation bed that is surrounded by dense eelgrass habitat); and (2) the conversion of 20 acres of cultivation beds with densely-spaced aquaculture gear to more widely-spaced gear configurations (particularly within cultivations beds such as EB 6-1 that are surrounded by dense eelgrass habitat). Both elements would facilitate an expansion or recovery of eelgrass within them.

The Commission considered impacts to eelgrass within these 83 acres in 2006 (along with the remaining 192 acres of the operation considered to be located within eelgrass habitat) as it developed its total eelgrass impact estimate of 137 acres. To develop this estimate, the Commission assumed that the amount of eelgrass supported by an area in use for oyster cultivation would be approximately 71% less than the amount of eelgrass that would be present otherwise.[6] Therefore, removal and re-configuration of cultivation gear within these 83 acres would either eliminate or substantially reduce the estimated impact to eelgrass within them and therefore significantly lower the total operation's 137 acre impact estimate. The amount of reduction could exceed 41 acres[7], bringing the total operation's impact to eelgrass from 137 acres to as low as 96 acre, based on the assumption that the 20 acres reconfigured to have wider spacing of cultivation gear and the 43 acres in the Bird Island and Mad River areas proposed to be used for relocated cultivation beds with widely spaced double longlines and basket lines effectively eliminated impacts to eelgrass in those locations.

[6] More specifically, the Commission assumed that the 275 acres of Coast's operation that was located within eelgrass habitat would support 192 acres of eelgrass without the cultivation gear in place and only 55 acres with the gear in place, a difference of 137 acres.

[7] Applying the same assumptions used to develop the impact estimate of 137 acres, the 83 acres in which cultivation beds would be removed or reconfigured could change from supporting only 16.6 acres of eelgrass (20% cover) to supporting 58.1 acres of eelgrass (70% cover), a net increase of 41.5 acres.

These impacts to eelgrass would be further mitigated through Coast's conveyance of over 50 acres of tidelands for conservation; contribution of $100,000 in 2006 for wetland restoration; commitment for more than 19 years (from 2006 to 2025, as required through its former Harbor District Use Permit and **Special Conditions 1 and 2** of this permit) to preserve undeveloped roughly 93% the 4,313 acres of tidelands in Arcata Bay that it either owns or leases; elimination of dredging activities and intentional shell deposition; and continuing efforts to identify sources of water pollution in Humboldt Bay and implement repairs to minimize or eliminate it.

Additionally, **Special Condition 3** would require Coast to submit, for Executive Director review and approval, a revised version of the monitoring plan it developed for its formerly proposed expansion project (included as **Exhibit 13**). This monitoring plan was designed for Coast's prior project so would be revised to reflect the design of the currently proposed project and integrate appropriate survey and analytical techniques.

Despite this, several public commenters have recommended further measures to reduce or eliminate the impacts to eelgrass from Coast's operation. Specifically, letters have been submitted to the Commission and Commission staff identifying the need for all of Coast's existing operations within the eastern 2/3 of Arcata Bay (between 82 and 130 acres – depending on the inclusion or exclusion of the cultivation beds in the Sand Island area) to be removed and relocated at the Bird Island and Mad River areas or for all of Coast's cultivation equipment to be located no less than ten feet from all eelgrass habitat. Commission staff have carefully reviewed each of these alternative approaches and believes that the available information strongly suggests that they are infeasible and would trigger a range of adverse impacts to other coastal resources. For example, the relocation of all of Coast's existing operations into the Mad River and Bird Island areas would require nearly 150 acres in each area. This level of expansion in these two areas – particularly the Bird Island area – could not be achieved without placement of a significant acreage of cultivation beds within areas of dense eelgrass habitat that have not historically been used for shellfish cultivation. Whereas the relocation component of the proposed project was carefully designed and focused on sections of the Bird Island and Mad River areas that are adjacent to or between existing cultivation beds and have limited eelgrass habitat and lingering impacts from historic aquaculture uses, a more extensive relocation effort would exceed the limited number of these types of locations and push into areas of higher density eelgrass farther from existing cultivation areas and historic use sites. Accordingly, the potential benefits of such an effort would be muted – balancing protection of eelgrass habitat on one side of the bay with adverse impacts on the other. Instead, the Commission finds that the proposed project, as conditioned, would strike a more appropriate balance among impact avoidance, minimization, and mitigation by incorporating some relocation of cultivation beds outside of eelgrass habitat, some reconfiguration of cultivation beds to wider spacing within eelgrass habitat and several other previously discussed mitigation measures (such as the past restoration and conservation efforts and commitment to limit the project footprint).

Implementation of a ten foot avoidance buffer for all eelgrass habitat would be similarly infeasible or would trigger other significant trade-offs. For example, the vast majority of Arcata Bay supports eelgrass habitat or is within ten feet of eelgrass habitat including all of Coast's existing operations. Therefore, to achieve a ten foot buffer from all eelgrass habitat, all of Coast's existing cultivation beds would need to be removed, relocated, and placed into higher elevation tidal mudflats. As Coast has long stated, such an effort would not be feasible and would result in its use of areas that are not optimally suited for shellfish cultivation. Even if it could be accomplished, however, the

conversion of up to 300 acres of mudflats to cultivation beds would very likely trigger significant adverse impacts to the populations of shorebirds that rely on such areas. The Commission finds such conversion would not provide clear overall benefits to Arcata Bay's marine biological resources by this type of trading impacts to one species or habitat type with impacts to another.

In sum, Coast's proposed project, as conditioned, is expected to adversely impact approximately 96 acres of eelgrass habitat. The Commission finds that the proposed project, as conditioned, provides adequate mitigation for these anticipated 96 acres of impacts to eelgrass through the continued permanent protection of 50 acres of intertidal habitat; the creation of habitat enhancement in the McDaniel Slough area of Humboldt Bay; the protection of approximately 3,800 acres of Arcata Bay from aquaculture operations for the next eight years; the complete and timely removal of cultivation gear from beds that would be fallowed, removed, or abandoned; and the limitation of Coast's operation to the 279 acre footprint proposed within its application to be consolidated primarily within the Mad River and Bird Island areas that continue to show the legacy effects to eelgrass habitat of historic oyster cultivation practices.

