

Adverse Impact of Geoduck Aquaculture on Forage Fish In Henderson Inlet.

Forage fish known to be found at the proposed aquaculture site in Henderson Inlet are primarily the Pacific Sand Lance and the Surf Smelt. These are small fish that are very important in the food chain of the Salish Sea and a significant source of food for salmon. Their life cycle includes a tiny(3mm), larval form after the eggs hatch.

Both species have been Identified as prey for nearshore dwelling salmonids. Surf Smelt have historically supported commercial and recreational fisheries. In all their developmental stages, from larva to adult, the Surf Smelt and Sand Lance represent a prey species for numerous predators. They depend on both planktonic and benthic food sources. Surf smelt are believed to return to their own specific beaches to spawn in the same way that salmon return to their home rivers. Surf Smelt have been documented to spawn in the South Puget Sound from July to April.

A 2015 article, published in the Marine Ecology Progress Series Appendix 2A), reports that surf smelt have declined in the central and south Puget Sound by “up to 2 orders of magnitude” over a 40-year study period. “These patterns suggest possible linkages between coastal anthropogenic activities (e.g. development, pollution) and the decline of forage fish.” What does that mean? $10 \times 10 = 100$ times reduction. Surf smelt are now at 1% of their levels compared to 40 years ago.

I want to bring attention to the work of Daniel Penttila, a marine biologist who worked with the Washington Department of Fish and Wildlife for 38 years. He researched and presented specific information about the risk of geoduck aquaculture to forage fish in Henderson Inlet.

(Appendix 2B)

His work documents the presence of Surf Smelt on the same beach as this proposed geoduck site, mapped below. Note known surf smelt zones in green and sand lance spawning in red. (Appendix 2C)

Taylor's experts suggests that the spawning of forage fish would be at higher tidal levels on the beach than where they would plant geoduck and that mitigation of activity on that upper beach would minimize impact on the fish. This is a speculative response, and they cite no scientific studies that *prove* no impact.

Even if these forage fish are able to spawn, the geoduck themselves represent a potentially overwhelming negative impact on these forage fish by eating their juvenile larval forms as they migrate down the beach after hatching.

Mr Penttila's research showed that clams don't just eat phytoplankton. They also filter-feed on a broad variety of zooplankton including the yolk-sac larva of forage fish. This has been documented in softshell clams, Quahogs and ribbed mussels and is likely much greater in larger species of clams including geoduck. He raised concerns over the lack of specific research into the effect of mass plantings of geoduck on the populations of forage fish due to larval mortality from ingestion. He raises further concerns over geoducks competing for food that's critical for forage fish and juvenile salmonids. Neither concern has been addressed with research.

Penttila quotes USFWS Nationwide Permit 48 which says "Since it is plausible that geoduck will compete for prey resources (particularly in sheltered bays and coves and when they are planted in high densities) and dominate as a consumer of the local food web, you must conclude

that juvenile salmonids and forage fish will have less to eat which will lower their growth rate and survival.”

The 250,000 geoduck that Taylor proposes to grow at this site will filter at least 7.5 million gallons of water per day. The potentially huge impact of zooplankton consumption by geoduck simply cannot be ignored.

While on the subject of filter feeding, consider that Taylor’s experts heavily market aquaculture as being beneficial to shorelines by “cleaning” the water. Bill Dewey very recently did so in his Zoom presentation for the Estuarium. What shellfish are actually doing is simply feeding off the nutrient rich waters. Shellfish aquaculture can be a benefit in waters that have undergone eutrophication (where a water body becomes overly enriched in nutrients leading to overgrowth of algal plant life) such as the Chesapeake Bay. The waters of Henderson Inlet are not eutrophied, are normally rich in nutrients, and need no “cleaning” from aquaculture. Shellfish incorporate other pollutants such as toxic chemicals, heavy metals, and microplastics they filter from the water and become contaminated themselves when such are present. Shellfish also don’t clear pathogenic bacteria from the water and our waters are closed for harvest when coliform contamination occurs from runoff from the watersheds of the cities of Lacey and Olympia.

Furthermore, the citizens who live around Henderson Inlet are already heavily regulated over their runoff and septic systems and must pay into a “special tax” program to support Thurston County’s enforcement of clean septic regulations. My annual “special tax” assessment in 2023 was \$126. I have spent \$7000 in the past 2 years to comply with these rigid requirements. Taylor Shellfish and Kyle Mazanti do not pay any substantial portion of these taxes, but certainly benefit with immense profits from the already-clean water the program ensures.

The bottom line:

- Although Surf Smelt are reduced to 1% of their former population in Puget Sound, they still exist in significant numbers along with sand Lance at the proposed site in Henderson Inlet. Their spawning beds may be negatively impacted by this project, threatening the species even more.
- Taylor presents no science that proves their operation is safe for forage fish.
- Predation of larval forms of these forage fish by geoduck is very likely and can't be mitigated.
- Secondary effect of geoduck predation on larvae likely will have negative impacts on other species up the food chain, from salmon to orcas.
- Adverse effects of this project on forage fish cannot be mitigated.
- Intensively planted geoduck do not provide a cleaning effect on the waters of Henderson inlet. In fact, they provide no benefit to this ecosystem whatsoever and their intensive production methods are likely to be harmful.
- Taylor Shellfish cannot show that there will be no net loss of ecological function.

Taylor Shellfish bears the burden of proof that their actions would meet regulatory criterion and that their actions can be mitigated. The effect of geoduck cultivation on forage fish is poorly understood and therefore, cannot be mitigated. This application for permission to plant 3.6 acres of geoduck in Henderson Inlet should not be approved.