



October 5, 2020

Mr. Adam Wagschal
Deputy Director
Humboldt Bay Harbor, Recreation and Conservation District
601 Startare Drive
Eureka, CA 95501

Dear Mr. Wagschal,

On behalf of the undersigned organizations, thank you for considering the following comments on the Draft Environmental Impact Report ("DEIR") for Harbor District's ("District") Draft Environmental Impact Report for the Humboldt Bay Mariculture Intertidal Pre-Permitting Project and Yeung Oyster Farm in Humboldt Bay, California ("Project"). For the reasons explained below, we oppose the proposed Project.

We disagree with the DEIR's conclusions that the Project would have less than significant impacts on numerous resources. Contrary to the DEIR's conclusions, the project is likely to have very significant impacts on shorebirds, waterbirds, protected habitats, visual resources, and recreational access and safety. The DEIR fails to accurately analyze or describe the likely impacts this project would have on the environment, including sensitive species and habitat

protected under state and federal law and policy. In particular, we disagree with the DEIR's assertion that the project would have less than significant impacts on eelgrass, shorebirds, Black Brant, other migratory waterfowl, and aesthetic and visual resources. In addition, numerous analyses, such as impacts on recreation and vessel safety, are missing.

The mitigation measures the District proposes are entirely inadequate to render these effects less than significant. In addition, the DEIR's inaccurately asserts that the project would not conflict with local policies and ordinances protecting biological resources, or with approved local, state or regional habitat conservation plans.

Among the DEIRs many deficiencies is the failure to include a map and area calculations of the percent of Arcata Bay already developed for aquaculture, for the public and agencies to understand all of the existing and proposed future aquaculture operational footprint in the bay. This would have aided the public and agencies in understanding of how the proposed project would contribute to the cumulative impact of aquaculture in the bay. According to information recently updated by the California Department of Fish and Wildlife (DFW) the existing operational footprint of aquaculture in Humboldt Bay comprises 386 acres farmed by seven different operators.¹ Additionally, the DEIR notes in Section 4.0 that Hog Island Oyster Company is pursuing 39 acres of lease area in the northwest portion of the bay.

The DEIR also fails to adequately analyze cumulative impacts to these resources, or impacts to recreation and navigational safety. The DEIR lacks an Environmentally Superior Alternative that would allow for a project and that would also be consistent with local, state and federal regulation and policy.

In the past several years, we have met with the District and shared our informed analysis and recommendations for proceeding with an intertidal pre-permitting project that would better avoid conflict and result in a Project that would fulfill the District's objectives for mariculture expansion while protecting sensitive resources and public access and safety.² Unfortunately the District has chosen to propose a large project with sites in the heart of the East Bay - an area the Coastal Commission recently moved to protect from the harmful impacts of aquaculture-³ as well as the west side of Indian Island, where impacts to Black Brant, other waterfowl, and shorebirds would be unavoidable and significant.

We urge the District to select the No Project Alternative as the Preferred Alternative. Otherwise, we urge the Harbor District to produce a Revised DEIR which includes an Alternative that removes HBHD-2, HBHD-3, and Yeung, and is constrained to HBHD-1. This would satisfy the District's objectives for a substantial intertidal Project while ensuring globally significant bird and other wildlife resources; recreation; and vessel safety are protected from significant harm. A Project located here, with appropriate mitigation measures, has the potential to be an

¹ CDFW. 2020. The status of commercial aquaculture in California ("informational report"). Report to the Fish and Game Commission. March.

² Orr, D., Weinstein, A., Frazer, S., 2018. Humboldt Bay Oyster Mariculture Spatial Planning Report. Audubon California. Available by request at dorr@audubon.org

³ Coastal Commission. 2017. Coast Seafoods CDP application Staff Report. <https://documents.coastal.ca.gov/reports/2017/9/w22b/w22b-9-2017-report.pdf> September.

Environmentally Superior alternative that would satisfy the goals of the intertidal portion of the pre-permitting project, as described in Section 2.2 of the DEIR. The District should also describe the role of the existing subtidal portion of the pre-permitting project as a component of fulfilling Project objectives.

Project Description

The project consists of 136 acres across four sites in Arcata Bay within mudflat, patchy eelgrass and channel edges. The proposed Yeung Oyster Farm (“Yeung”) is located in East Bay and totals 45 acres. The DEIR notes this is a private venture and that Mr. Yeung would pursue his own environmental permits separate from the Project. The pre-permitting project totals 91 acres in east bay, on the west side of Indian Island, and in the northwest part of the bay. Allowable gear types include rack-and-bag, cultch-on-longline, and basket-on-longline.

Legal Background: California Environmental Quality Act

CEQA is intended to provide for the protection and enhancement of the state’s environment and to “ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.”⁴ CEQA accomplishes these goals in part by ensuring that proposed projects are authorized only after their environmental impacts are thoroughly analyzed in an EIR, the public has full opportunity to inform that analysis, and necessary mitigation measures have been adopted.

A. Analysis of Significant Impacts

CEQA requires that an “EIR must demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed and it must permit the significant effects to be considered in the full environmental context.”⁵ CEQA defines “significant effect on the environment” as “a substantial, or potentially substantial, adverse change in the environment.”⁶ In addition, an EIR “must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published...or...at the time the environmental analysis is commenced, from both a local and regional perspective.”⁷

Notably, CEQA requires analysis of effects on “ecosystems,” the boundaries of which are not defined by state lines.⁸ Therefore, the EIR must analyze environmental effects occurring both within California and outside of it. Indeed, as CEQA is “to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language” the Project’s impacts must be analyzed in terms not only of their effects around Humboldt Bay, but throughout the Pacific Flyway and California Current Large Marine Ecosystem.⁹ This is particularly important for this project given that many of the species it

⁴ Pub. Res. C. § 21001(a)-(d).

⁵ CEQA Guidelines, § 15125(c), (emphasis added).

⁶ Pub. Res. C. § 21068.

⁷ CEQA Guideline § 15125(a)

⁸ CEQA Guidelines § 15358(a)(2).

⁹ *Laurel Height Improvement Ass’n v. Regents of University of California*, 47 Cal.3d 376, 404 (1988).

affects are highly migratory and commercially important.

The EIR's conclusions regarding the project impacts must be based on a full analysis of relevant factors and the best available information. A conclusion regarding the significance of an environmental impact that is not based on an analysis of the relevant facts fails to fulfill CEQA's informational goal.¹⁰ Furthermore, CEQA requires an agency to "use its best efforts to find out and disclose all that it reasonably can."¹¹

As detailed below, the DEIR's analysis of significant impacts is inadequate in that it relies on unsubstantiated conclusions and uncertain, insufficient mitigation measures, and conflicts with local, state, and federal policies and laws related to resource protection.

B. Analysis of Cumulative Impacts

CEQA requires that an EIR address cumulative impacts "when the project's incremental effect is cumulatively considerable."¹² The EIR must therefore identify all existing and likely future projects that contribute to the same cumulative impacts as the proposed project. Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."¹³

The cumulative impact analysis must address the severity of the impacts and their likelihood of occurring. An adequate discussion of significant cumulative impacts must include, among other things, a "summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available"¹⁴ In other words, in deciding whether to approve a project, decision makers need to know what the expected impacts will be on the ground as a result of all of the projects identified as contributing to cumulative impacts.

C. Analysis of Alternatives

The analysis of alternatives to the proposed project lies at "[t]he core of an EIR."¹⁵ In this analysis, the EIR must consider a reasonable range of alternatives that would avoid or substantially lessen this impact while feasibly attaining most of the Project's basic objectives.¹⁶ A "reasonable range" of alternatives includes alternative locations for project as well as alternatives to the project.¹⁷ In addition, the EIR must analyze a "no project" alternative.¹⁸ If the EIR refuses to consider a reasonable range of alternatives or fails to support its analysis with substantial evidence, the

¹⁰ *Stanislaus Natural Heritage Project*, 48 Cal.App.4th at 182; *Citizens of Goleta Valley v. Board of Supervisors of City of Santa Barbara*, (Cal. 1990) 52 Cal.3d 553, 568.

¹¹ Guidelines § 15144; *see also* Guidelines § 15151 (an EIR must disclose what is "reasonably feasible").