Conclusion

With implementation of **Special Conditions 1 through 17**, Coast's proposed shellfish aquaculture operation in Arcata Bay would be carried out in a manner that maintains marine resources, provides special protection for species and areas of special biological significance, sustains the biological productivity of coastal waters, and maintains healthy populations of all species of marine organisms. In addition, the proposed project, as conditioned, will maintain the biological productivity of coastal waters appropriate to maintain optimum populations of marine organisms. The Commission therefore finds that the proposed project, as conditioned, is consistent with the marine resource sections (Sections 30230 and 30231) of the Coastal Act.

E. CULTURAL RESOURCES

Section 30244 of the Coastal Act states:

> *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

Archaeological resources protected under this Section include sacred lands, traditional cultural places and resources, and archaeological sites. As noted in the July 2016 RDEIR developed by the Harbor District for Coast's proposed expansion project, the cultural significance of Arcata Bay and the Humboldt Bay area is well established:

> *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.*

> *The Wiyot Tribe has used Humboldt Bay for ceremony, gathering and subsistence since time immemorial. The Wiyot Tribe considers Humboldt Bay's extensive eelgrass beds as a cultural landscape, as defined by California Public Resources Code Section 4.21074(a). In addition to being a vital resource to The Wiyot Tribe for subsistence, eelgrass also serves as a habitat for a variety of species of importance to The Tribe, including salmonids, Dungeness crab, Pacific herring, and other aquatic species. Additional, a variety of tribally important avian species including waterfowl (e.g. ducks, swan, and geese—especially black brant) and shorebirds (e.g. curlew), utilize eelgrass habitat and associated species (e.g. macroinvertebrates).*
>
> *Eelgrass beds thus form an important contribution to both the historical and contemporary cultural heritage of The Wiyot Tribe. In addition to the value of the eelgrass itself, which was used for cooking, the species it supports are essential to the Wiyot diet. Supported species also support other cultural practices; for example, waterfowl feathers are used to make regalia for ceremony, including the World Renewal Ceremony held on Tuluwat in the middle of Humboldt Bay. Impacts to eelgrass thus also impact The Wiyot Tribe's ability to engage in traditional subsistence hunting and fishing, as well as have an impact on regalia making and The Wiyot Tribe's ability to conduct ceremony.*

Based on the long history of Native American use and presence on and around Arcata Bay and the importance of the bay's marine ecosystem – in particular its eelgrass beds - as a valued cultural landscape, the proposed project raises two types of primary issues: (1) issues associated with the disturbance, degradation or loss of biological resources; and (2) issues associated with the degradation or disturbance of historic, archaeological or tribal cultural resources or sites.

Discussion of the proposed project's potential to adversely affect terrestrial and marine biological resources and measures to address those effects is primarily included in previous sections of this report and in the Commission's adopted findings for the previous CDPs and CDP amendments issued to Coast for its oyster and clam cultivation operations. In particular, the above sections and previous findings discuss effects to eelgrass habitat; native shellfish; marine, migratory, and wintering marine birds, shorebirds, and waterfowl; marine mammals; and fish species of special biological and economic significance.

Regarding potential adverse impacts to historic, archaeological and tribal cultural resources or sites, based on the discussion included in the RDEIR developed by the Harbor District for the expansion project that Coast had initially proposed, there are no identified or known historic, archaeological, or cultural resources within Coast's proposed project footprint. While such resources are unlikely given the intertidal and subtidal operation areas and the siltation that is continually occurring in these areas, the placement, replacement, and removal of aquaculture equipment such as posts, stakes, anchors, or supports could potentially disturb previously undiscovered or unknown historic, archaeological or tribal cultural resources. Additionally, such resources could be discovered or uncovered by culturists when working in intertidal areas or through vessel scour and wash associated with the use of skiffs and support craft.

To address these potential discoveries and help ensure that cultural resources are appropriately protected through notification and consultation with tribal representatives, **Special Condition 19** would require Coast to maintain an established point of contact to be used in the event any cultural or archaeological resource, human remains, or Native American grave goods are discovered

during its aquaculture operations. While a point of contact has already been established, **Special Condition 19** would ensure that if Coast changes this contact, the contact information for this new individual would be provided to agency staff and the Tribal Historic Preservation Officers appointed by the Blue Lake Rancheria, Bear River Band of Rohnerville Rancheria and Wiyot Tribe, thus providing a consistent and established source for communication and coordination work in the event a discovery is made. Further, **Special Conditions 20 and 21** would establish a series of notification, protection, and response protocols to be followed in the event a discovery is made. The process required through implementation of these three special conditions was initially developed by the Harbor District in consultation with representatives of the Wiyot Tribe during the development of the RDEIR. The Tribe's subsequent letter to the Harbor District acknowledged its support for the condition language. Because this language was modified slightly by Commission staff for application here and because Commission staff was not aware of input from the other two area tribes on the condition language, Commission staff reached out directly to representatives of the Blue Lake Rancheria, Bear River Band of Rohnerville Rancheria, and Wiyot Tribe regarding the conditions and modifications. None of these representatives expressed concern with the inclusion of these special conditions in this recommendation or requested revisions to them.

