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Sound Action (Comment on Shor22-0015)	1	<p>of shoreline development and related anthropogenic stressors. Although we work throughout the entirety of the Washington State portion of the Salish Sea, the organization originated on Vashon Island. Working as Preserve Our Islands, we previously worked to protect the Maury Island nearshore from the impacts of a proposed mining and barging facility.</p> <p>Sound Action performs our habitat protection work with a particular eye on ensuring regulatory tools are appropriately applied and that the best available science is considered and documented in any decision-making. In this role, we review every state development permit proposed for inland marine waters, which gives us a unique lens and experience level in nearshore habitat protection and the known impacts on ecosystem functions that come from this wide range of project proposals.</p> <p>We are a member of the Puget Sound Nearshore and Forage Fish and Foodwebs workgroups under the Puget Sound Partnership's Puget Sound Ecosystem Monitoring Program and served on the Prey Availability workgroup tasked with establishing salmon and orca-focused recommendations for Governor Inslee's Orca Task Force. We also lead in tracking and monitoring orca and other cetaceans when they are present in island waterways. With this experience base, as well as knowledge and evaluation of the baseline conditions at the proposed project site, we are writing with deep concerns regarding both this proposal and the permit process taken by King County.</p> <p>As a starting point, we are troubled that DLS has chosen the optional DNS process under SEPA.</p> <p>Although we believe the project applicant is well-intended, this proposal would convert approximately 10 acres of intact and fully functioning marine habitat into a commercial kelp and primarily non-native shellfish aquaculture operation. It is not benign and comes with a range of significant environmental impacts. Along with the nearby Vashon Kelp Farm proposal under SHOR22-0017, the proposal constitutes what would, in effect, be the first kelp farm project proposal in the state undergoing SEPA or any related form of environmental review as the Blue Dot pilot project location in Hood Canal was proposed on an existing aquaculture site. It would also be the first commercial shellfish aquaculture project in King County.</p> <p>In addition to ensuring that project impacts are carefully identified and considered, SEPA is one of the few tools that allows and even mandates public and stakeholder input.</p> <p>Not only does the abbreviated process of an Optional DNS eliminate the opportunity for meaningful public participation in what is currently an unprecedented type of development in Washington State, we see no support for a reasonable basis for King County to expect a DNS finding when considering the full facts. This proposal represents</p>	Introduction	Noted	
Sound Action (Comment on Shor22-0015)	2	<p>It does not appear that notice was provided to local environmental organizations. Sound Action is both registered on Vashon and well known as an island-based nonprofit working specifically on marine nearshore issues. We have historically provided comment letters to DLS on a range of environmental projects. We have been a party of record for similar projects, yet we received no notice of the application or comment period. Because of this, we only learned of the NOA and Optional DNS several days ago. As a result, our comments are abbreviated, and we have not had the opportunity to compile full reference lists and citations on the informing science.</p>	Permit Application Materials	For King County	
Sound Action (Comment on Shor22-0015)	3	<p>The NOA/SEPA document instructs that ... "Written comments on this application must be submitted to DLS at the address below." However, there is no "below" address provided, and it is unclear how comments for the record are to be submitted.</p>	Permit Application Materials	For King County	
Sound Action (Comment on Shor22-0015)	4	<p>There are no plans showing appropriate project or site detail. The submitted "site plan" is an overlay of a rectangle on an aerial image. Although there is a brief snippet of information at the end of the SEPA checklist, this section has information discrepancies or lack of clarity. It does not provide details related to tidal datum, vegetation presence, buoy sizes or specific locations or the dimensions of the lighted Private Aids to Navigation required by the Coast Guard. There is no detail on proposed shellfish growing mechanisms versus kelp or locations.</p>	Permit Application Materials	Additional project plans are available and have been provided to the County. Information regarding the location and interactions with existing eelgrass and macroalgae in the project vicinity is available in the SPARO Aquatics 2022 Eelgrass and Macroalgae Survey Report and SPARO Aquatics Impact Analysis Report.	