¹² CEQA Guidelines § 15130; *see also* CEQA Guidelines § 15355.

¹³ CEQA Guidelines § 15355.

¹⁴ CEQA Guidelines, § 15130(b)(4).

¹⁵ *Citizens of Goleta Valley*, 52 Cal. 3d at 564; *see also* Pub. Res. Code § 21002.1(a) ("The purpose of an environmental impact report is to identify alternatives to the project").

¹⁶ *See* § 21100(b)(4); CEQA Guidelines § 15126.6(a).

¹⁷ CEQA Guidelines, § 15126.6(a).

¹⁸ CEQA Guidelines, § 15126.6(e).

purposes of CEQA are subverted and the EIR is legally inadequate.¹⁹ If a feasible alternative exists that will meet the project's objectives while reducing or avoiding its significant environmental impacts, the project may not be approved.²⁰

As explained below, the range of alternatives considered in the Harbor District DEIR does not meet CEQA's requirement to avoid or substantially lessen the project's impacts. Nor does the DEIR explain the rationale for selecting the alternatives that it does consider or offer substantial evidence that any of the alternatives other than the "No Project" alternative meet CEQA requirements.

D. Mitigation Measures

CEQA's core substantive component requires that any public agency, including the Harbor District, "shall mitigate or avoid the significant effects . . . of projects that it carries out or approves *whenever* it is feasible to do so."²¹ CEQA requires agencies must adopt environmentally superior alternatives or feasible mitigation measures to substantially decrease or avoid otherwise significant adverse environmental impacts of the proposed project.²² To enable that decision making process, the EIR must set forth mitigation measures that can be adopted at the findings stage of the planning process. Those measures should be capable of: (a) "[a]voiding the impact altogether by not taking a certain action or parts of an action"; (b) "[m]inimizing impacts by limiting the degree or magnitude of the action and its implementation"; (c) "[r]ectifying the impact by repairing, rehabilitating, or restoring the impacted environment"; or (d) "[r]educing or eliminating the impact over time by preservation and maintenance operations during the life of the action."²³ The EIR must also include evidence of each mitigation measure's efficacy.²⁴

In addition, agencies may review a project proponent's prior shortcomings in analyzing the adequacy of proposed mitigation measures. The Supreme Court has stated that "[b]ecause an EIR cannot be meaningfully considered in a vacuum devoid of reality, a project proponent's prior environmental record is properly a subject of close consideration in determining the sufficiency of the proponent's promises in an EIR."²⁵

In addition to CEQA's mitigation requirements, the California Endangered Species Act (CESA) requires full mitigation of impacts to state-listed species.²⁶ In particular, any permit issued to authorize incidental take of such species by the project must provide mitigation for all impacts on the species resulting from project, meaning that mitigation must address habitat loss as well as direct take.

Missing and contradictory information

¹⁹ *San Joaquin Raptor*, 27 Cal. App. 4th at 735-38; *Kings County Farm Bureau*, 221 Cal. App. 3d at 736-37.

²⁰ Pub. Res. Code § 21002.

²¹ Pub. Res. Code § 21002.1(b) (emphasis added).

²² Pub. Res. Code §§ 21002, 21081(a); CEQA Guidelines, §§ 15002(a)(3), 15021(a)(2), 15091(a)(1).

²³ CEQA Guidelines § 15370.

²⁴ See *Save Our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal. App. 4th 99, 130.

²⁵ *Laurel Heights Improvement Assoc. of San Francisco v. Regents of the University of California*, 47 Cal.3d 376, 420 (Cal. 1988).

²⁶ Pub. Res. C. § 2081(b)-(c).

The DEIR includes less than one page on the environmental setting of the bay, leaving out readily available information on the bay's importance for eelgrass, shorebirds, waterbirds, visual resources, and wildlife-dependent activities including bird-watching and hunting for Black Brant and other waterfowl. The DEIR does not include a map or visual aid for the public and agencies to understand existing and proposed future aquaculture footprint in the bay. The lack of this visual aid curtails public understanding of how the proposed project would contribute to the cumulative impact of aquaculture in the bay to a myriad of stakeholders and resources.

In addition, the information the EIR does present on the extent of aquaculture operations and affected habitat is incorrect or confusing. The EIR's Table 3.5.1 (pg 32) notes that 1.4%, or 27.04 acres of the bay's existing culture is in continuous eelgrass, defined as 85-100% cover. There is no source or citation for this value, and the information provided by the Coastal Commission and Coast Seafoods appears to contradict this finding, instead suggesting throughout that 100 or more acres of existing culture is surrounded by dense eelgrass, and/or is below the 1.5+/1.5- MLLW tidal levels to sustain dense eelgrass. Also, the total habitat in north bay is listed as 7,918 acres in the table, and 9,587 acres in the text. This needs clarification or correction.

The DEIR does not include any analysis of potential impacts to recreation and navigational safety. Finally, the DEIR also fails to include an Alternative that would allow for a Project and that would also be consistent with local, state and federal regulation and policy.

The proposed project would have unavoidable, significant and adverse effects on shorebirds

A. Shorebirds have declined and access to undisturbed tidal flats is necessary to sustain shorebirds

Shorebirds in North America have declined 37% since 1970 due to the effects of disturbance, habitat loss and alteration, and pollution.²⁷ While trends among the dozens of species that migrate and/or overwinter in California are not well known, the numerically dominant shorebirds in California- Western Sandpiper and Dunlin- have declined in California. Dr. Nils Warnock, an internationally recognized shorebird expert, suggests that Dunlin in particular appear to be declining throughout their range and should be considered as a California Species of Special Concern.²⁸ Shorebirds have been censused annually in Tomales Bay. Dr. Nils Warnock notes in 2020²⁹:

In recent months, I have been analyzing our shorebird numbers going back to 1989, and the results are sobering – a loss of over 60% of total shorebirds since 1989 (the most affected being Dunlin and Western Sandpipers).

In Bolinas Lagoon, Dunlin and Western Sandpipers declined between 1972-2015 (where 1972-

²⁷ K. V. Rosenberg *et al.*, Decline of the North American Avifauna. *Science* 10.1126/science.aaw1313 (2019).

²⁸ Warnock, Dr. Nils. 2020. Pers. Comm.

²⁹ Warnock, Dr. Nils. Information submitted to the California Fish and Game Commission. Pg 217 in: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=177719&inline>

1993 and 1998–2015 were the years shorebirds were annually assessed).³⁰ Western Sandpipers declined in San Francisco Bay between surveys that took place in 1996-1998 and 2000-2002.³¹

Twice a day when exposed at the lower tides, tidal flats, teeming with life, provide migratory shorebirds with sustenance for migration and reproduction. The loss of tidal flats to sea level rise, disturbance and habitat alteration is cited as a primary threat to shorebirds in California and around the world.³²

B. Humboldt Bay is a site of Hemispheric importance for shorebirds

Humboldt Bay is a shorebird site of Hemispheric Importance within the Western Hemisphere Shorebird Reserve Network. The Bay currently supports at least 850,000 shorebirds a year, according to a new comprehensive set of published, peer-reviewed surveys conducted in 2017-2018. Yet, the District proposes to develop aquaculture in critical areas for shorebirds in the Bay—the East Bay, and the west side of Indian Island.

The importance of the bay to shorebirds, and the threat to shorebirds from the impacts of disturbance and displacement from aquaculture development, is a primary reason in 2017 the Coastal Commission denied Coast Seafood’s CDP application to the Commission to expand aquaculture in the critically important East Bay. Rather, the Commission contracted and consolidated Coast’s operations in part to protect shorebirds and migratory waterfowl from the impacts of disturbance and displacement.³³

The foremost expert on Humboldt Bay shorebirds, Dr. Mark Colwell of Humboldt State University note in 2015³⁴:

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. 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.

The Coastal Commission in 2017 examined Humboldt Bay’s value to shorebirds and found

³⁰ Stenzel, L. E., and Page, G. W. 2018. Trends in abundance of wintering waterbirds relative to rainfall patterns at a central California estuary, 1972–2015, *in* Trends and traditions: Avifaunal change in western North America (W. D. Shuford, R. E. Gill Jr., and C. M. Handel, eds.), pp. 236–257. Studies of Western Birds 3. Western Field Ornithologists, Camarillo, CA.