However, in a letter sent by the Chair of the Wiyot Tribal Council to the Army Corps of Engineers on May 2, 2017 (Wiyot Letter) regarding the expansion project that Coast had initially proposed, several additional concerns are raised about the proposed project's potential to adversely affect cultural resources:

> *The rack and bag area* [proposed to be] *located in mudflats of the northeast portion of Indian Island, and identified during your visit should be removed from consideration for development. Its proximity to Tuluwat suggests that it would have a heightened potential for impact to the archeology of the site. Furthermore, Tuluwat is an active ceremonial location. Oyster cultivation at that location would impact privacy, and thus the ability of tribal members to conduct ceremony and engage in traditional practices at that site.*
> …
> *Central of the Wiyot Tribe's existence are the native mussels and clams many of which were harvested in the bay. These species include, but may not be limited to, geoduck clams, butter or Washington clams, mussels, and little neck clams. The importance of these species as a food resource can be seen in the volume of shells at most village sites, which are typically referred to as shell mounds or middens. They also serve as an important archeological marker for other archeological locations, such as fish camps or seasonally occupied locations. In addition to the dozens of shell mounds and other sites that encircle, or are within the environs of the bay, the shells were also used to decorate ceremonial regalia, clothing, jewelry, and other cultural items.*
>
> *They have also been an important protein source for Tribal citizens in the historic era. For example, they served as a readily available source of sustenance during difficult times, such as when Tribal citizens were held against their will at the North Spit Reservation. They remain a popular source of subsistence gathering, as well as recreational and cultural support for current Tribal citizens.*
>
> *We were therefore disappointed when the Harbor District did not make the monitoring of such bivalves a requirement of the ad hoc committee. These species are part of the history*

> *and ongoing culture of the Wiyot people and the human environment as defined in 40 CFR 1508.14 and are a tribal cultural resource as defined in Section 21074 of the California Public Resources Code. The Tribe understands that there are numerous challenges to ongoing health of native bivalves, including, but not limited to, climate change, ocean acidification, urban development, and pollution. The addition of large numbers of a non-native commercial bivalve into the bay is likely to add pressure to the native bivalve populations.*
>
> …
>
> *We are also concerned that the use of space has not been optimized in this project. We understand that there are areas that are currently permitted for oyster mariculture, and have the existing infrastructure in place that would allow them to be used. However, we understand that they are not currently in use. Furthermore, we have been informed by the Coastal Commission that areas that have not been used since the 1990s retain visible impacts associated with historical oyster farming. We have confirmed this with a simple examination of the bay using Google Earth. We understand that both currently permitted areas that are not being used and areas that retain visible impacts to the benthic layer of the bay from previous maricultural practices may not be as useful for current practices. However, we hope that full consideration is given to these spaces before expansion is allowed into unimpacted areas of the bay. We also ask that mariculture infrastructure be removed from unused areas before new areas are open for development.*

To address the concern of the Wiyot Tribal Council over the four acres of rack-and-bag cultivation gear Coast had formerly proposed on the intertidal mudflats near the northern end of Indian Island, Coast has eliminated this concept from its current project and has also removed and is not proposing to replant or re-install an additional 6.5 acres of its existing cultivation beds at Indian Island. Both of these areas were near the village of Tuluwat, a culturally significant site owned by the Wiyot Tribe on Indian Island that is designated as a National Historic Landmark (CA-HUM-67). This modification would eliminate a potential source of interference with its ongoing ceremonial use.

The second issue noted in the Wiyot letter, the potential for adverse impacts to occur to populations of native bivalves within Arcata Bay as a result of Coast's proposed planting of several million non-native oysters and clams, is discussed in more detail in the marine resources section of this report. To help ensure that these effects are less likely to occur and are limited in scale, Coast has proposed to reduce the overall scale of its proposed project and to further consolidate it within the bay.

In addition, the Commission is also requiring **Special Condition 17** as an additional assurance against adverse impacts to the bay's native bivalve populations and infaunal communities. This condition requires Coast to implement precautionary measures to help prevent the accidental release of non-native clams into the bay and to limit its cultivation of non-native clams to only juvenile or immature clams that are not capable of reproducing. Whereas the oyster species that Coast proposes to cultivate are not able to successfully spawn in Arcata Bay due to the low water temperatures, the clam species it cultivates have been shown to be capable of establishing self-sustaining naturalized populations (as discussed in more detail in the Commission's findings for CDP No. E-02-005 and its associated amendments).

With the proposed reduction and consolidation of Coast's operation and implementation of **Special Conditions 2 and 17**, the potential for adverse impacts to native bivalve populations would be sufficiently reduced so as to not require additional monitoring.

The final issue raised by the Wiyot letter, Coast's inefficient or incomplete use of its existing permitted operational footprint, would also be addressed through Coast's proposal to further consolidate its operations, including by removing 63 acres from the central and eastern portions of the bay and relocating approximately 42 of these acres into areas with "legacy impacts" from its historic operations. In addition, **Special Condition 9** would help address the abandonment of cultivation gear within beds by requiring all cultivation gear to be removed from any cultivation bed that would be out of use for six or more months, and by establishing a more strict and enforceable process for ensuring that removal of cultivation gear is carried out completely.

Conclusion

With implementation of **Special Conditions 2, 9, 17, 19, 20 and 21**, Coast's proposed aquaculture operation in Arcata Bay would include mitigation measures to address potential adverse impacts to archaeological or paleontological resources. The Commission therefore finds the proposed project, as conditioned, consistent with Section 30244 of the Coastal Act.