Sound Action (Comment on Shor22-0015)	5	<p>The submitted SAV survey is extremely limited and does not comply with state and federal requirements which generally call for a June to October survey time frame. The SAV and baseline survey submitted for this project was conducted in May 2022. Surveys conducted outside the June to October period will often miss vegetation or other habitat or species presence or abundance due to natural cycle dieback.</p>	Permit Application Materials	There are no state or federal requirements for June to October surveys for macroalgae. Preliminary surveys designed to determine if eelgrass or macroalgae are present, evaluate if the project can be located and constructed to avoid impacting eelgrass or macroalgae, or to establish a location for the project that will minimize impacts "may be conducted at any time during the year" (WDFW 2008). Advanced survey methodologies used to quantify impacts to eelgrass when present requires a June to October timeframe in order to establish more detailed quantitative data. No eelgrass is occurs at the sites due to the site depth being deeper than any documented eelgrass in Washington State so eelgrass survey expectations and timing requirements do not apply to these sites. The absence of eelgrass at the project site was confirmed during the surveys conducted.	<a href="#">WDFW 2008</a>
Sound Action (Comment on Shor22-0015)	6	<p>The SAV survey reports transects spaced 50 feet apart. Underwater visibility is extremely limited in Puget Sound. Based on conditions captured at a Sound Action underwater camera installed along Maury island, less than ten feet would be visible along each side of a transect -- which leaves a large area between each transect line that has not been surveyed or evaluated.</p>	Permit Application Materials	Underwater video surveys have successfully been utilized to describe eelgrass and macroalgae distributions for marine projects. The recommended survey methodologies from WDFW and others all rely on the interpolation of conditions between survey tracts, especially when the survey areas are large and exhibit similar characteristics across transects. The survey at the SPARO Aquatics site followed a systematic survey design to identify representative conditions within the study area.	
Sound Action (Comment on Shor22-0015)	7	<p>The limited SAV survey reports a significant volume of wild kelp and native macroalgae -- yet no detail is provided about where this vegetation is within the project site.</p>	Permit Application Materials	The SAV report provides an overview of the site sufficient for identifying the potential for effects to SAV communities from the project. The distribution of kelp is also described in this report with some amounts (10-60% cover) in shallow depths (25-35'), less than 5% cover in depths between 45-80', and no macroalgae at depths exceeding 80'. Bathymetry information is also provided as part of this report. It is therefore relatively straight forward to determine where macroalgae is present in relationship to the project area.	

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Sound Action (Comment on Shor22-0015)	8	Similarly, there was no survey or information provided on the habitat and SAV found in the adjacent nearshore area. There are a range of project impacts that could impact this landward area of the project site – for example, long-line aquaculture can affect the hydrodynamics and littoral process of the area, having, in turn, a potential effect surrounding ecology.	Permit Application Materials	The comment letter references an area well beyond the potential area of effects for the project. The study area encompasses the project footprint and a buffer surrounding it. Studies evaluating current velocity within and outside longline aquaculture in Willapa Bay showed non-significant differences in velocities and concluded that oyster flip bag plots do not have a significant effect on tidal currents or the sediment transport processes associated with tidal currents (Confluence 2016) .	
