

Date: January 31, 2011

To: Hearing Examiner Causseaux
Pierce County Hearing Examiner

Re: **Summary of professional opinions of Jim Johannessen relative to Proposed Longbranch Shellfish geoduck aquaculture (farming) facility in Drayton Passage**

Introduction and Purpose

The purpose of this letter is to outline professional opinions relative to the proposed installation of a geoduck aquaculture (farming) facility in the Longbranch area of Drayton Passage in South Puget Sound. As described in a Pierce County Department of Planning and Land Services (DPLS) staff report, applicants have requested a Shoreline Substantial Development Permit to plant, cultivate (grow) and harvest geoduck clams for commercial purposes (aquaculture). This activity would occur on beaches between approximately the -3 to +2 ft MLLW (mean lower low water) tidal elevations on approximately 2 ½ acres of private intertidal tidelands in a Rural Shoreline Environment. The site is located at the tidelands in front of 7711 and 7913 Yeazell Road KPS on the east side of the Key Peninsula, on the west shoreline of Drayton Passage between Filucy Bay to the north and Devils Head to the south (¼ mile south of the public boat ramp at the east end of 72nd Street KPS) within the SW ¼ of Section 25, T20N, R1W, W.M., in Council District #7.

This letter outlines my professional experience, assignment for this review process, work completed, and general conclusions reached. The information in this letter is based on the review and analysis as described, but does not represent a complete analysis or the full explanation of my conclusions. Additionally it would be beneficial to visit the site during daytime very low tides when these tides occur.

Resume

A copy of my resume is attached to this letter that outlines my professional experience in the field of coastal geomorphology and coastal management.

Assignment and Activities Completed

I was asked to address issues that may be pertinent to the proposal relative to coastal geology and geomorphology, as well as management of coastal physical processes. Within the specialty, I was asked to review appropriate written information other information, perform a site visit to the proposed geoduck farming location, and formulate professional opinions relative to my

professional area of expertise. I took this assignment to also include reviewing other information available to me such as reports, maps, and aerial photos.

The following information was reviewed as part of this effort:

1. Habitat assessment report, prepared by Paul Dorn, Dorn salmon enhancement services, dated 1/16/07
 2. Joint aquatic resources permit application (JARPA) for the proposal, signed 1/12/10, no figures
 3. SEPA environmental checklist, dated 5/13/10
 4. Longbranch Shellfish aquaculture project – site plan/vicinity map
 5. Pierce Co. Staff Report, Shoreline substantial development permit SDE 22-06, Longbranch shellfish, by Booth, appears to be 2010.
 6. Pierce County, determination of non-significance, SD22-06, 5/26/10
 7. Programmatic biological assessment of potential impacts from new geoduck aquaculture sites to essential fish habitat, endangered species, and forage fish in a Puget Sound, Washington, by Environ International Corporation, July 2009
 8. Transcript of proceedings before T. McCarthy, 11/2/07(188 pages)-- portions thereof
 9. Concerns and Questions Relevant to Infaunal and Epibenthic Impacts of Geoduck Aquaculture, by Dethier, Leitman, & Matthews, 3/14/07
 10. Longbranch list of environmental issues reviewed by Pierce County, By Hendricks, no date
 11. Letter from Pierce County DPLS to Vivian Barry Shoos, 5/4/09
 12. Letter from Pierce County DPLS to Barb Shoos, 12/9/08
 13. Letter from Pierce County DPLS to GordonDerr LLP, Plouche, 9/4/08
 14. Letter from Pierce County DPLS to Shoos and Leenstra, 5/19/06
 15. Letter from Pierce County DPLS to Barb Shoos, 6/15/09
 16. Letter from Lauche and Stock LLP to Ty Booth, 1/14/10
 17. Letter from Pierce County DPLS to Barb Shoos, 2/5/10
 18. Memo from Risvold (Pierce County DPLS) to Booth, 2/5/10
 19. Email from Dan Pentilla to Dave Risvold, 2/3/10
 20. Email from Dave Risvold to Dan Pentilla, 2/1/10
 21. Draft shellfish culture areas in South Puget Sound map by Eviron, June 2008
 22. Nearshore Salmon Habitat Assessment completed in 2003 for Pierce County, by Houghton et al., Pentec 2003
 23. Shoreline aerial oblique photos for Pierce County, by Washington Department of Ecology, 2006
 24. Aerial photos from Google Earth -- numerous dates between 1990 and 2010
 25. Net shore-drift mapping for Pierce County, for Washington Department of Ecology, Schwartz et al. 1991
 26. Digital net shore-drift mapping by Washington Department of the college, as initially corrected by Coastal Geologic Services for the US Army Corps of Engineers, 2007
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I performed a site visit on January 24, 2010. During the time, I walked the beach from the 72nd St. southward including traveling across the tideland parcels identified in the applicant's documents that are proposed for geoduck farming. The site visit occurred at what was predicted to be an approximately +2.4 ft MLLW tide. This was the lowest daytime low tide during the work conducted for this project in January, 2011. During the site visit, I examined the low tide terrace (lower beach, including into shallow water), the intertidal beach, the stream filter channel and associated soul marsh vegetation, the moderately high bluff, and shoreline development features present. I also traveled several adjacent roads to try to ascertain the general level of development and the general nature of the surrounding upland environment.