G. COASTAL ACCESS AND WATER ORIENTED RECREATION

Section 30210 of the Coastal Act states:

> *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Section 30220 of the Coast Act states:

> *Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

Section 30222.5 Oceanfront lands; aquaculture facilities; priority

> *Oceanfront land that is suitable for coastal dependent aquaculture shall be protected for that use, and proposals for aquaculture facilities located on those sites shall be given priority, except over other coastal dependent developments or uses.*

Section 30224 of the Coast Act states:

> *Increased recreational boating use of coastal waters shall be encouraged, in accordance with this division, by developing dry storage areas, increasing public launching facilities, providing additional berthing space in existing harbors, limiting non-water-dependent land uses that congest access corridors and preclude boating support facilities, providing harbors of refuge, and by providing for new boating facilities in natural harbors, new protected water areas, and in areas dredged from dry land.*

Water-oriented recreation activities in and around Arcata Bay include boating, paddling (e.g., kayaks, canoes, and stand-up paddleboards), fishing, clamming, birdwatching and nature enjoyment, walking and hiking, beach play, and enjoyment of scenic views. Additionally, recreational hunting for waterfowl and wintering black brant also occurs throughout Arcata Bay during the permitted seasons. Hunting is generally conducted using boats, sculling in a low-profile skiff, walking along levees, and using temporary or permanent blinds along the shoreline. Hunting

is allowed during the State of California waterfowl hunting season, which is generally October 10 through January 22 for ducks, and a variable period between October 10 and March 10 for geese, depending on the species. The hunting season for black brant on Arcata Bay is typically restricted to approximately 14 days (Holidays, Wednesdays, Saturdays and Sundays) between November 15 and December 15. Commonly used public boating access points are limited to three locations in the south-east area of the bay near Eureka and several more in the north-west near the Mad River Slough.

Among the water oriented recreation activities that take place in Arcata Bay, those most susceptible to adverse impacts from Coast's proposed aquaculture operation are boating and navigation, waterfowl hunting, and black brant scull hunting. An excerpt from correspondence provided to Commission staff during its review of Coast's prior proposal to expand operations from a member of the waterfowl hunting community, Mr. Stan Brandenberg, provides a description of the scull boat hunting method and summarizes a variety of conflicts that exist between this type of recreational activity and Coast's existing operations:

> *Scull boats were developed on Humboldt Bay over 100 years ago and whose design is referred to as the Humboldt Bay Scull Boat design by hunters around the world.*
>
> *Sculling remains an active and popular sport in north Humboldt Bay. Waterfowl hunting takes place in winter months when conditions can change quickly, and safety is always a first priority. This method uses a scull boat that incorporates some specific defining features necessary to sneak up on birds for hunting. First, the boat must be un-motorized, and be designed to allow a person to row while lying down. Second, the boat is designed to minimize the profile of the watercraft and be as low to the water as possible.*
>
> *These design features enable hunters to get right up to the ducks and brant they are pursuing, though require constant re-evaluation once in the water regarding tacks and the possibility of deteriorating conditions. For a successful hunt, a hunter must be able to row long distances while lying down, often in low light conditions or in marginal weather, to get from the put in to the area for hunting. Areas hunted on a given day depend on where the birds are located, tides, what the weather and wind is doing, where other hunters are located, and other factors dependent on the conditions of the day. This method of sport also provides a unique and important coastal dependent recreational activity that cannot be provided in inland waters (§ 30220 CA Coastal Act). This recreational activity must be protected from further industrialization of the bay by oyster farms, and our concerns regarding ongoing operations must be addressed to ensure access to public trust resources and ensure the sport can continue in a safe manner.*
>
> *We believe the concerns from the waterfowl hunting community were not considered during the last round of permitting for Coast Seafoods operations 10 years ago. We have the following concerns and recommendations:*
>
> *• When Coast Seafood went from on-bottom to off-bottom methods they inadvertently took away one of the most popular and utilized hunting areas in north Humboldt Bay. The oyster farm areas operated by Coast Seafoods in the north-west area of the bay, next to the Mad River Slough channel, were once a great place to hunt. With the addition of extensive off-bottom gear, this area is no longer available to hunters or to recreational boaters and requires a much longer tack to get around the existing gear. This severe decrease in safety and the taking of area from hunters and other recreational users for corporate aquaculture uses was never considered in the previous permitting process. As we don't feel we can*

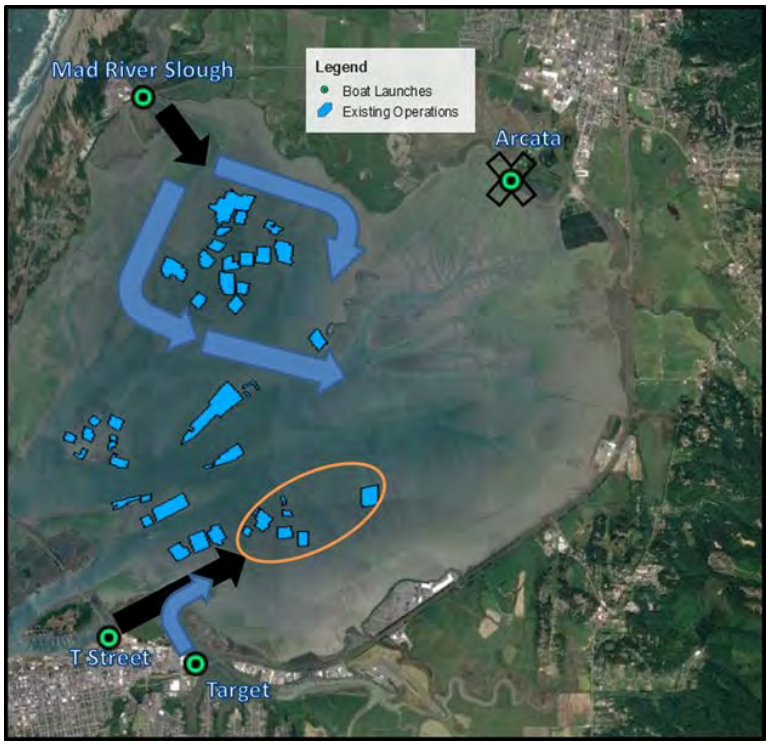
realistically regain this area back, we ask that you enhance our ability to utilize other frequented areas in North Bay for hunting. Of importance is the area circled in orange in the attached picture. Removing operations from this area would enhance our safety when utilizing the T-Street and Target boat launches to get to North Bay in general, and would greatly enhance our access to productive hunting grounds from any access point.