Sound Action (Comment on Shor22-0015)	9	Humpback whales are regularly at the site and site area, yet the environmental checklist omits Humpbacks as listed species known to be on or near the site.	Omissions	Although sightings of humpback whales in the Salish Sea have increased substantially from a baseline of less than 50 sightings per year prior to 2000 to approximately 500 observed in 2015, Humpback whales are rarely observed in central Puget Sound. Sato and Wiles (2021) reports that "Washington Salish Sea sightings have been concentrated in the Strait of Juan de Fuca and near San Juan Islands, but are also reported throughout Puget Sound, including Hood Canal and as far south as Olympia (Calambokidis and Steiger 1990, Calambokidis et al. 2017, Palacios et al. 2020)." Further, whales feeding in coastal Washington have been tracked using photo-ID to 3 stocks with the majority (63.5%) coming from the Hawaii DPS which is unlisted and the balance coming from the ESA endangered Mexico and Central America DPSs (Wade 2017). The ESA Section 7 consultation between the US Army Corps of Engineers and National Marine Fisheries Service (NMFS) addressed humpback whales, with the biological evaluation concluding the project is "not likely to adversely affect" Humpback whales and that any effects would be insignificant and discountable (Endangered Species Act Biological Evaluation, 2022).	<a href="#">Sato and Wiles 2021</a>
Sound Action (Comment on Shor22-0015)	10	The proposed project site is in an aquatic area adjacent to a natural shoreline environment designation. Per King County Code 21A.25.100, in the natural shoreline environment and aquatic areas adjacent to the natural shoreline environment, aquaculture activities are limited to activities that do not require structures, facilities and that will not alter the natural systems, features or character of the site. This conflict with the code is not discussed or recognized anywhere in the documentation.	King County Code	The proposed project is an allowed use within the Aquatic shoreline environmental designation and adjacent to a conservancy (not natural as state in the comment) shoreline environment designation as "aquaculture, not otherwise listed" pursuant to KCC 21A.25.110. Furthermore per Conservancy Shoreline Environment Management Policies: S-516.1. "King County should allow aquaculture, forestry and agriculture in the Conservancy Shoreline Environment."	
Sound Action (Comment on Shor22-0015)	11	Per 21A.25.110, Aquaculture activities that, after implementation of mitigation measures, would have a significant adverse impact on natural, dynamic shoreline processes or that would result in a net loss of shoreline ecological functions shall be prohibited. As outlined below, this proposal introduces a range of impacts on habitats, species and ecological functions	King County Code	See responses below on impacts to habitats, species, and ecological functions. As proposed the project would not result in the net loss of shoreline ecological function and may provide beneficial functions.	
Sound Action (Comment on Shor22-0015)	12	Per 21A.25.110, Aquaculture should not be located in areas that will result in significant conflicts with navigation or other water-dependent uses. The project site is a highly used boating area with a significant volume of recreational boats commonly utilizing the area.	King County Code	The project has been sited to avoid conflict with navigation channels and commonly used routes. The project area is NOT a highly used boating area. While the interior of farm area itself may limit some recreational boating activity, the farm will be clearly marked and easily avoided with large areas surrounding the project area remaining unchanged and fully accessible.	
Sound Action (Comment on Shor22-0015)	13	Listed Humpback whales also commonly use -- and even favor -- the project site with regular reports documenting foraging at the site area, often daily and for weeks at a time.	Potential Cetacean impacts	While humpback sightings in the Salish Sea have increased in recent years, the vast majority of sightings occur in the Strait of Juan de Fuca and over 65% are from unlisted Hawaii stocks. It is not accurate to characterize use of Colvos Passage or the project site as common and there is no evidence of preferential use. No data is provided to support these claims.	
Sound Action (Comment on Shor22-0015)	14	Benthic shading by kelp farming can affect understory algae and benthic habitats, as artificial top-down kelp canopies can reduce the light that reaches the benthos. Natural macroalgae communities grow bottom up. Cultivated seaweed habitats differ from natural macroalgal habitats as the crops must be cultivated in surface waters at depths that optimize levels of Photosynthetically Active Radiation (PAR). As a result, the cultivation of seaweeds on surface waters can shade underlying habitats. Although little detail on shellfish growing has been provided, the bags and lines typically associated are also documented to create shade impacts.	Potential SAV Impacts	The project area has limited macroalgae present, with the highest densities (10-60% cover) located in the shallowest zone (25-35' depth). The kelp lines will only occupy a limited portion of the project area and will be located over the deeper portions (>35'), which has a very low density of macroalgae of less than 5% cover.	