³¹ Pitkin, M. and Wood, J. (Editors). 2011. The State of the Birds, San Francisco Bay. PRBO Conservation Science and the San Francisco Bay Joint Venture.

³² Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at: <http://www.shorebirdplan.org>.

³³ California Coastal Commission. 2017. Staff Report and Supplementary Materials for CDP Application 9-17-0646. September. <https://www.coastal.ca.gov/meetings/agenda/#/2017/9>

³⁴ Colwell, M. 2015. Letter to the Humboldt Bay Harbor, Recreation and Conservation District regarding shorebirds and aquaculture in Arcata Bay.

that³⁵

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... 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.

Following the Coastal Commission's 2017 decision made in part to reduce disturbance to shorebirds in the East Bay, new studies were completed that further underscore Humboldt Bay's extraordinary importance to shorebirds. Between 2018-2019, Dr. Mark Colwell and his colleagues at Humboldt State University conducted three shorebird census studies capturing the full annual cycle of shorebirds on the Pacific Flyway: summer/fall, winter and spring.^{36,37,38} Employing highly qualified and experienced shorebird fieldworkers in the surveys, the scientists found Humboldt Bay was used by ~850,000 shorebirds of 31 species. Over 620,000 shorebirds used the bay in spring migration alone. This means that after San Francisco Bay, which supports up to a million shorebirds a year, Humboldt Bay is the most important place for shorebirds in California. The authors provide estimates for the minimum percentage of global populations of shorebirds that use Humboldt Bay: 25% for Beringian subspp. Marbled Godwit (*Limosa fedoa ssp beringiae*); 15% for Western Sandpiper, 5% for Marbled Godwit (*Limosa fedoa*), 5% for Short-billed Dowitcher, 4% for Dunlin, and 2% for Whimbrel. For the Beringian Marbled Godwit subspp., Colwell et al. in press does not rely on observation, as the subspecies is not easily discernible from the supra-species. Instead, the authors note that

Ruthrauff *et al.* (2019) provided details on the movements of eight radio-tagged godwits from the Alaskan population, two of which wintered on Humboldt Bay. If this small sample is representative, it suggests that a large percentage (25%; 500 birds) of the Alaskan population spend much of their year (average 272 ± 15 days, Ruthrauff *et al.* 2019) at Humboldt Bay.

In the three Colwell et al. census studies conducted in 2018-2018 in Humboldt Bay, most observations were of Western Sandpipers and Dunlin, both of which avoid structured habitats and are highly susceptible to disturbance.³⁹ The authors note that

Within Arcata Bay, recent proposals to expand oyster cultivation may threaten to degrade critical foraging habitats.

A. The impacts of disturbance to shorebirds are not included or analyzed in the DEIR,

³⁵ Coastal Commission. 2017. Coast Seafoods CDP application Staff Report.

<https://documents.coastal.ca.gov/reports/2017/9/w22b/w22b-9-2017-report.pdf> September.

³⁶ Colwell, M. and E. Feucht. 2018. Humboldt Bay, California is more important to spring migrating shorebirds than previously recognized. Wader Study. Volume 125. [10.18194/ws.00111](https://doi.org/10.18194/ws.00111)

³⁷ Colwell, M. Feucht, E. and C. Polevy. 2019. Winter abundance of shorebirds on Humboldt Bay, California, USA. Wader Study [10.18194/ws.00146](https://doi.org/10.18194/ws.00146)

³⁸ Colwell, M., C.Polevy & H. LeWinter. *In press*. Humboldt Bay, California, USA Hosts A Globally Important Shorebird Community Year-Round. Wader Study.

³⁹ Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at: <http://www.shorebirdplan.org>.

and total area of impact is inaccurately described.

The DEIR asserts that impacts to shorebirds will be less than significant (IMPACT BIO 1.1) and provides no mitigation for increased disturbance to and displacement of shorebirds. The finding of less than significant impact is not supported by science; contradicts the concerns previously expressed by numerous state and federal agencies in regard to prior proposals for aquaculture development in Arcata Bay; and, ignores the importance and heavy use of the Bay's intertidal mudflats and patchy eelgrass by shorebirds. The DEIR contains numerous speculative, unsubstantiated assertions as well as dramatically incomplete and misleading information on shorebirds, their life history requirements, and the impacts of aquaculture.

The DEIR notes that “up to 136 acres of intertidal mudflats, representing 1.7% of Arcata Bay intertidal habitat, could be used for aquaculture under the Project, species exhibiting brief stopovers are unlikely to be affected by loss of habitat if those areas avoided or utilized.” This statement is false. Mudflats cannot be equated with other types of intertidal habitats, as the numerically dominant species- Western Sandpiper and Dunlin- occur on open mudflat with unobstructed views and avoid structured habitat such as vegetated areas.⁴⁰ Therefore the DEIR must provide the percentage of the 136 acres as a proportion of the total acres of mudflat, not of total intertidal acres.

Furthermore, disturbance is neither limited to the 136 acres of mudflats, nor limited to two visits a week. Our analysis⁴¹ shows that **the new area of disturbance would total approximately 0.87 mi²—about 7% of the total mudflat/non-mariculture patchy eelgrass foraging area available to shorebirds in all of Humboldt Bay.** Most of the affected disturbed area is within the east bay, among the highest quality foraging habitat for shorebirds in the bay, where among the largest shorebird flocks feed along the edges of the flats as the tide exposes area.

The DEIR notes that “human disturbance may also preclude shorebirds from using intertidal sites, at least temporarily, as some practices require approximately two visits per week for maintenance.” This statement is false. In regard to visits per week, there may be between 10-20 permittees, each with different schedules. Assuming 15 permittees, that would equate to 30 vessel trips per week for inspections and flipping bags for rack-and-bag alone, one of three types of culture that may be used. On top of that is the existing level of disturbance from current permittees. According to the Coast Seafoods FEIR, its current operations include 57 trips, 218 hours/week (Table 4.1 in the FEIR). (Note: The number of trips may be reduced somewhat following Coast's downsizing to 273 acres from 300 acres per its 2017 CDP.)

Taken together, vessel traffic could approach or exceed 100 trips per week in Arcata Bay,

⁴⁰ Kelley, J., J. Evens, R. Stallcup, and D. Wimpfheimer. 1996. Effects of aquaculture on habitat use by wintering shorebirds in Tomales Bay, California. California Fish and Game 82(4): 160-174.

⁴¹ Distance from Woodley Marina to proposed Project sites in the east bay is between 3-3.5 (4.83 - 5.43 km). Distance to the proposed Project sites in the northwest side of the bay it is about 4 miles (6.44 km). Assume 100 m of flushing birds on each side of a vessel. Those amount to up to 1,126,540 m² (1.13 square km) of bird disturbance on the east side and 1,287,476 m² (1.29 square km) of bird disturbance on the west side. Summed together (2.259 square km), that equals 0.87 miles² of disturbance. Mudflats (unconsolidated sediment and/or Macroalgae) and patchy eelgrass (excluding mariculture areas) in Humboldt Bay = 12.5 mi² using 2009 NOAA data layers also used by the Harbor District.

causing *new* chronic disturbance to birds in 7% of their total foraging habitat, most of that in the critical East Bay. The DEIR must accurately and thoroughly analyze disturbance levels associated with its own proposed Project, as well as cumulative impacts of existing levels of disturbance related to aquaculture. Then it must provide adequate mitigation for those impacts.

B. Intertidal habitat alteration and disturbance are key drivers of shorebird declines

As noted above, shorebirds in North America have declined 37% in the last 50 years due to the effects of disturbance, habitat loss and alteration, and pollution. Key threats to shorebirds include disturbance and habitat loss in wintering and migration areas on the Pacific Flyway. Remaining intertidal wetlands are critical for birds. Over 90% of California's historical two million hectares of wetlands has been lost.⁴² Stralberg et al. (2011)⁴³ found for California that estuarine habitats including eelgrass, tidal flats and tidal marsh are the most limited in spatial extent, yet support the highest densities of shorebirds and waterbirds. The study's lead author recently confirmed that these habitats can be considered the highest priority for protection from further loss of even small acreages from habitat degradation and conversion, and disturbance.