• Coast Seafood operators often disrupt our hunts. We are limited to only certain days per year to hunt Brant and other waterfowl. During those times, Coast Seafood boats have often (seemingly purposefully) flushed birds we were trying to hunt and sometimes even come dangerously close to our scull boats. They have shown blatant disregard for our sport and our safety. We ask that Coast Seafood boats be disallowed in north Humboldt Bay during brant season during daylight hours.

• The current operations should be consolidated as much as possible to allow recreational hunting and boating. We recommend consolidating operations in the west side of the bay to give recreational boaters, kayakers, windsurfers, stand-up paddle boarders, and hunters access to the east side of the bay for use and enjoyment of the bay. No operations should occur east of the Arcata Channel. This would provide much needed access for the people of the state to the public trust resources you protect.

• In addition, the view-shed of the bay has been significantly diminished due to the gear visible at low and high tides. When we hunt or otherwise recreate in north bay our use and enjoyment of the area is severely diminished due to the wide-spread PVC pipes and other gear visible at all tides. This severely reduces the beauty of the bay and ruins the scenic vistas that previously existed. To address this we ask that you greatly consolidate operations as described above.

The footprint of Coast's operations relative to the size of Arcata Bay available for waterfowl hunting and other recreational activities suggests that both types of uses could reasonably be accommodated. However, as the figure included here from Mr. Brandenberg's letter indicates, not all areas of the bay are of equal value and importance to recreational users. For example, access points and routes (noted in the figure with circles and arrows), subtidal channels, deeper intertidal areas, and productive hunting areas are not spread equally and abundantly throughout the bay. Similarly, not all areas present viable options for productive shellfish cultivation. The conflicts that have developed between the recreational community and Coast's operations are a result and indication of the scarcity of some of these features around the bay. At least some of these conflicts have arisen as a result of Coast's conversion to off-bottom culture in the early 2000s



– which caused its culture beds to extend several feet above the substrate, thus presenting an obstacle to safe navigation at a larger range of tidal heights. In authorizing the permit amendments for its existing operation (E-02-005-A5 and E-06-003-A5) last February, the Commission found although Coast's existing operation makes use of a system of marking stakes for its oyster beds and nursery areas, this system appears to have been primarily focused on facilitating internal operations rather than aiding public users of the bay to safely avoid and navigate around the potential hazards posed by the culture beds. The Commission found that a clearer, uniform, systematic and more easily understandable system of markers would likely alleviate some of the navigation and boating conflicts that are occurring with Coast's existing operation. Additionally, the Commission also found conflicts with hunting could be minimized by limiting Coast's operations during the short several week long brant hunting season.

The Commission required, through Special Condition 11 of CDP No. E-06-003-A5, that Coast implement a Mapping and Marking Plan that includes the use of uniform marking stakes or posts that (1) remain visible and above water during maximum tidal heights; (2) are topped with reflective material; (3) identify the side of the stake on which the culture bed is located; and (4) are placed every 200-feet along the outer sides and at each corner of each of Coast's active culture beds. In addition, the plan calls for a method for Coast to develop, consistently update, and distribute digital and hard copy maps of Arcata Bay showing the location of its rafts and culture beds. Coast has submitted this plan for review and although it now needs to be revised to reflect the current project configuration and design, it is included as **Exhibit 10** for reference.

In addition, the Commission required the inclusion of Special Condition 12 in CDP No. E-06-003-A5 to require Coast to limit its operations within the areas of the bay with the highest levels of hunting use during the days in which brant hunting is allowed on Arcata Bay (typically only Wednesdays, Saturdays and Sundays between November 15 and December 15; usually 14 total days).

While the Commission found that Special Conditions 11 and 12 of CDP No. E-06-003-A5 were adequate to address the ongoing conflicts between Coast's existing operation and public recreational uses of Arcata Bay, this finding was opposed by recreational users at that time and additional information provided to Commission staff subsequently has substantiated this opposition.

The common themes raised by recreational users concerned about Coast's proposed project include the continuing presence of cultivation beds within the area east of the Arcata Channel – in other words, those approximately 130 acres of cultivation beds outside of the Bird Island and Mad River areas, the conversion of cultivation bed EB 6-1 from longlines to basket lines, and the limitation of Special Condition 12 to only the brant season instead of the longer waterfowl or duck hunting season (typically three days a week between mid-October to mid-January rather than mid-November to mid-December).

Regarding the conversion of cultivation bed EB 6-1 to baskets, the concern is that with a line height of approximately three feet and a post height of over five feet, basket lines are the highest type of gear that Coast proposes to use. As noted in the comments from Mr. Brandenberg included above, the height of the cultivation gear directly affects the severity of its impact on navigation because the higher the gear is, the greater the tidal height must be to allow safe passage over or among it. Because Arcata Bay is such a shallow water body, those types of elevated tidal heights are often

sporadic and limited in duration. Therefore, the proposed conversion of 7.8 acres from longlines placed 12 to 18 inches about the substrate to basket lines placed three to five feet above the substrate would negatively affect navigation across this area and use of adjacent areas. As several recreational users have noted to Commission staff through recent email correspondence, this conversion would worsen the impacts to recreational users that already occur in this area due to the presence of the existing longlines and one acre of existing basket lines.

At the same time, however, existing recreational use of this area is already limited by the existing cultivation equipment and aquaculture activity. In other words, the existing condition may not be one that is well suited to recreational use. Cultivation bed 6-1 is surrounded on nearly all sides by six other smaller cultivation beds that present similar challenges to navigation and recreational use. Anecdotal information presented to Commission staff suggests that despite the presence and use of these beds, the area does support hunting and other recreational uses. Additionally, with Coast's proposal to eliminate use of and remove cultivation bed EB 7-2 and all of the roughly 50 acres of cultivation beds in the central portion of Arcata Bay, Coast's operational footprint would be significantly consolidated and scaled back. These two aspects of the proposal would eliminate Coast's activities within the center of the bay and shift westward by one half-mile the eastern extent of its operations in the east bay. Large areas of Arcata Bay would therefore become more accessible and better suited for recreational use than they currently are, including the eastern area of the bay.