Sound Action (Comment on Shor22-0015)	15	Shading is also well documented to create impacts on juvenile salmonids. Not only do juvenile salmon avoid shaded areas, they are visual feeders, and reduced light diminishes their ability to find food. This proposal includes water column areas used by juvenile salmonids, and impacts would be expected.	Potential SAV Impacts	This comment is inaccurate and misleading. Shading impacts to juvenile salmonids have been documented for life stages when juvenile salmon are shore oriented. These studies suggest that fish move into deeper water to avoid moving underneath dark structures. This movement to deeper water creates predation risk and predators may preferentially use shaded areas. This mechanism of effect is not associated with this project for several reasons. First, the vast majority of juvenile salmon present along Vashon shorelines originate from freshwater systems not on the Island (there are limited natal streams on Vashon with no ESA listed stocks present) and therefore, these older individuals are typically less shoreline oriented, since they have already chosen to cross deep waters to get to the Vashon shoreline. Second, the project areas where shading from kelp would occur is in waters deeper than 35' located away from the shoreline, allowing any shoreline migrating individuals passage without entering the project areas. Third, the concept of shade as an impact to juvenile salmon comes from literature associated with docks and overwater structure, extending perpendicular from shore, with static, well-defined light dark edges causing a behavioural avoidance response from some individuals. Shade from kelp, as well as the structure provided by kelp, are different in fundamental ways including: the location (deeper water and within the water column); moving versus static nature of the shade (as the kelp moves in the water); and, the refugia from predation and prey resources provided by kelp. The beneficial ecological functions of kelp (e.g., refugia, prey resources, nurseries for juveniles) are precisely why eelgrass and macroalgae are protected habitats. The kelp aquaculture will provide many of these same beneficial ecological functions for juvenile salmon.  This mechanism is not transferable to structures that are not attached to shore and occur in deep water like the proposed project. Fish may move around these structures with no change in water depth or predation risk.	

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Sound Action (Comment on Shor22-0015)	16	Shellfish growing on lines is also documented to impact benthic habitats through shading, shell debris alterations and biofouling.	Potential SAV Impacts	The scientific literature on shellfish impacts to benthic habitats suggest that areas with shellfish and with shell have increased diversity as compared to mud and sand habitat (DeAlteris et al. 2004, Hosack et al. 2006). In the project area, the predominant substrate is cobble, so it is indeterminate whether the addition of shell would increase diversity due to the similarity in size of the material. Biofouling on shellfish lines primarily consists of attached macroalgae, so while termed "biofouling", this does not represent a negative impact to the environment. Shading is discussed in previous responses, however the location of the kelp lines within the project area will avoid deleterious effects of shade.	
Sound Action (Comment on Shor22-0015)	17	Natural kelp beds are anchored in the seabed and have a bottom-up effect on currents and sedimentation rather than the predominantly surface-impacting structure of suspended kelp culture.	Currents and Littoral Effects	Natural bull kelp beds reach the water's surface and would therefore have effects on water movement throughout the water column.	
Sound Action (Comment on Shor22-0015)	18	Top-down kelp and shellfish farming has been documented to alter the hydrodynamics at a project site and in adjacent areas. Impacts include changes in wave energy, water current, nutrient availability and related littoral processes that are often significant.	Currents and Littoral Effects	See response to #19	
Sound Action (Comment on Shor22-0015)	19	Alterations to water flow can affect the biodiversity and carrying capacity of a project site and adjacent areas by reducing water exchange necessary for maintaining levels of nutrients required for growth. These alterations could have implications for the adjacent and below benthic and pelagic habitats, which would experience altered flow dynamics resulting from changes to surface boundary conditions.	Currents and Littoral Effects	The project is not expected to have a significant effect on water flow. Currents may be locally affected within the boundaries of the site, but water movement and associated processes are expected to reform immediately down current from the project area. See also response to Comment #8 above. Puget Sound waters have abundant nutrients from both natural and anthropogenic sources and concerns over excess anthropogenic contributions potentially leading to eutrophication have been a consistent concern as regional populations have continued to grow. This poly culture system includes both use of and contributions to nutrients in the project area and harvesting allows for removal of excess nutrients which have been incorporated into the kelp and shellfish tissues. This excess nutrient removal is considered an ecological benefit given the extensive human nutrient inputs into Puget Sound.	
Sound Action (Comment on Shor22-0015)	20	Additional impacts can result from changes to sedimentation and littoral processes, which in turn impact the habitats present at and adjacent to the proposed project site.	Currents and Littoral Effects	No changes to sedimentation or littoral processes are expected given the offshore location of the project area.	