The 2016 Pacific Americas Shorebird Conservation Strategy⁴⁴, a collaboration among numerous binational agencies, academic institutions, and NGOs, notes

The habitats used by shorebirds have been altered dramatically in the last century across the Western Hemisphere and indeed around the world. Human disturbance is recognized as a key threat in shorebird conservation and recovery plans, as well as in many published studies and received a high overall threat rating in this Strategy. Human disturbance does not typically destroy habitat but causes disruption to breeding and nonbreeding shorebirds. This, in turn, can have consequences on reproductive success and survivorship. Shorebirds can exhibit the inability to gain weight and build fat reserves required for long-distance migration because of exclusion, interrupted access or changes in timing of access to food resources or roosting locations.

The Plan further notes that “even small losses in the extent or quality of available feeding habitat for shorebirds could result in proportionally greater decreases in some wintering shorebird populations,” and identifies the high priority to “protect, maintain, restore and enhance breeding habitats for species of highest conservation concern and at sites of high nonbreeding shorebird concentrations.”

Humboldt Bay also supports wintering populations of shorebirds, when access to food resources are diminished. Dr. Mark Colwell concludes that:

⁴² Dahl, T. 1990. Wetlands Losses in the United States 1780s to 19080's. U.S. Department of the Interior. Washington, D.C. 13. Pp.

⁴³ Stralberg, R. Cameron, M. Reynolds, C. Hickey, K. Klausmeyer, S. Busby, L. Stenzel, D. Shuford, G. Page. 2011. Identifying habitat conservation priorities and gaps for migratory shorebirds and waterfowl in California. *Biodiversity Conservation* 20: 19-40

⁴⁴ Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at: <http://www.shorebirdplan.org>.

If populations are at carrying capacity set by winter food, then further loss or degradation of habitats will likely result in population declines. Large wintering shorebird populations demonstrate the importance of the bay as essential foraging habitats. Accordingly, bay habitats deserve renewed protection, especially given continued proposals to expand commercial oyster culture within Arcata Bay. Additionally, a century-old levee borders much of the bay, which will increasingly limit the time that shorebirds can forage given habitat loss stemming from climate change and sea level rise (Galbraith *et al.* 2006, 2014). One project has enhanced availability of intertidal habitats on Arcata Bay, which has attracted large shorebird concentrations during spring migration (Colwell & Feucht 2018). Future efforts to conserve shorebirds at Humboldt Bay will necessitate creative solutions including restoration of additional intertidal habitats behind breached levees. Moreover, increased development of bay habitats (e.g., oyster culture) poses a real threat to waterbird populations year-round, but especially in winter when food resources may limit local populations.

C. HBHD-3 would have a significant impact on Long-Billed Curlew

Long-billed Curlew, with a global population of just 140,000 birds is considered to be “highly imperiled” and declining.⁴⁵ It is considered one of the highest priority species for monitoring among the shorebird species breeding the temperate region.⁴⁶ Colwell *et al.* found that in 2017-2018, Humboldt Bay supported 351-875 Long-billed Curlew depending on season. This species is unusually territorial; the DEIR correctly points out that Long-billed Curlew maintain foraging territories on the west side of Indian Island. These overlap with HBHD-3, and the DEIR concedes the Project is likely to exclude Curlew from this area due to displacement and disturbance. However the DEIR incorrectly states, with no citation, that 10 Long-billed Curlew use the west side of Indian Island. Mathis *et al.* mapped Curlew in 0.5 m² blocks and while totals were not summed in the paper, the block coding map shows the west side of Indian Island supports, at a minimum, dozens of Long-billed Curlews. The DEIR must mitigate for impacts to this imperiled, uncommon shorebird species or remove the area from the Project.

D. Permitting and Trustee agencies have since 2013 expressed concerns to the Harbor District about siting aquaculture in important shorebird habitat

The Coastal Commission in its 2017 Staff Report on Coast Seafoods CDP application in Arcata Bay noted that

The California Department of Fish and Wildlife (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

⁴⁵ U.S. Shorebird Conservation Plan. 2004. High priority shorebirds – 2004. U.S. Department of Interior, Fish and Wildlife Service, Arlington, Virginia.

⁴⁶ Fellows, S. D., and S. L. Jones. 2009. Status assessment and conservation action plan for the Long-billed Curlew (*Numenius americanus*). U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication, FWS/BTP-R6012- 2009, Washington, D.C.

culture has been identified as a priority shorebird conservation goal for Humboldt Bay (Hickey et al. 2003)...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.” The high rate of disturbance caused by workers attending the mariculture areas would negatively impact birds and other wildlife through the energetic costs of flushing and loss of time in key foraging habitat. During migration, turnover times in shorebirds are often rapid and there is little time for habituation during a phase of heightened energy demand for the migrants.⁴⁷

The Proposed Project Will Have Unavoidable, Significant, Adverse Impacts on Black Brant and other waterfowl

A. Black Brant

Humboldt Bay is the most important spring staging area for Black Brant California’s only sea goose species, and one of the most important in the entire Pacific Flyway. Notably, these eelgrass beds host up to 60% of the total brant population each year.⁴⁸ An estimated 80,000 birds use Humboldt Bay each year.

From 2015 to 2019, the USFWS conducted surveys showing that Brant used the North Bay between one-third to three-quarters of the time compared with the South Bay. The Service notes

⁴⁷ Myers, J.P. et al. 1987. Conservation Strategy for Migratory Species. American Scientist 75:19-26.

⁴⁸ Pacific Flyway Council. 2002. Pacific Flyway management plan for Pacific brant. Portland, Oregon: Pacific Flyway Study Committee, U.S. Fish and Wildlife Service.

that in the last winter the data has been analyzed, 2018-2019, they observed ~75% of brant use of Humboldt Bay occurring on North Bay. Brant researchers have noted⁴⁹

the need to conserve large eelgrass habitats along the Pacific Coast, and we suggest this may be exceptionally important for isolated staging areas, such as Humboldt Bay and San Quintin Bay. Since large, alternative feeding locations are not nearby, these remote bays may serve as critical sites for birds to better accumulate nutrient for migration and successful reproduction.

The DEIR fails to include Black Brant in Table 3.5-3: Special status and commercially important animal species potentially affected by the project. This is a serious oversight considering Black Brant is a California Species of Special Concern⁵⁰ and is also managed separately from other waterfowl species by the U.S. Fish and Wildlife Service and Pacific Flyway Council. It is also prized by the local Humboldt Bay hunting community more than any other waterfowl species.

Brant must travel thousands of miles away from their wintering and staging grounds in California in order to breed in the coastal areas of the Arctic. Any compromise in their ability to make that migration due to insufficient food resources or delayed migration could lead to either direct mortality during migration or reduced reproductive potential. For example, during the 1930s, a disease decimated eelgrass beds and black brant populations declined significantly.⁵¹

Unlike other waterfowl species, brant have not adapted to feed significantly on agricultural crops, and eelgrass remains by far the most important component of their diet, particularly in the winter and spring. The specialization on eelgrass makes the Pacific brant particularly vulnerable to forced changes in their environment.⁵²

Monitoring efforts by waterfowl biologists suggest that brant disproportionately use bays with greater abundance of eelgrass. However, available scientific studies show that brant change their seasonal use patterns due to habitat disturbance like mariculture projects. In Washington State, oyster farming activities were correlated with reductions in eelgrass abundance and in turn, significant decreases in brant use-days.⁵³

The DEIR fails to include Black Brant in Table 3.5-3: Special status and commercially important animal species potentially affected by the project. This is a serious oversight considering Black Brant is a California Species of Special Concern and also prized by the local

⁴⁹ Moore, J.E., M.A. Colwell, R.L. Mathis, and J.M. Black. 2004. Staging of Pacific flyway brant in relation to eelgrass abundance and site isolation, with special considerations of Humboldt Bay, California. *Biological Conservation* 115: 475-486.

⁵⁰ 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.

⁵¹ Menning, D. et al. 2020. Are migratory waterfowl vectors of seagrass pathogens? *Ecology and Evolution*. <https://onlinelibrary.wiley.com/doi/10.1002/ece3.6039> February.

