

## **Appendix 2**



**To:** Jesse DeNike, Plauche & Carr  
**cc:** Erin Ewald, Taylor Shellfish

**From:** Chris Cziesla and Kelly McDonald

*Chris Cziesla Kelly McDonald*

**Date:** September 18, 2023

**Re:** Response to Post Hearing Comments on SHR2023-00003

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The following table provides responses by topic to comments received in response to the information provided on August 30, 2023, related to environmental impacts of Taylor Shellfish's proposed floating aquaculture farm in Oakland Bay (Mason County SHR2023-00003). The relevant comment letters for each of the topics are listed in the second column. Where necessary, references are provided to support the responses. Many topics and issues were already raised and addressed. In those cases, the reader is referred back to previous responses for further detail.

**Table 1. Responses to Post Hearing Comments on SHR2023-00003**

Topic	Relevant Comment Letters	Response	References
Dioxins and other toxins	Mark Hernickx, 08/31/23; Mark Herinckx, 09/03/23; Mark Hernickx, 09/03/23 (2 <sup>nd</sup> letter from same day); Betsy Norton, 09/09/23; Mark Herinckx, 09/09/23; Melissa Kennedy, 09/10/23; Nancy & James Hancharik, 09/10/23	<p>We acknowledge that the presence of dioxins and other toxins within Oakland Bay is of concern. Multiple commenters reference the sampling results from Ecology (2014). These results indicate levels of dioxins and furans above acceptable levels throughout Oakland Bay, with the highest mean levels of dioxins and furans (polychlorinated dibenzo-<i>p</i>-dioxins and polychlorinated dibenzofurans; collectively, PCDD/Fs) in Shelton Harbor (Ecology 2014). Dioxins continue to be a concern within Oakland Bay and are monitored by Ecology and the Washington Department of Health to ensure that shellfish grown in Oakland Bay are safe for consumption.</p> <p>Regardless, the potential for the proposed project to interact with or influence dioxin levels relies on the assumption that there would be significant sediment disturbance. Such disturbance could release toxins within the substrate into the water column. However, sediment disturbance would be limited to the installation of anchors and disturbed sediments are expected to remain within the vicinity of the anchor footprint. Therefore, there would not be displacement of sediments or introduction of toxins to the water column. This issue was covered in more detail in the August 30 responses on the topic “Anchor impacts”.</p>	Sandvik et al. 2014
Shading	Kim Robison, 09/02/23	Shading effects from the proposed floating gear are inherently minimized by the design. First of all, the bags are not solid and would allow for light penetration. Second, there is substantial space between bags and between lines minimizing shaded area below the array. Additionally, the gear will be constantly moved by wind, waves, and currents, which will further distribute any shading effects across the benthic portion of the site. Most importantly, the proposed site does not overlap with documented submerged aquatic vegetation. Therefore, shading from the proposed floating gear is not expected to have a significant effect on benthic habitat or submerged aquatic vegetation.	
Marine mammal effects	Kim Robison, 09/02/23; Devitt & Deborah Barnett, 09/07/23	Transient killer whales (also known as Bigg’s whales) have been documented in Oakland Bay, as indicated in previous responses, as indicated by data from the Orca Network. One commenter notes the error and bias associated with the Orca Network data due to the reliance on civilians who report sightings. This sampling bias is implicit to many citizen science datasets and is true of data collected opportunistically. Despite limitations in the observational data, the use of Oakland Bay by large marine mammals is relatively infrequent when compared to the rest of Puget Sound and very infrequent compared to known high use areas. Additionally, as described in the August 30 responses on the topic of “Marine mammal effects”, the array does not include loose lines which are the primary cause of known entanglements for marine mammals.	
Wildlife interactions	Andrew Greaves, 09/06/23; Bella Greaves, 09/06/23;	The potential effects to wildlife habitat from the proposed project (including marine mammal and bird habitat) were assessed in the Habitat Management Plan (Exhibit 8). The primary concern for marine mammals in the vicinity of the project is entanglement. This risk for harbor seals that occur in Oakland	Žydelis et al. 2008