Sound Action (Comment on Shor22-0015)	21	Currently, kelp aquaculture uses a small amount of reproductive material to produce project spores. As a result, the kelp on an individual farm commonly has a similar genetic composition. This farmed kelp can release gametes into the surrounding ecosystem that could outcompete or replace wild gametes. Over time, local or even regional kelp populations can experience genetic degradation towards a genetic makeup similar to that of the farmed species as spores from the farm drift freely through the water.	Genetic Diversity	The project is coordinating with the Puget Sound Restoration Fund (PSRF) which has developed a conservation hatchery with NOAA to propagate kelp for restoration and related activities. Genetic diversity and using seed stock that is local to the project vicinity is an important component of the project. Strong population structure (i.e., genetic differentiation between stands of natural kelp) has been documented for certain kelp species (e.g., Luttkhuizen et al. 2018), supporting the importance of limiting movement of genetic information and using local seed stock.	<a href="#">Luttkhuizen et al. 2018</a>
Sound Action (Comment on Shor22-0015)	22	Genetic diversity in the wild stock kelp population is correlated with disease resistance and increased protection against other anthropogenic stressors. In contrast, downgraded genetic diversity is widely understood to create a risk to wild stock health.	Genetic Diversity	See response to #21	
Sound Action (Comment on Shor22-0015)	23	The proposed project site is in a designated critical habitat area the Endangered Southern Resident orcas regularly use for foraging and transit in the late fall and early winter when salmon runs are present in the South Central Puget Sound area and scarce elsewhere. This is not speculative, and the whales have been documented using the project site for decades.	Potential Cetacean impacts	Noted and agreed that the vicinity of the project area is occasionally visited by Orcas, mostly from the transient population with less frequent use by listed resident Orcas. Potential effects to Orca were evaluated as part of the ESA consultation and NMFS concluded the project is "not likely to adversely affect" Orca.	
Sound Action (Comment on Shor22-0015)	24	Note that in the BE, the project consultant incorrectly reports the project area is a part of the Orcas Summer Core Critical Habitat Area and that "Orcas may occur in the action area while summer construction activities occur." However, the site is not a part of the Summer Core Habitat, and the Southern Resident Orcas are not present in island waterways during the summer. The project site is part of the Puget Sound Critical habitat area, and as noted above, the whales regularly utilize the site location during the fall and winter	Potential Cetacean impacts	Agreed. The BE misstated the timing of use of the project area by Southern Resident killer whales. Based on past sightings (Orca Network 2022) and as indicated here, individuals may be present within the project area during the fall and winter months.	<a href="#">Orca Network 2022</a>
Sound Action (Comment on Shor22-0015)	25	The long line infrastructure presents a significant risk of entanglement and injury that could easily occur during travel or when the orcas are chasing salmonid prey.	Potential Cetacean impacts	As part of a synthesis effort by the National Marine Fisheries Service (NMFS) and Puget Sound Restoration Fund evaluating opportunities and challenges associated with kelp aquaculture in Washington State, the risk of Orca entanglement within kelp aquaculture sites was evaluated. Searches of the scientific literature and outreach to NMFS marine mammal experts failed to identify any known instance of Orca entanglements with aquaculture gear worldwide (Dan Tonnes NMFS, pers comm. Sept 27, 2022). Similarly the World Wildlife Fund has been working on this concern and states " <i>There have been no credible documented marine entanglements in 40 years.</i> " <a href="https://www.worldwildlife.org/industries/farmed-seaweed">https://www.worldwildlife.org/industries/farmed-seaweed</a>	<a href="#">Saez et al. 2021</a>
Sound Action (Comment on Shor22-0015)	26	Although there is a lack of clarity on the infrastructure of the proposed project in the application documentation, a typical Kelp and shellfish long-line development of this size would have dozens of horizontal growing and vertical anchor lines installed at the project site. In addition, there would be over 100 vertical lines and floats running upward from the growing lines. The abundance and tight spacing of these combined lines creates a barrier effect that could prevent an adult orca from fully surfacing normally in the likely event that the whale attempts to enter the project site while foraging. Similar entanglement risks would be present through normal movement behaviors like breaching, porpoising, tail and pectoral slapping and surface rolling.	Potential Cetacean impacts	Note that the reported project size includes sufficient area for scope of the lines; aquaculture lines would cover only a portion of the 10-acre project area. See response to #25 for information on entanglement risk.	