During the review of Coast's previous proposal to expand its operations in Arcata Bay, the importance of this area for recreational use was heavily stressed to Commission staff from a variety of recreational users, interested parties and agency staff. It was identified as one of the highest priority use areas for recreational hunting on Arcata Bay and discussed in correspondence as "of critical importance to recreational hunting because it is where the majority of traditional, historic waterfowling occurs in North Humboldt Bay." Estimates were provided that during the hunting season, the area around the EB 7-2 cultivation bed is estimated to support a minimum of 50 hunters per day. Although that level of use has not been documented or independently confirmed, the point raised is that this section of Arcata Bay, located furthest from the majority of Coast's operations, is an important area for recreational uses that may conflict with Coast's on-water activities and development.

While this area is difficult to easily reach, the wildlife and habitat resources it supports and relative absence of shellfish cultivation there appear to draw members of the public to seek it out. As such, existing and continued use of this area for Coast's operations – primarily through the use of its approximately 11 acre cultivation bed referred to as EB 7-2 – was considered to be limiting recreational opportunities there due to concerns about navigational safety (resulting from collisions between vessels and aquaculture gear that may be submerged or partially exposed) and disturbance to recreational users from Coast's periodic maintenance visits, inspections, and planting and harvest activities. Coast's proposal to limit operations in this area over time would eliminate these sources of conflict and provide a large area of the bay free from shellfish cultivation activities and more fully available for wildlife, habitat, and recreational uses.

In addition to the steps that Coast has taken to reduce conflicts with recreational users through the design of its project, additional measures are also available to facilitate continuing recreational use of Arcata Bay. An example is the requirement in **Special Condition 11** that Coast develop a revised bed marking and mapping plan (similar to the one described above a part of CDP No. E-06-

003-A5 but updated to include the currently proposed project configuration). This would further accommodate multiple uses of the bay and reduce the likelihood that the presence and use of Coast's cultivation beds would result in the loss of recreational resources.

In addition, to address the concerns raised by the recreational hunting community about disturbance from Coast's on water operations and vessel use, a modified version of the requirement from Special Condition 11 of CDP No. E-06-003-A5 would be carried forward as **Special Condition 12** to limit Coast's operations within the bay during the days in which brant hunting is allowed on Arcata Bay (typically only Wednesdays, Saturdays and Sundays between early November and mid-December; usually 14 total days). Although this limitation would severely restrict Coast's operations during this time of the year, the timing and duration of this restriction would be very limited.

Conclusion
Under this coastal development permit, Coast would be able to pursue its proposal to reduce and consolidate its operations, consistent with Coastal Act Section 30222.5. And with implementation of **Special Conditions 2, 11 and 12,** the Commission finds the proposed project consistent with Sections 30210 and 30220 of the Coastal Act.

H. CUMULATIVE IMPACTS
In addition to Coast's proposed operations, a variety of other shellfish aquaculture operations have been recently authorized by the Commission in Humboldt Bay or are in advanced planning stages. Recently authorized operations include three onshore shellfish nurseries and associated in-water "grow-out" facilities (one each for Coast, Taylor Shellfish, and Hog Island Oyster Company; CDP Nos. 9-16-0033, E-11-029, and 9-13-0500, respectively) and approximately 21 acres of additional subtidal areas authorized to be used by the Humboldt Harbor District or its designees for floating shellfish cultivation systems and rafts (CDP No. 9-16-0204). Projects in advanced planning stages include a proposal by Mr. Jerry Yeung and another by the Humboldt Harbor District that would result in a combined total of approximately 329 acres of intertidal shellfish cultivation operations in Arcata Bay (as shown in **Exhibit 11).**

Although many of the potential coastal resource concerns raised by the recently permitted onshore and subtidal operations are different than the primary issues raised by the intertidal operations proposed by Coast, Mr. Yeung and the Harbor District, one issue they have in common is the bay's carrying capacity or ability to support extensive populations of cultivated non-native shellfish without adversely affecting native species that rely on similar sources of food.

This was briefly addressed by the Commission in its findings for the Harbor District's subtidal project (CDP No. 9-16-0204):

> *Based on an analysis carried out in the Project Description and Biological Analysis developed for the Harbor District for this project by its biological consultant, each day, the clam and oyster seed proposed to be cultivated on the nursery rafts and FLUPSYs would have a 14-day clearance efficiency of between 0.022 and 0.042. Clearance efficiency (CE) is a measure of how effectively shellfish can process bay water during feeding compared to the efficiency of tidal flushing. For reference, Gibbs (2007) states that "very low values of this indicator (<0.05) suggests that the culture will not be able to induce significant changes to the pelagic functioning" (i.e., connectivity between an embayment and nearby coastal*

areas). In contrast, CE values greater than 1.0 indicate that water in the bay is flushing slower than the water is being processed by cultured shellfish. Based on the calculations of CE carried out by the Harbor District's biological consultant, the shellfish that would be produced by the proposed project would filter a fractional amount of the total volume of water in Arcata Bay at high tide and the volume of water that leaves Arcata Bay at ebb tide each day.

Calculations of several other carrying capacity or sustainability indicators carried out by the Harbor District's biological consultant provide similar indications that the filtration effect of the shellfish cultured from this project would remain well below the potential carrying capacity of the Humboldt Bay system. If the project is considered cumulatively along with other existing aquaculture operations in Humboldt Bay, the total filtration effect also appears to remain below a level that may adversely affect the biological productivity of non-cultured organisms within the Humboldt Bay ecosystem. However, as future largescale expansion of shellfish aquaculture in Arcata Bay or Entrance Bay is considered, this combined filtration effect would need to be more closely considered.