	<p>Bill and Florence Fierst, 09/07/23; Tom and Melanie Nevares, 09/06/23; Patrick Pattillo, 09/10/23</p>	<p>Bay is consistent with that described previously for whales (refer to August 30 responses on the topic of “Marine mammal effects”). Documented entanglements along the US West Coast have been associated with gear that includes loose lines (e.g., crab or shrimp pot gear). The proposed floating farm does not include such loose lines and gear will be managed to limit entanglement risk. Harbor seals are not expected to be affected by the presence of the proposed gear; they commonly navigate through and around structures or gear in the water.</p> <p>Commenters additionally raise concern with loss of habitat for scoters and other diving ducks. Although the lease area for the proposed project is 50 acres, gear would not cover that entire acreage and scoters would be able to forage within much of the proposed farm area (gear would only cover 9.1 acres). We acknowledge that the proposed project constitutes a minor loss of open water foraging habitat for scoters and other diving ducks. These species, present in winter months during migration, would still be able to forage beneath the proposed farm footprint. Additionally, should the proposed project limit access to a small area of open water foraging habitat, such loss of habitat is not expected to result in effects to these species at the population level. Study of interactions between surf scoters and off-bottom shellfish aquaculture in British Columbia suggests that the scoters benefit from the higher densities of prey that grow on the shellfish gear (Žydelis et al. 2008). Although scoters may be excluded from small areas of open water foraging habitat by the proposed floating gear, they likely benefit overall from the greater availability of prey.</p>	
<p>Sediment and anchor effects</p>	<p>Ginny Douglas, 09/06/23</p>	<p>As described in the August 30 responses, installation of the anchors for the proposed project would have a minimal effect on the substrate, limited to the footprint of the anchors themselves. Once the anchors are set, further movement of the sediment is not anticipated to occur. Movement of the lines (for harvest or maintenance) does not require the anchors themselves to be moved or adjusted as the anchors would remain in place and the lines simply detached temporarily from the anchoring system.</p>	
<p>Excess nutrients</p>	<p>Ginny Douglas, 09/06/23; Bella Greaves, 09/06/2023</p>	<p>Regarding the potential for excess nutrients to result from the proposed project, the commenter is referred back to the August 30 responses on the topics of “Phytoplankton and trophic impacts” and “<i>Vibrio</i> and harmful algal blooms”. Because Taylor Shellfish is focusing on seed oysters at the proposed floating farm, the accumulation of excess nutrients from the cultured shellfish is unlikely. Regardless of whether seed or adult shellfish are cultivated, the net effect from shellfish aquaculture is removal of nutrients (via feeding on phytoplankton) from the water column and from the aquatic system when the mature shellfish is harvested.</p> <p>The potential for biodeposition from cultured shellfish to result in organic enrichment of the sediment beneath floating aquaculture farms has been assessed in the context of mussel rafts. Studies evaluating biodeposition under mussel rafts in Totten Inlet, South Puget Sound have shown that after three years of mussel cultivation there was no significant difference in sediment grain size or total organic carbon beneath, downstream or upstream of the raft array (Brooks 2006). It is important to note</p>	<p>Brooks 2006</p>