Sound Action (Comment on Shor22-0015)	27	In addition to the risk of injury or entanglement from intact infrastructure lines, there is also a risk from lines that may become loose or separated from the supporting float. This is a common event in aquaculture and is highly likely at the site, given that it directly faces the substantial winter weather systems that come from the SW.	Potential Cetacean impacts	Site maintenance will include regular inspection of lines and removal of any project components that are worn or showing signs of failure. If a float separates from a line, the line would either sink or partially sink. The commenter has inappropriately conflated shellfish aquaculture floats which are attached to baskets that are attached to lines with kelp aquaculture where lines that are anchored on both ends use floats to bring the line to optimal kelp growing depth just below the surface.	

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Sound Action (Comment on SHOR22-0015)	28	The proposal also presents a similar entanglement risk to other cetaceans, including humpback whales and transient orcas that are also commonly at the site area.	Potential Cetacean impacts	The presence of lines within the water column has been identified as a potential entanglement risk. A review of whale entanglements along the U.S. West Coast between 1982 and 2017 found that confirmed entanglements were primarily a result of fisheries using netting (34%) or pots/traps (22%) or unidentified (44%) (Saez et al. 2021). Both of these fisheries represent methods where lines or nets are oriented vertically within the water column and either unattached at one end or actively moving through the water column. Entanglement events with kelp longlines have not been reported (Grebe et al. 2019). Measures will be taken to minimize the entanglement risk to the extent practicable. Also see response related to Orca entanglement risk above.	<a href="#">Grebe et al. 2019</a>
Sound Action (Comment on SHOR22-0015)	29	Although the project consultant suggests that orcas would use echolocation to avoid lines and that no cases have been reported in the Puget Sound of entanglement by any cetacean, both of these statements are without basis.	Potential Cetacean impacts	See response to #25 and #27.	
Sound Action (Comment on SHOR22-0015)	30	There is no evidence to support that orcas would or even could use echolocation to determine a line or lines covered with native kelp as an area or object to avoid. Further, Orcas are attracted to the kelp beds around the Pacific Northwest, and they often play with and interact with the vegetation itself. This behavior has been observed so often that it has been dubbed "kelping."	Potential Cetacean impacts	Numerous killer whale encounters have occurred near floating structures including foraging by transient killer whales inside a marinas and under a floating breakwaters in Puget Sound in 2022. These structures are also colonized with kelp and macroalgal communities. Similar observations have occurred on shellfish harvest areas and near mussel rafts. Gill and seine net fishing occurs adjacent to San Juan Island within prime Orca foraging areas. There have been no documented reports of Orca entanglements within these lines or structures.	