⁵² Moore, J. and J. Black. 2006. Slave to the tides: spatio-temporal foraging dynamics of spring staging black brant. *Condor* 108, 661-677.

⁵³ Wilson, U.W., and J.R. Atkinson. 1995. Black brant and spring-staging use at two Washington coastal areas in relation to eelgrass abundance. *Condor* 97: 91-98.

hunting community. The Coastal Commission notes⁵⁴ that impacts to black brant from aquaculture 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. In light of these likely impacts to Black Brant, the Coastal Commission in 2017 scaled back and consolidated Coast Seafoods' footprint in Arcata Bay, particularly the east bay.

In direct contrast to this precedent set by the Coastal Commission in Arcata Bay, the DEIR incorrectly asserts that impacts to Brant would be less than significant because "the potential loss of a very small proportion of foraging habitat in Arcata Bay will not result in a significant impact" to Brant in regard to disturbance or loss of foraging habitat. This statement is not consistent with the best available science and is unsupported by any reasonable explanation; the Project may reduce access to eelgrass through exclusion and is certain to reduce access through disturbance.

These impacts are likely to be unavoidable and significant. HSU scientist and Brant expert Dr. Jeff Black recently noted⁵⁵:

We know the birds need all the time in the day and tidal opportunities (which brings eelgrass into reach) to be able meet energetic requirements just to maintain constant body mass, let alone gain extra nutrient stores, which are then carried to the Arctic for converting to eggs. Any reduction in available time and opportunities to feed undisturbed (without interruptions) limits those affected birds' ability to acquire their daily ration. They need all the time available to them. Any reduction in this time impacts the birds' ability to meet daily and seasonal needs enabling thousand-mile migrations with enough body stores left over to launch a breeding attempt. The issue here is disturbance events from increased boat traffic (or other human disturbances), which limits those affected birds' ability to acquire their daily ration.

As we noted above, current plus proposed vessel trips in Arcata Bay could approach 100 trips per week, creating chronic disturbance. The DEIR fails to provide a rationale for why this existing and increased vessel presence in Arcata Bay would not significantly impact this highly sensitive species.

Furthermore, three of the four proposed sites are located in important places for Brant in Humboldt Bay. Yeung and HBHD-2 are located in the heart of the east bay where brant, other waterfowl and shorebirds eat and loaf among the mudflats, patchy eelgrass and channels.⁵⁶

Figure 1 shows the use of the Yeung and HBHD-2 by birds in December, 2017.

HBND-3 is located in the vicinity of one of a handful of grit sites for Black Brant in the bay. The

⁵⁴ Coastal Commission. 2017. Coast Seafoods CDP application Staff Report. <https://documents.coastal.ca.gov/reports/2017/9/w22b/w22b-9-2017-report.pdf> September.

⁵⁵ Black, Dr. Jeff. 2020. Pers. Comm. September.

⁵⁶ Brandenburg, S., Frazer, S., Rosenberg, S., Romo, T. 2015-2020. Pers. Comm. Each are Brant hunters on the bay with decades of experience. S. Frazer is a former Refuge Director for the U.S. Fish and Wildlife Service.

DEIR fails to mention the presence of this grit site and its importance to Black Brant, nor mitigate for the loss of access to the grit site Brant would experience. As the CDFW noted⁵⁷ in 2017:

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).

According to experts, a buffer of 1 km is needed to prevent brant from flushing. Brant are known to change their seasonal use patterns due to disturbance. In Washington, oyster farming activities were correlated with reductions in eelgrass abundance and in turn, significant decreases in brant use-days.⁵⁸ Aquaculture activities, including oyster operations, have specifically been noted to negatively affect brant populations.^{59, 60} Additionally, persistent human disturbance, such as occurs during aquaculture operations, could reduce the amount of time black brant utilize Humboldt Bay, and prevent populations from returning to historical levels.⁶¹ Reducing winter food availability would decrease the ability of adults to breed and has the potential to decrease the size of the Brant population. The dependence of brant on eelgrass and other intertidal habitats leaves them vulnerable to the human activities that increasingly impact shallow bays and estuaries along North America's coast, including the large-scale expansion of mariculture.⁶²

B. Other Waterfowl

The DEIR fails to mention or analyze the impacts of the Project to other waterfowl, which would primarily take place through the impacts of disturbance. Humboldt Bay is very important for many species of waterfowl on the Pacific Flyway, including Wigeon, Greater and Lesser Scaup, Pintail, Canvasback, Ruddy Duck, Surf Scoter and Western Grebe. Humboldt Bay has been designated by the National Audubon Society and BirdLife International as an Important Bird Area of national and global significance due to its importance in part to waterfowl. Humboldt Bay's tidelands provide critical foraging habitat for waterbirds, especially during winter and

⁵⁷ California Department of Fish and Wildlife. 2016. Letter to the Humboldt Bay Harbor, Recreation and Conservation District on the Recirculated Draft Environmental Impact Report for the Coast Seafoods Company Humboldt Bay Shellfish Aquaculture Permit Renewal and Expansion Project (SCH# 2015082051). September.

⁵⁸ Wilson, U.W., and J.R. Atkinson. 1995. Black brant and spring-staging use at two Washington coastal areas in relation to eelgrass abundance. *Condor* 97: 91-98.

⁵⁹ Schmidt, P. 1999. Population counts, time budgets, and disturbance factors of black brant (*Branta bernicla nigricans*) at Humboldt Bay, California. Master's Thesis.

⁶⁰ Shuford, W. D. and Gardali, T., editors. 2008. Brant chapter in: California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

⁶¹ Moore, J. and J. Black. 2006. Slave to the tides: spatio-temporal foraging dynamics of spring staging black brant. *Condor* 108, 661-677.

⁶² Ward, D.H., A. Reed, J.S. Sedings, J.M. Black, D.V. Dirkson, and P.M. Castelli. 2005. North American Brant: effects of changes in habitat and climate on population dynamics. *Global Change Biology* 11:869-880

migration periods.

Eelgrass has been noted as the most important single food item to waterfowl that winter in Humboldt Bay.⁶³ Waterfowl, including pintail, mallard, and green-winged and cinnamon teal feed on eelgrass seeds and infaunal bivalves.⁶⁴ Because eelgrass is essential spawning habitat for herring, it benefits many sea duck species who rely on herring as a food resource.⁶⁵ Scoters in particular are highly dependent on herring roe for overwinter survival and breeding success. Scoters dramatically alter their movement and habitat use patterns in spring to take advantage of ephemeral and energy-rich herring roe, suggesting that this food resource is of particular importance to these species.⁶⁶ Scoters (all spp.) experienced an overall decline since the 1950s in North America.⁶⁷ while greater and lesser scaup, two other diving ducks that depend on herring roe, have declined by 15%.⁶⁸

HBHD-2 and Yeung are located in the heart of the east bay within patchy eelgrass, tidal channels and mudflats, known to local birdwatchers and hunters as a key place for waterbirds to feed and loaf.⁶⁹ The DEIR fails to acknowledge energetic costs associated with flushing large flocks of migratory birds (especially Pacific black brant, American wigeon, and other dabbling ducks) from their preferred foraging sites in the vicinity of and surrounding travel lanes used to access HBHD-2 and Yeung. The Project would likely adversely affect numerous waterfowl species by reducing their food supply and increasing disturbance, especially in the east bay which currently serves as a refugia from disturbance. The Coastal Commission in 2017 recognized this expansive, undeveloped area as critical for birds when it removed Coast Seafoods' aquaculture operations from this part of the east bay in part in order to reduce disturbance to birds.

In Tomales Bay, CA, Kelly & Evens (2013) found that many waterbirds are highly susceptible to disturbance and are unlikely to habituate to disturbance. Buffer distances well over 250 m would be required to protect species including wigeon, greater and lesser scaup, goldeneye, surf scoter, grebe, mergansers, loons, canvasback, and ruddy duck from the negative impacts of motorized vessels.⁷⁰

The Project would have unavoidable, significant impacts on eelgrass

⁶³ Yocum, C. and M. Keller. 1961. Correlation of food habits and abundance of waterfowl, Humboldt Bay, California. Calif. Fish Game 47:41-53.

⁶⁴ Schlosser, S., and A. Eicher. 2012. The Humboldt Bay and Eel River Estuary Benthic Habitat Project. California Sea Grant Publication T-075.