		that the stocking density (i.e., number or cultured organisms) is substantially higher at the Totten mussel farm than the stocking density being proposed for the Oakland Bay floating culture. Given the lack of biodeposition and sediment enrichment in a similar ecological setting with a substantially higher stocking density, it is extremely unlikely that any benthic changes would occur in the Oakland Bay project area.	
Scale	Ginny Douglas, 09/06/23; David Douglas, 09/10/23; Patrick Pattillo, 09/10/23; Nancy Wilner, 09/01/23	This issue was thoroughly addressed in August 30 responses (refer to the topic “Analysis area and scale of farm”).	
Water quality and circulation	Devitt & Deborah Barnett, 09/07/23; Patrick Pattillo, 09/10/23	Regarding water quality and the potential for the proposed project to result in beneficial effects to water quality through the filter feeding of the cultured shellfish, the commenter is referred back to the previous responses. It is acknowledged that seed oysters have a lower feeding rate than adult oysters and that the warmer water temperatures in Oakland Bay likely result in lower feeding rates, relative to shellfish in colder waters. These factors do not change the fundamental interaction between oysters and the system in which they grow: through filter feeding, oysters remove particulate matter from the water column and assimilate dissolved nutrients (e.g., Kellogg et al. 2013). This filtration has the potential to improve local turbidity (through removal of suspended materials) and help control the effects of nutrient loading resulting from human development. Such effects from the proposed project may not be significant or even measurable on a bay-wide scale, but the interaction exists nonetheless and should be considered.  Additional concerns have been raised related to water circulation and temperature within Oakland Bay. On this topic, the commenter is referred back to the previous response and the references included therein.	Kellogg et al. 2013
Microplastics and leaching	Betsy Norton, 09/09/23; Janey Aiken, 09/10/23; Melissa Kennedy, 09/10/23	The materials to be used for the proposed project (i.e., HDPE) are not considered to result in leaching of chemicals or introduction of microplastics. Taylor Shellfish employs gear management protocols throughout its farms, the proposed farm being no exception, and closely manages the age and condition of gear. This is in stark contrast to the reference cited by the commenter, which notes in the first sentence of the abstract that pearl-farming leads to plastic pollution because “the end of life of most farming gear is currently poorly managed” (Gardon et al. 2020).  Phthalates are “plasticizers” which help make plastic materials flexible. The HDPE containers and other materials proposed as part of the floating farm do not contain significant levels of phthalates. Additionally, the primary concern with polycyclic aromatic hydrocarbons (PAHs) is not leaching from the plastic material, but absorption or adsorption of these hazardous materials to the plastic from the environment. As noted in the report attached to the August 30 responses, plastics can act as a sink for marine pollution, including metal(loid)s, polyaromatic hydrocarbons (PAHs), and per- and	Gardon et al. 2020; Bhagwat et al. 2021

		polyfluoroalkyl substances (PFAS), and such pollutants were common in plastics that had been in the environment for over 10 years (Bhagwat et al. 2021). Given Taylor’s gear management protocols and the type of plastics being used, these issues are not considered to be potential effects of the proposed project.	
Reliance on studies conducted elsewhere	Bricklin & Newman, 09/10/23	This issue was thoroughly addressed in August 30 responses (refer to the topic “Analysis area and scale of the farm”).	
Fish passage and migration	David Douglas, 09/10/23; Patrick Pattillo, 09/10/23	<p>Commenters continue to suggest that the proposed floating array in Oakland Bay is somehow analogous to the Hood Canal floating bridge and therefore may present an obstruction to outmigration of salmonids and in particular, steelhead. As in previous responses to this concern, it is important to note the vast differences in the proposed floating array versus the structure of the Hood Canal floating bridge. Most importantly perhaps is the shallow profile (inches) and non-continuous nature of the Oakland Bay array which includes small baskets at the surface of the water with spaces in between each basket versus a non-interrupted, continuous, 15+ foot deep solid structure.</p> <p>Commenter Pattillo speculates that the proposed array would impede steelhead outmigration since juvenile steelhead use open water areas and are known to also use surface layers of the water column. While steelhead use open water and are surface-oriented, they by no means are restricted to these areas. Nor does the proposed project substantially obstruct use of the open water or surface layers. Steelhead are known to typically use the top several meters of the water column (WDFW 2011). One study conducted in British Columbia indicated that steelhead use the top 1 meter of the water column 72% of the time, suggesting that the remaining 28% of the time was at deeper depths (Ruggerone et al. 1990). Alternatively, another study recorded outmigrant steelhead making descents to depths of 50 meters (Walker et al. 2000). Ultimately, it is clear that juvenile steelhead may encounter the proposed array and will have ample space and area to move in, around, and under any structure they encounter. Given that steelhead travel at rates of up to 27 km/day in marine waters (Melnychuk et al. 2007), their interaction with the proposed farm in Oakland Bay will likely represent a nominal time period within their outmigration pathway.</p>	WDFW 2011; Ruggerone et al. 1990; Walker et al. 2000

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