Sound Action (Comment on SHOR22-0015)	31	There have also been multiple cases of cetacean entanglement in Puget Sound, and orca (and other whales) entanglement by long lines documented worldwide. In a recent 2022 regional case, a dead juvenile orca was discovered off the Oregon coast with a crab-pot line wrapped around its tail.	Potential Cetacean impacts	Crab pots have been identified as a source of entanglement risk for cetaceans and are the cause of many US West Coast entanglements. Reports of these entanglements are from US West Coastal waters and not from Puget Sound. The project proposal includes lines anchored at both ends that do not include large amounts of slack that can wrap around a passing cetacean. Similar mooring systems in Washington and BC include mussel rafts, fish pens, and other kelp aquaculture operations. These structures have not been associated with any entanglements. NMFS did not identify entanglement as a risk as part of its analysis of the project when specifically considering potential effects to whales (i.e., humpback and orca) and concluded the project would not adversely affect the species or designated critical habitat (NMFS Letter of Concurrence June 24, 2022)	
Sound Action (Comment on SHOR22-0015)	32	Even if orcas or the humpbacks that regularly use the area somehow knew to avoid the project site, impact would occur due to displacement from important foraging and transit areas. For the orcas who are desperate for food, this is not insignificant and must be given the full weight of consideration.	Potential Cetacean impacts	There is no evidence the project would reduce forage resources for cetaceans or killer whales. Indeed, kelp is a nursery habitat for many fish species and it is likely forage resources would increase as a result. The 10 acre project area represents less than 0.1% of the 9,820 acres included as Colvos passage. These conclusions are supported by the conclusions in the Endangered Species Act Consultation Letter of Concurrence (LOC) evaluating effects to listed species including salmon and marine mammals. NMFS concluded that effects to behavior, movement, prey resources, risk of entanglement are "discountable, insignificant, or beneficial" and is not likely to adversely affect listed species and designated critical habitat (NMFS LOC; WCRO-2022-00938).	
Sound Action (Comment on SHOR22-0015)	33	In closing, we would like to reiterate our belief that the project applicant is motivated by good and commendable intentions. However, there are clear and significant project impacts that at a minimum require a detailed review and substantive public participation opportunity. With this, we request that King County step away from the Optional DNS pathway and move to a more substantive review and SEPA process. We would also like to note that while the proposal suggests there would be significant project benefits to environmental conditions and biodiversity, the most current non-industry developed evaluation found that it is unlikely that kelp farms act as kelp forests and deliver meaningful biodiversity outcomes. A short list of abbreviated core references is outlined below. We welcome any questions or input and can be reached via phone or email.	Closing	Noted. While we acknowledge that the referenced review indicates that kelp farms may not function as kelp forests, the same paper (Forbes et al. 2022) also recognizes that kelp farms confer their own valuable ecological services, including support of restoration and conservation. Lack of functioning as kelp forests does not preclude substantial and meaningful ecological value including carbon sequestration, nutrient cycling, habitat provisioning, food security, among others (as reviewed in Theuerkauf et al. 2022).	<a href="#">Theuerkauf et al. 2022</a>
Patrick Christie (Comment on SHOR22-0015)	34	I'm commenting on the proposed mariculture installation off of Vashon Island (permit SHOR22-0015). I am a Vashon resident (living about 3 miles north of the project site near the waterfront) and am a UW professor in marine policy. In general, I favor this project. Aquaculture, if well managed, provides local and healthy food and has the potential to support ecosystem recovery. While it's clear that kelp farming is unlikely to offset carbon emissions /acidification in any significant manner, setting aside areas that are off limits to extraction can allow ecosystem recovery. It is essential that the Tribal Usual and Accustomed fishing rights are respected, but it's my understanding that the Puyallup Tribe has approved this farm. I can imagine that local residents may not wish to look at a mariculture installation, but there are many eyesores, including overly large houses approved by King County that detract from the view scape.	Introduction	Noted. Thank you for your support.	
Patrick Christie (Comment on SHOR22-0015)	35	Local recreational and commercial fishers may raise concerns, but there are few marine protected areas that preclude fishing anywhere in the Puget Sound. (As an expert in MPA implementation, and based on hundreds of interviews of Puget Sound residents that I've conducted with UW graduate students, the majority of Puget Sound residents support MPAs.)	Permit Application Materials	Noted.	
Patrick Christie (Comment on SHOR22-0015)	36	The project will need to avoid adding any water pollution, as was associated with prior salmon farms in Puget Sound due to overfeeding, etc. The permit states "The mariculture farm will grow sugar kelp, clams, mussels, oysters, and possible scallops at one location.: As such, there is no risk from pollution from feeds, and the farm may locally improve water quality. I'm assuming pen cleaning and defouling will be conducted manually without chemical applications. Native or naturalized species will be grown, unlike with Atlantic Salmon farming.	Permit Application Materials	The project description appropriately states that the potential for pollution is avoided due to the lack of any feed being utilized. Water quality issues associated with salmon farming are distinctly different from those associated with kelp farming. Cleaning and removal of biofouling would be conducted manually and is not expected to result in significant changes to water quality or associated benthic habitat.	