Using this same measure of carrying capacity – clearance efficiency (CE) – and reviewing the carrying capacity analysis included as Appendix G to the Harbor District's R-DEIR for Coast's existing operations (a rough equivalent to the current proposal), the combined effect of all of the different shellfish cultivation projects is greater. Specifically, the carrying capacity analysis estimates a CE of between 0.24 and 0.46. This remains well short of the 1.0 value that indicates cultured shellfish are filtering the bay's waters more quickly than they can be flushed and replaced with new water from tidal action. Additionally, this estimate is likely high because the carrying capacity analysis included in the R-DEIR was completed in October of 2015 when the Harbor District was proposing intertidal operations in Arcata Bay that were several times larger than its current proposal. Additionally, the CE values of 0.24 to 0.46 represent estimates that assume a replacement time of 14 days for the waters of Arcata Bay. This is acknowledged as a conservative estimate, and a shorter replacement time may be more accurate. The effect of a shorter replacement time on the CE value would be significant – for example, a replacement time of seven days rather than 14 would halve the estimated CE value. The carrying capacity analysis also acknowledges several other caveats or sources of potential error or overestimation, including by not incorporating nutrient deposition by cultured shellfish and the effect that this may have on promoting phytoplankton populations. In other words, to some degree, cultured shellfish provide nutrients that can trigger the growth of their food sources.

At the same time, however, the carrying capacity analysis may also be underestimating the effect of Humboldt Bay's shellfish aquaculture operations because it does not appear to include all of the existing operations – for example, the onshore nursery facilities that are run by Coast, Taylor Shellfish, and Hog Island Oyster Company, and rely on the removal of significant quantities of seawater from the bay. It also must be acknowledged that this type of carrying capacity analysis has rarely been done before and therefore its results should be used somewhat cautiously. While the work included in the appendix to the R-DEIR was reviewed and supported by a technical team of aquaculture specialists at NOAA, it is likely that this type of work will continue to be refined over the next several years, as more powerful modeling tools are developed and more robust and accurate estimates of the key biological and oceanographic attributes upon which the model is built become available (for example, the replacement rate of water in Arcata Bay). This suggests that until greater information is available and given the relatively high clearance efficiency (CE) values

for Coast's project in combination with other shellfish aquaculture operations in Arcata Bay, it would be appropriate to ensure that further aquaculture development in this area proceed at a measured pace and modest scale. Coast's proposal to reduce and consolidate its operations in Arcata Bay represents an appropriate first step in that direction.

In addition to the cumulative effect of Coast's project and other shellfish aquaculture projects in Arcata Bay on phytoplankton populations, these projects also have the potential to result in cumulative or additive effects on other types of marine resources. For example, the approximately 329 acres of intertidal shellfish cultivation operations proposed by Mr. Yeung and the Harbor District would be expected to affect several of the same sensitive wildlife species, populations, and habitats that may be affected by Coast's proposed project. In particular, the proposed location for over half of these other projects is within the far east portion of the east bay, higher in the intertidal mudflats within an area known to support extensive populations of migratory shorebirds.

Coast's proposed project combined with these other two would result in approximately 608 total acres (279 acres + 329 acres) of intertidal shellfish cultivation within Arcata Bay, roughly doubling the amount of area currently being used. Although the proposals by Mr. Yeung and the Harbor District would largely be located in tidal flats that have higher elevations and do not support the high densities of eelgrass found within Coast's proposed footprint, these projects have raised a variety of concerns similar to those discussed above with Coast's project regarding disturbance and lost or reduced foraging opportunities for migratory waterfowl (such as black brant) and shorebirds. As noted in its June 2, 2017, letter to Commission staff from the U.S. Fish and Wildlife Service regarding Coast's former expansion proposal, these impacts would be in addition to ongoing disturbance to wildlife resulting from the increasing use of Arcata Bay by the general public:

> *Finally, there are the cumulative impacts. This project alone proposes a significant areal impact on eelgrass, and therefore, as documented above, brant. There are also other project proposals in the works to allow additional aquaculture in North Bay along the west shore of Indian Island and in the NE portion of North Bay. In addition to these proposed aquaculture projects and their impacts is the ever increasing disturbance from increasingly popular recreational activities (ie. touring and fishing kayaks, kiteboards, paddleboards, jetskis, etc.) which occur throughout the bay.*

The Pacific Fisheries Management Council has raised similar concerns. In light of these potentially additive cumulative effects from ongoing and proposed aquaculture projects and other activities in Arcata Bay, the Commission found in its denial of Coast's expansion proposal that it would be appropriate for Coast's operations to be reduced, consolidated, and carried out incrementally with a close evaluation of impacts and the success of resource protection and mitigation measures. Coast's current proposal for a smaller-scale project, 2/3 of which would be consolidated within the western portion of bay that retains the legacy effects of historic use and provides less robust habitat and wildlife resources is consistent with that direction from the Commission.

I. ATTORNEYS COSTS AND FEES

Coastal Act section 30620(c)(1) authorizes the Commission to require applicants to reimburse the Commission for expenses incurred in processing CDP applications. *See also* 14 C.C.R. § 13055(e). Thus, the Commission is authorized to require reimbursement for expenses incurred in defending its action on the pending CDP application. Therefore, consistent with Section 30620(c), the Commission imposes **Special Condition 22**, requiring reimbursement of any costs and attorneys

fees the Commission incurs "in connection with the defense of any action brought by a party other than the Applicant/Permittee … challenging the approval or issuance of this permit."

J. CALIFORNIA ENVIRONMENTAL QUALITY ACT

Section 13096 of the California Code of Regulations requires Commission approval of a coastal development permit application to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

As discussed in detail above, the proposed project includes twenty-one special conditions imposing numerous requirements that will minimize and mitigate the anticipated adverse environmental effects caused by the proposed project. As conditioned, there are no feasible alternatives or additional feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, is the least environmentally damaging feasible alternative and complies with the applicable requirements of the Coastal Act to conform to CEQA.