⁶⁵ Kelly, J. et al/ 2019. Echoes of numerical dependence: responses of wintering waterbirds to Pacific herring spawns. Vol. 597: 243–257, 2018

⁶⁶ Lok EK, Esler D, Takekawa JY, De La Cruz SW and others (2012) Spatiotemporal associations between Pacific herring spawn and surf scoter spring migration: evaluating a 'silver wave' hypothesis. Mar Ecol Prog Ser 457: 139–150

⁶⁷ Sea Duck Joint Venture. 2015. Status Summary. <https://seaduckjv.org/wp-content/uploads/2014/08/SUSC-status-summary-March-2015-FINAL1.pdf>

⁶⁸ U.S. Fish and Wildlife Service. 2019. Waterfowl population status, 2019. U.S. Department of the Interior, Washington, D.C. USA.

⁶⁹ Frazer, S., Romo, T., Rosenberg, S., Brandenburg, S. 2020. Pers. Comm.

⁷⁰ Kelley, J. and J. Evens. 2013. Boating Disturbance to Waterbirds in California Estuaries. ACR Technical Report 89-12-6

We disagree with the DEIRs conclusion that with mitigation the Project would have a less than significant impact on eelgrass. Contrary to the DEIR's statements, the Project is likely to have significant adverse effects on eelgrass and the numerous species that depend on it. We recommend the District develop a new Alternative that consolidates the intertidal portion of its Project at HBHD-1 where it can minimize impacts to current and future eelgrass habitat while satisfying Project goals.

1. The Project would fail to avoid less-dense eelgrass.

By committing only to avoid "dense" eelgrass (>84% cover) in its Site Selection Process described in Appendix D, the District has failed to follow the guidance of the California Coastal Commission, nor the guidance of the California Eelgrass Mitigation Policy ("CEMP") promulgated by the National Marine Fisheries Service. In July 2020, the Coastal Commission issued draft *CDP Application Guidance for Aquaculture and Marine Restoration*⁷¹ which states that

Eelgrass is a species of special biological significance under the meaning of Section 30230 of the Coastal Act, and the Commission has consistently determined that it warrants special protection under this policy. Providing eelgrass with special protection means that adverse impacts to it are to be avoided if feasible. If avoidance is not feasible, adverse impacts are to be minimized and mitigated. In-water aquaculture or marine restoration projects can result in loss of eelgrass habitat due to shading and displacement from the installation and presence of cultivation or habitat structures and/or disturbance and damage due to their use.

The Guidance further states that

In its evaluation of these project types, the Commission's approach has been to encourage the avoidance of potential conflicts through careful siting and spatial separation between eelgrass habitat and proposed aquaculture and native oyster habitat creation projects.

The CEMP -- which the Coastal Commission and other state agencies have adopted as their guidance when considering eelgrass in project applications, renewals and updates -- states that eelgrass should be avoided to the extent practicable. By siting the Project within areas that support up to 83% eelgrass, the District is not avoiding eelgrass to the extent practicable. The CEMP states that eelgrass loss must be mitigated at ratios specific for different geographies in the state.

With state and federal resource management agencies focusing considerable effort on protecting and restoring eelgrass, a Project that would destroy eelgrass does not constitute a reasonable proposal. Related to this, while we applaud the District for its stated intent through MITIGATION BIO-4 to avoid eelgrass through 30-foot buffers between the Project and eelgrass plants, the DEIR does not explain how it will be possible to establish a 30-foot buffer from an eelgrass plant that is at least 30 feet from another plant within eelgrass habitat.

⁷¹ California Coastal Commission. 2020. CDP Application Guidance: Aquaculture and Marine Restoration. July.

2. Use of outdated and flawed data in the site selection process

The DEIR primarily relies on two information sources. The Humboldt Bay, California Benthic Habitats 2009 dataset from NOAA Coastal Services Center⁷² and a contracted survey to assess eelgrass within potential mariculture development areas conducted by SHN Engineers & Geologists in 2017. The DEIR primarily uses the NOAA Coastal Services 2009 dataset, a more than ten-year-old dataset to assess impacts to eelgrass. It is widely known that the extent of eelgrass varies between and within years with seasonal expansions and changes in annual abundance^{73 74}. While the 2009 habitat assessment⁷⁵ that created these data assessed eelgrass during a season when it would be close to its maximum extent it does not account for variability in eelgrass areal extent across years; it only documents where eelgrass was present that season.

The NOAA Coastal Services 2009 dataset also assesses macroalgae as a habitat within Arcata Bay. *Gracilaria* and the ephemeral *Ulva*, both macroalgae species found in Arcata Bay (and included in the habitat class macroalgae in the 2009 NOAA dataset used in this DEIR (Schlosser and Eicher 2012)), are known to occur in the same areas as eelgrass. These areas can transition from macroalgae to eelgrass from year to year so that an area may have *Gracilaria* or *Ulva* one year and eelgrass the next. This indicates that areas that were identified as macroalgae in the 2009 NOAA dataset could today be eelgrass. Without a reliable and appropriately conducted recent survey, the extent and presence of eelgrass in the proposed aquaculture areas is unknown and the DEIR cannot adequately assess potential impacts to eelgrass.

The DEIR also relies on a 2017 survey of eelgrass (“SHN survey”) conducted in May, months before it would have reached its maximum annual extent.^{76,77} These data were also collected at a time when eelgrass statewide had been on the decline for several years^{78, 79} which could be related to prolonged drought conditions.

The SHN survey also used inappropriate validation methods designed to inflate reported accuracy measures. The investigators used image classification methods along with an accuracy assessment. There is a gross mismatch in scale between the methods of classification and the methods of accuracy assessment that artificially inflates the accuracy assessment. The methods

⁷² National Oceanic and Atmospheric Administration (NOAA), Coastal Services Center. 2010. Humboldt Bay, California Benthic Habitats 2009. NOAA’s Ocean Service, Coastal Services Center, Charleston, SC.

⁷³ Boyer, K.E.; Wylie-Echeverria, S.W. 2010. Eelgrass Conservation and Restoration in San Francisco Bay: Opportunities and Constraints. San Francisco Bay Subtidal Habitat Goals Project, Appendix 8-1.

⁷⁴ Orth R.J., Moore, K.A. 1986. Seasonal and Year-To-Year Variations In The Growth of *Zostera Marina* L. (Eelgrass) In The Lower Chesapeake Bay. Aquatic Botany, 24, 335-341.

⁷⁵ Schlosser, S., and A. Eicher. 2012. The Humboldt Bay and Eel River Estuary Benthic Habitat Project. California Sea Grant Publication T-075. 246 p.

⁷⁶ SHN Engineers & Geologists. 2017. 2017 Results of Eelgrass Mapping, Humboldt Bay Intertidal Mariculture Pre-Permitting Project and Yeung Family Oyster Farm. A report prepared for Humboldt Bay Harbor Recreation & Conservation District and Yeung Family Oyster Farm.

⁷⁷ Ruesink, Jennifer L., Hong, Jae-Sang, Wisheart, Lorena, Hacker, Sally D., Dumbauld, Brett R., Hession-Lewis, Margot, Trimble, Alan C. (2010). Conger comparison of native (*Zostera marina*) and introduced (*Z. japonica*) eelgrass at multiple scales within a Pacific Northwest estuary. Biological Invasions 12:1773-1789.

⁷⁸ Gilkerson, Whelan (2015). Preliminary Eelgrass (*Zostera marina*) Mapping and Habitat Characterization, North Humboldt Bay, California. A report prepared for Humboldt Bay Harbor, Recreation and Conservation District.

⁷⁹ Merkel, Keith; Gilkerson, Whelan (2017). Humboldt Bay Eelgrass Comprehensive Management Plan. A report prepared for Humboldt Bay Harbor, Recreation and Conservation District.

section of the report detailing the accuracy assessment lack clarity and detail. While the classification was performed at a 1cm² resolution the accuracy assessment was performed at a 1m² resolution. This indicates that if eelgrass was within this 1m² area and the model classified eelgrass in the 1m² area, this was considered accurate. Hence, the accuracy was assessed in 1m² cells (which would contain 10,000 classified 1cm² pixels) instead of at the 1cm² scale of the classification.