Patrick Christie (Comment on SHOR22-0015)	37	In short, this is an important development in the Puget Sound, and I welcome it. The Sound was once a significant source of sustainably sourced food, but that is no longer the case. We should experiment and look for solutions that align with ecosystem recovery, provide jobs, and encourage maritime businesses.	Permit Application Materials	Noted, thank you.	
Patrick Christie (Comment on SHOR22-0015)	38	I assume there will necessary ongoing biological impact monitoring.	Closing	There are ongoing discussions with University of Washington, Sea Grant, and the National Marine Fisheries Service about potential biological monitoring and studies associated with the project. These study plans will continue to be defined as the project becomes operational.	

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Karen A. Davis (Comment on Shor22-0015)	39	In addition to the concerns that I sent to you regarding the Vashon Kelp Forest, I am writing to express my concerns about this proposal and to let you know that I do not support it. I did not receive notice for this one directly, so have had even less time to research it once I became aware, but I understand that this proposal involves shellfish in addition to seaweed and does not propose any kelp restoration. The two proposals have the same comment period and the same planner, and I am disappointed with the county's decision to elect an optional DNS notice process and with a predetermined intention to issue a SEPA DNS for an unprecedented and untested practice in Vashon Island Salish Sea waters where ESA species are present. This process will not allow proper time or input concerning community and environmental considerations.	Permit Application Materials	For King County	
Karen A. Davis (Comment on Shor22-0015)	40	This site is not located directly off of a treasured island preserve like the other one, but I am still concerned about the multiple flashing lights that will be required by the Coast Guard. Artificial light will pollute the night sky and could cause negative issues for wildlife and people.	Visual Impacts	It is expected that the Coast Guard would require approximately 8 navigational lights, one at each corner and at the midpoints. Lights would have a 1 mile visibility and would flash on 10 times per minute (i.e., every 6 seconds). Within the context of residential and other development in the area, such lighting is not expected to result in negative issues for wildlife and people.	
Karen A. Davis (Comment on Shor22-0015)	41	Photoperiod is important for plants and animals, and artificial light can disrupt nesting and breeding. Artificial lighting is also known to disorient migrating birds, causing them to crash and become exhausted. It can also have a negative effect on foraging, schooling, migration and reproductive behavior of aquatic species.	Potential Wildlife Impact	The lighting described in #40 is not considered to be sufficient to result in impacts to photoperiod, disrupt nesting and breeding, or disorient birds or aquatic animals. The lighting would be according to Coast Guard requirements which are standard across the country. Again, given the context of the surrounding area, lighting associated with the proposed project is not expected to impact migrating birds or aquatic species.	
Karen A. Davis (Comment on Shor22-0015)	42	I am also concerned about the vertical lines and potential to entangle wildlife. Both WWF and Sierra Club state that entanglement is a seaweed farming risk for both nearshore and offshore. It is thought not to be common, but--by all accounts--not a very studied practice. For me, any entanglement is unacceptable, especially relative to the presence of ESA species.	Entanglement	See responses to #27, #28, and #31	
Karen A. Davis (Comment on Shor22-0015)	43	I request that the county take more time, conduct a more substantial environmental review with a more rigorous and involved public and stakeholder process, including a public hearing. This application should go through a thorough ESA review as well due to the presence of several ESA species, notably several specials of fish (including Chinook salmon), Grey whales and Southern Resident orca.	Permit Application Materials	The project has undergone ESA review through Section 7 consultation between the US Army Corp of Engineers and the National Marine Fisheries Service and US Fish and Wildlife Service. All agencies concurred that the project will not adversely affect listed species and designated critical habitat. This included analyses for Chinook salmon, humpback whales, southern resident Orca and numerous other listed species and their habitats.	
Karen A. Davis (Comment on Shor22-0015)	44	Please send me notification of any official notices concerning this application and thank you for your attention to and consideration of my input: kdavissmith@yahoo.com	Closing	For King County	