Appendix A: Detailed Description of Coast's Oyster Cultivation Methods

Longlines
Coast's oyster longline practice (also known as cultch on longline) would involve the placement of nylon or polypropylene ropes on notched PVC stakes that are arranged in 100-foot long rows on the mudflats. Included at regular intervals on the ropes are clusters of empty oyster shells onto which groups of small oysters are seeded. The rope and shell clusters are suspended approximately one foot above the bay bottom. Long-line spacing within Coast's existing operation area varies from bed to bed, but most beds have five long-lines spaced 2.5 feet apart, with a ten-foot space between each group of five lines. As initially required by the Commission through Special Condition 14 of CDP No. E-06-003-A5 and again required through **Special Condition 15** of this permit, those beds within Coast's existing operation that are more densely planted would be required to be reconfigured to meet this spacing. Within Coast's proposed 42 acres of relocated operations and its 20 acres of reconfigured or converted operations, the spacing of longlines would be less dense. These areas would include 46 acres of cultivation baskets installed and used as detailed below and XX acres of paired longlines. The paired longline configuration would include sets of two lines directly adjacent to one another at different heights and separated from the next set by a ten-foot wide corridor**. Exhibit 3** presents a graphic showing the design of the long-line culture apparatus and the proposed configuration of lines within cultivation beds in both the existing operation area and expansion area.

A crew of six would typically by used to "plant" or install the long-line ropes when the tide is low enough to allow the crew to walk on the bed. Each bed would then be inspected monthly as part of a maintenance survey but would otherwise remain untouched for roughly 18 to 36 months until the bed is ready for harvest. A bed inspection or maintenance survey would typically involve one or two people walking a small portion of the bed at low tide or floating over it at higher tides to verify that lines are in the stake notches and suspended above the bay bottom. During these inspections, lines that have collapsed would be restored and loose gear or debris would be removed.

Long-line beds are proposed to be harvested by Coast at 18 to 36 months, using one of two harvest methods. Hand-picking would involve walking each longline in the bed at low tide, cutting the line by hand into small lengths around the clumps of oysters and filling 20-bushel tubs with the oysters and lengths of rope. These tubs would be temporarily stored on the mudflat between tidal cycles during harvest. The second method would use a long-line harvester and would involve positioning a scow over the bed at high tide, then pulling the lines into the floating scow either by hand or by means of a hydraulically-operated roller. Whenever feasible, the long-line harvester would not come into contact with the bay bottom while harvesting long lines.

Baskets
For the past several years, Coast has also been cultivating oysters within its existing operation using a basket on longline technique. Coast carried out an unpermitted conversion of several acres of its operation to this technique and later followed Commission staff direction to seek an after-the-fact CDP amendment to authorize its use. The Commission approved this amendment (E-06-003-A1) in 2013 for the use of 492 individual baskets on 10.86 acres. In its proposed project, Coast would expand its use of this cultivation method and would implement it in approximately 46 acres. This would be accomplished by Coast's continuing use its existing 10.86 acres, its conversion of several dozen additional acres from traditional densely-spaced longlines to baskets on longlines, and its relocation of densely-spaced longline cultivation beds from sensitive resource

areas and replanting into less sensitive areas as baskets on longlines. Basket on longline culture would involve the use of 100-feet of enclosed monofilament line stretched between metal stake anchors and elevated above the substrate by two-inch diameter PVC pipe posts installed every 10-feet. Plastic mesh baskets (roughly two-feet long by one-foot wide) fitted with floats and filled with oysters would be hung from the monofilament line with plastic clips and held one-foot above the substrate. Each 100-foot longline would support 40 baskets and the lines would be arranged in one of two configurations (as shown in **Exhibit 3**): (1) groups of three lines spaced three-feet apart and separated from the next group of three lines by a 20-foot wide corridor; or (2) groups of two lines spaced nine feet apart and separated from the next group of two lines by a 16-foot wide corridor. The more dense configuration with groups of three lines would be limited to the 10.86 acres of Coast's existing operation that are currently planted this way. The other acres (relocation areas and areas converted from 2.5 foot spaced longlines) in which basket culture is proposed to be used would be installed with the more widely spaced configuration.

Based on Coast's estimates, planting, harvest, inspections, and maintenance activities would be approximately six times more frequent for the basket lines compared to traditional longlines. Coast estimates, however, that many of these visits would be carried out from a boat during higher tides. Roughly every four months, Coast would remove the baskets for sorting and harvest. The lines and stakes would remain in place during harvest.

Appendix B: Substantive File Documents

Coastal Development Permits and Application Materials:

Project File for Coastal Development Permit Application No. 9-17-0646

Project File for Coastal Development Permit number E-02-005-A6

Project File for Coastal Development Permit number E-06-003-A5

Project File for Coastal Development Permit number 9-15-1931

Revised Staff Report for Coastal Development Permit number 1-96-69

Notice of Immaterial Permit Amendment for Coastal Development Permit number E-02-005-A1

California Coastal Commission, Final Adopted Findings for Coastal Development Permit number 9-15-1931, 2017

California Coastal Commission, Final Adopted Findings for Coastal Development Permit number E-06-003, 2006

California Coastal Commission, Final Adopted Findings for Coastal Development Permit Amendment Application number E-06-003-A1

California Coastal Commission, Final Adopted Findings for Coastal Development Permit number E-02-005-A2, 2012

California Coastal Commission, Final Adopted Findings for Coastal Development Permit Amendment Application numbers E-06-003-A5 and E-02-005-A6, 2017

Environmental Documents:

Humboldt Bay Harbor, Recreation, and Conservation District, *Final Environmental Impact Report for Coast Seafoods Company Humboldt Bay Shellfish Aquaculture Permit Renewal and Expansion Project Humboldt County*, California, February 2017. + Appendices.

Humboldt Bay Harbor, Recreation, and Conservation District, *Recirculated Draft Environmental Impact Report for Coast Seafoods Company Humboldt Bay Shellfish Aquaculture Permit Renewal and Expansion Project Humboldt County*, California, July 2016. + Appendices.

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