In sum, the SHN survey does not appropriately assess the 2017 eelgrass distribution within the proposed aquaculture areas because it was conducted long before the annual maximum extent and used accuracy assessments that artificially inflates the accuracy of the survey. The year of the survey also represented a time when eelgrass had been declining statewide for several years. Therefore, this survey should not be used to assess the potential environmental impacts to eelgrass from the proposed aquaculture development.

3. MITIGATION BIO-3 is not likely to prevent damage to eelgrass from trampling and propellor and boat hulls

Conditions on the bay are often variable, windy, and dark. Maintenance workers may be under pressure to complete maintenance work while sometimes-narrow time windows allowed by tides, winds and light conditions. The notion that farm workers will be able to avoid eelgrass is an unreasonable and unsupported assertion. For example, **Figure 2** shows Coast Seafoods farm workers knee deep in eelgrass beds as they maintain culch lines.

A. Humboldt Bay is uniquely important for eelgrass and state and federal regulations and policy call for its full protection

Humboldt Bay contains approximately 5,646 acres of eelgrass, which represents between 45-53% of the state's total eelgrass. Though eelgrass is the dominant macrophyte of the shallow subtidal and lower intertidal zones, it is one of the rarest habitats in California. Just five bays—Humboldt, San Francisco, San Diego, Mission, and Tomales—support more than 80% of the known eelgrass in the state. Eelgrass has declined in California⁸⁰ making any continuing or additional loss in Humboldt Bay more important from a cumulative impacts standpoint.⁸¹ Many species that depend on eelgrass are highly migratory. If these species are adversely affected by the loss of habitat in Humboldt Bay, the effects will be seen throughout the California coast and beyond. The uneven distribution of eelgrass resources increases the risk to this habitat and contributes to its dynamic nature. Moreover, the narrow depth range within which eelgrass can occur further places this habitat at risk in the face of global climate change and projected sea-level rise.

It should also be noted that, once degraded, healthy eelgrass beds are very difficult to re-establish, especially in the context of climate change. For example, considerable effort and funding has been dedicated to eelgrass restoration in Morro Bay over the past 10 years. Unfortunately, these efforts have thus far not proven successful and eelgrass has not significantly

⁸⁰ Merkel & Associates. 2014. San Francisco Bay Eelgrass Inventory. Report for the National Marine Fisheries Service. Santa Rosa.

⁸¹ Schlosser, S. and A. Eicher. 2012. The Humboldt Bay and Eel River Estuary Benthic Habitat Project. California Sea Grant Publication T-075.

recovered from its 90% decline in recent years. New research in Morro Bay⁸² shows that

Large-scale erosion following seagrass loss may be predictive of future shoreline and coastal habitat changes and is likely to be exacerbated by increased storm surge and sea level rise expected with climate change.

Many species that depend on eelgrass are highly migratory. If these species are adversely affected by the loss of habitat in Humboldt Bay, the effects will be seen throughout the California coast and beyond. The uneven distribution of eelgrass resources increases the risk to this habitat and contributes to its dynamic nature. Moreover, the narrow depth range within which eelgrass can occur further places this habitat at risk in the face of global climate change and projected sea-level rise. The National Oceanic and Atmospheric Administration (NOAA) has determined that there should be “no net loss” of eelgrass, a policy adopted by the DFW for other aquaculture operations in California.

The California Ocean Protection Council’s (“OPC”) “Strategic Plan to Protect California’s Coast and Ocean 2020 – 2025” Section 3.1.4 directs the OPC to “Work with partners to preserve the existing, known 15,000 acres of seagrass beds and create an additional 1,000 acres by 2025 by supporting projects that protect existing and potential eelgrass habitats as identified in habitat suitability mapping, consistent with the California Eelgrass Mitigation Policy.” In September 2020, the OPC passed a new Resolution committing its staff to work to support a 5-year review of the California Eelgrass Mitigation Policy (“CEMP”) to support the goals of:

More clearly prioritizing avoidance of impacts above minimization and mitigation; better define adverse impacts to suitable eelgrass habitat and providing a mechanism for ensuring there will be places for eelgrass to migrate with sea level rise; and incorporate emerging science on the role eelgrass plays in mitigating climate change impacts (e.g. sea level rise, acidification, hypoxia, carbon flux, wave energy attenuation).

This focus from the OPC is based on a recognition that eelgrass contributes to ecosystem functions at multiple levels: as a primary and secondary producer, habitat structuring element, substrate for epiphytes and epifauna, and a sediment stabilizer and nutrient cycling facilitator. Eelgrass provides important foraging areas and shelter to young fish and invertebrates, food for migratory waterfowl and spawning surfaces for invertebrates and fish, such as Pacific herring. Eelgrass is an essential refuge, foraging, and spawning habitat for many marine species, including such economically valuable species as Pacific salmon, Pacific herring, and Dungeness crab.⁸³ In addition, eelgrass has the capacity to sequester carbon in the underlying sediments and may help offset carbon emissions.⁸⁴

The Pacific Fishery Management Council’s Fishery Management Plan for the Pacific Coast Groundfish Fishery and regulations implementing essential fish habitat (“EFH”) designations for

⁸² Walter, R. et al. 2020. Large-scale erosion driven by intertidal eelgrass loss in an estuarine environment. *Estuarine, Coastal and Shelf Science* Volume 243, September.

⁸³ Plummer, M., et al. 2013. The Role of Eelgrass in Marine Community Interactions and Ecosystem Services: Results from Ecosystem-Scale Food Web Models. *Ecosystems*, Volume 16, Issue 2, pp 237-251

⁸⁴ Simenstad, C. A., and R. C. Wissmar. 1985. Delta carbon-13 evidence of the origins and fates of organic carbon in estuarine and nearshore food webs. *Mar. Ecol. Prog. Ser.* 22:141-152.

this fishery include Humboldt Bay as a Habitat Area of Particular Concern (“HAPC”) for Estuaries and for Sea Grass. An HAPC⁸⁵ is an area within designated EFH that is

Rare, particularly susceptible to human-induced degradation, especially ecologically important, and/or located in an environmentally stressed area. HAPC designations are used to provide additional focus for conservation efforts.” In designating sea grass habitat as an HAPC, fishery managers noted that it has great ecological importance and is sensitive to human-induced environmental degradation.

B. The DEIR fails to adequately analyze potential future impacts to eelgrass related to sea level rise and climate change

The DEIR finds less than significant impacts to eelgrass through constraining Project expansion into higher elevation areas as a result of sea level rise (IMPACT BIO-12). It asserts that “the eelgrass and shellfish culture will be expected and allowed to co-exist.” In contrast, a NOAA meta-analysis of 14 aquaculture and eelgrass studies in seven West Coast estuaries shows that shellfish culture on the West Coast is a stressor that negatively impacts eelgrass.⁸⁶

We found that eelgrass response metrics to shellfish aquaculture were generally negative, particularly metrics associated with abundance (biomass, density and percent cover).

Furthermore, sea level rise may expand potential habitat but rising temperatures and changes in sediment deposit and runoff have been shown to negatively affect seagrass habitat as shown for Morro Bay (described above). These potential future and cumulative impacts are not adequately addressed in this DEIR, nor is the mitigation provided adequate.

The Project Would Have Significant Adverse Impacts on Recreational Activities Such as Hunting and Birdwatching, and Vessel safety

The DEIR fails to mention or analyze recreation and vessel safety, despite the fact that these were significant factors in the Coastal Commission’s 2017 decision to remove Coast Seafoods’ operations from the north part of the East Bay and put in place Special Conditions related to gear marking and gear retrieval, and maintenance vessel traffic. Subsequently, in 2019, a fisherman in Southern California drowned when his vessel’s propellor caught in shellfish growing ropes and his boat capsized.⁸⁷ This event underscores the need to

Along with Morro Bay, Humboldt Bay is arguably the most important hunting area for black brant in California. In fact, a waterfowl tradition unique to Humboldt Bay was developed that centers around distinctive scull boat design, manufacture and use primarily for brant hunting in the shallow, narrow channels of the Bay.

⁸⁵ NOAA Fisheries. 2015. Habitat Areas of Particular Concern.
http://www.westcoast.fisheries.noaa.gov/habitat/habitat_types/HAPC.html

⁸⁶ Conway, T. et al. 2017. National Marine Fisheries Service. Eelgrass-shellfish aquaculture interactions in west coast estuaries: using meta-analysis to quantify sources of variation in effect size

⁸⁷ <https://www.latimes.com/socal/daily-pilot/news/story/2019-12-11/underwater-mussel-farm-reason-fishing-boat-capsized>

Hunting on North Humboldt Bay is generally limited per California Fish and Game Commission regulations to 3 days a week during the regular waterfowl season (mid-October through the last Sunday in January), for a total of only 27 hunt days. There is also a post-season youth hunt on the first Saturday and Sunday of February, which is restricted to youth 15 years of age and younger.

Brant hunting opportunity is even more limited, with the season only running from November 18 through December 14th (for the 2020/21 season). However, tides and the timing of the brant migration even further restrict the window of opportunity for brant hunting, so that there may be only a handful of days each year for brant hunters to use North Humboldt Bay.

Successful waterfowl hunting is dependent on a minimal amount of human disturbance in waterfowl habitat areas, including from artificial structures, powerboat traffic and foot traffic. Because of this, many waterfowl hunting areas managed by the D and U.S. Fish and Wildlife Service restrict or ban non-hunting uses during waterfowl season.

Humboldt Bay is a publicly-owned navigable waterway and subject to the Public Trust Doctrine. The public right of navigation over navigable waters extends to waterfowl hunting. As cited in State Attorney General Opinion 85-602: “In *Forestier v. Johnson*, supra, 164 Cal. 24, 40, the Supreme Court stated: “...the hunting of wild game...is a privilege which is incidental to the public right of navigation.” In *People ex rel. Baker v. Mack*, supra, 19 Cal. App. 3d 1040, 1048, the court interpreted *Forestier* as recognizing “that members of the public had an absolute right to navigate and hunt in small boats” on navigable waters.”

As such, navigable waters must be first and foremost managed in the public interest, rather than for any private gain. Private activities, such as mariculture operations, cannot obstruct the navigability of tidal waters or unduly impact with Public Trust resources, including wildlife and boat-dependent recreational activities such as hunting. We agree with concerns expressed by Ducks Unlimited that any expansion into areas important for brant – such as east bay- would likely cause unacceptable impacts.⁸⁸ The Yeung and HBHD-3 sites are located in areas exceptionally important for migratory waterfowl and Brant to feed and loaf, and a prized site for hunting.⁸⁹

The DEIR does not address impacts to birdwatching, another very important recreational use. Such impacts would likely result from disturbance of brant and other birds, and reductions in numbers of some bird species due to degradation of habitat and food sources. The Godwit Days festival – the only one of its kind in the world- held twice a year attracts over 600 participants, supporting local businesses and culture. The mudflat and patchy eelgrass complex in the east bay, and to a lesser extent the other Project sites, provide essential feeding and resting habitat for these migratory birds.

The Project could deplete planktonic food sources in Humboldt Bay

⁸⁸ Ducks Unlimited. 2015. Letter to Humboldt Bay Harbor, Recreation and Conservation District on the Initial Study: Coast Seafoods Company, Humboldt Bay Shellfish Culture Permit Renewal and Expansion Project. February.

⁸⁹ Brandenburg, S., Rosenberg, S., Romo, T., Frazer, S. Pers. Comm. with longtime Brant and waterfowl hunters who live in the Humboldt Bay area.

The DEIR acknowledges that cultured shellfish could compete for planktonic food resources, but it dismisses this potential impact as less than significant without sufficient explanation. The DEIR's assertion that "food resources are likely abundant enough that native species would not be significantly affected" is not substantiated. A 2015 analysis of carrying capacity attached as Appendix C to the DEIR, conducted by a contractor for the District is unclear and does not use current information on total shellfish mariculture in Arcata Bay, needed for an accurate analysis. This 2015 study should be updated and subject to independent peer review before a finding of impact significance is determined. The Project would add substantially to the biomass of filter feeding organisms relying on planktonic food in Humboldt Bay. Many other species in Humboldt Bay also rely on plankton for survival, including herring and Dungeness crab. The DEIR does not present any evidence that these planktonic food sources, however abundant, are not already being fully utilized.

The Project would have unavoidable and significant impacts to visual resources

We disagree with the assertion that the Project would have less than significant impact on visual resources from the presence of mariculture workers, and shellfish culture equipment. The DEIR makes false statements to support its finding of no significant impact: "Project sites are located between 0.15 to 0.70 miles from transportation corridors including Highway 101; due to the distance from shore, the appearance of workers at these intertidal sites [Yeung and HBHD-3, located 0.15 to 0.70 miles from shore] would be overwhelmed by the extensive saltmarsh, mudflat, and water between observers and subjects, rendering the workers and vessels difficult to see... and rendering [shellfish equipment] difficult to see from typical vantage points, with minimal visual effect."

In reality, the Project, in particular Yeung and HBHD-3, would in fact substantially degrade the existing visual character and quality of the site or surroundings. Birds at the sites – which are far lower in profile than aquaculture gear, vessels or workers- are easily visible from Highway 101. Drivers can easily see large flocks of waterfowl and shorebirds while driving on Highway 101 between Airport Road and Bracut. Furthermore, the sites are even closer to the public land at Bracut Marsh Ecological Reserve, which is accessible to the public for wildlife viewing and for scull boat launch from Rocky Creek Launch for recreational hunting in the east bay. Finally, in November the City of Arcata will open the northern section of the Bay Trail connecting Arcata and Eureka, a publicly funded project.⁹⁰ The Yeung and HBHD-3 sites would significantly degrade the wildlife and open space vistas of this trail, through flushing of birds, and the presence of aquaculture workers, vessels and equipment.

Cumulative Impacts

The DEIR's analysis of cumulative impacts suffers from similar flaws as its analysis of the impacts of the Project. The DEIR's severe underestimate of the Project's likely impacts to birds, eelgrass, recreation and vessel safety, and visual resources resulting in erroneous "less than significant effect" conclusions fundamentally undermines the cumulative effects analysis. In addition, the DEIR similarly underestimates the overall cumulative impact of the Project plus existing aquaculture operations. As discussed above, a thorough evaluation of likely future impacts from aquaculture operations readily demonstrates that the proposed project would have

⁹⁰ <https://www.cityofarcata.org/DocumentCenter/View/5718/June-2017-Humboldt-Bay-Trail-Powerpoint-Presentation-PDF?bidId=>

individually and cumulatively significant adverse impacts on multiple biological and ecological resources.

In sum, we disagree with the DEIR's conclusions that the Project would have less than significant impacts on numerous resources. Contrary to the DEIR's conclusions, the project is likely to have very significant impacts on shorebirds, waterbirds, protected habitats, visual resources, and recreational access and safety. The DEIR fails to accurately analyze or describe the likely impacts this project would have on the environment, including sensitive species and habitat protected under state and federal law and policy. We urge the Harbor District to produce a Revised DEIR which includes an Alternative that removes HBHD-2, HBHD-3, and Yeung, and is constrained to HBHD-1. This would satisfy the District's objectives for a substantial intertidal Project while ensuring globally significant resources; recreation; and vessel safety are protected from harm.

Sincerely,

Anna Weinstein
Director, Marine Conservation
National Audubon

Fred Harpster
President
Black Brant Group

Mark Hennelly
Vice President, Legislative Affairs and Public Policy
California Waterfowl

Gail Kenny
President
Redwood Region Audubon Society



Figure 1. Photos within Yeung and HBHD-3 areas in December, 2017. Numerous species of shorebirds and waterfowl are feeding and resting in the patchy eelgrass, mudflat, and channels in this area in the heart of east bay. These photos were taken from a stealth position in a scull boat specially designed for hunting and to not disturb birds as it moves through channels. Longtime Brant hunter Stan Brandenburg led the field trip. The top picture shows birds, including numerous Black Brant, over 100 m away flushing due to our presence, despite our attempts to not disturb them. Photos by A. Weinstein.



Figure 2. Coast Seafoods maintenance workers in Arcata Bay in 2016 up to their knees in eelgrass. Photo by California Department of Fish and Game.