During the site visit, I examined beach sediment in some detail. I collected two sediment samples from between +0.5 and +1.5 ft MLLW, one from each proposed farming area. I also examined intertidal organisms and evidence of organisms on the lower beach.

General Conclusions

Impacts to Sediment Accretion and Erosion

After reviewing the above-referenced information and after performing the site visit, it is my general professional opinion that the proposed farming and harvest of geoducks at the density outlined presents a moderate risk of negatively impacting physical beach habitats within the farming area and also off-site. There are two general activities that will change conditions at the beach at the site, use of "water jets" in harvest that suspend sediment and installation of PVC tubes and netting.

The use of water jets while harvesting will likely cause suspension of sediment down to a depth of at least 1-2 feet below the surface. However it is not explained in the applicant's documents or other documents reviewed for this effort the exact depths to which the harvest-age geoducks would be found and the extent of water jet penetration during harvest. Sediments on the lower beach on the site contain abundant fine sand and silt, based on initial visual observation only—no grain size data were found in this project documents). These small grain sizes can be transported for a considerable distance off-site. It is important to note that sediment on many Puget Sound beaches is finer beneath the surface veneer and therefore it is likely that unusually high percentages of fine sand and silt that would be exposed during harvest, as compared to the action of wind waves on the surface veneer of sediment. Additionally, several documents by the applicants, consultants, and County characterize this site as a high wave energy site. While there may be relatively greater fetches at the Longbranch site relative to some other South Puget Sound aquaculture sites, the site is certainly not a high wave energy site in terms of the whole of Puget Sound, with maximum wave fetch in a narrow southerly direction of approximately 5 miles and lower fetches from most other directions.

The drift cell that the site is within continues northward for approximately 2 miles including the portion of the drift cell that wraps back to the west around the point to the north after rounding and forming several sand and gravel spits. Additionally a spit is located a short distance south of the

site, and have intertidal stream channel and associated delta is located between the two proposed harvest areas. Increased sediment transport and the deposition would likely occur within the stream channel and on the forage fish spawning beaches following harvest and could smother eggs. Although harvest may be prohibited if sampling identifies active spawn, sediment resuspension may be quite high at times after harvest, which has not been examined to my knowledge. Changes to the sediment transport budget could also occur and affect the stability of the spits in the area.

The use of PVC tubes and netting, although not used continuously, would likely change local sediment transport processes. The tubes would be placed at the density of approximately one every square foot, which would dampen the wave energy around them and would likely lead to increased sedimentation. This would then cause a decrease in sediment transport beyond the site.

Both of the above-mentioned impacts to sedimentary processes would be inconsistent with the Pierce County Shoreline Master Program regarding aquaculture practices (Chapter 20.24), which states that:

“Aquaculture development shall not cause extensive erosion or accretion along adjacent Shorelands”

Lack of Physical Monitoring

Although I understand that Sea Grant is conducting some studies on the impacts of this type of aquaculture at this time, all of the documents reviewed seem to have a substantial lack of data on sediment accretion, erosion, and transport, as well as changes to beach habitats prior to and during intertidal and subtidal aquaculture use. A number of statements are contained in the Entrix draft programmatic evaluation and also in statements by Fisher, and the applicants such as *“beach level may be lowered by 1-2 inches. However, beach topography typically returns to its former state within 1 to 2 tide cycles”* (Entrix). Summary conclusions made in these documents do not appear to be based on scientific sampling and instead appear to be speculation. It is concluded that the proposal needs further study and examination relative to actual beach monitoring data from similar sites in terms of being used similarly to the proposed activities and also in a similar physical setting.

Additional study prior to issuing permits appears important for several reasons. The proposed site is located at an ecologically rich area which is also because classified as essential fish habitat in Pierce County. Numerous species are known to use the sites including salmon, forage fish for spawning, other fish and wildlife, and intertidal organisms such as sand dollars. Additionally a stream channel runs through the site with a very small fringing salt marsh habitat. The site was within the study area of a Nearshore Salmon Habitat Assessment completed in 2003 for Pierce County (Houghton et al. 2003). The site was part of ecological management unit 10 (EMU 10) which extends from Devils Head in the south to the north end of Pitt Passage. The subject site was within a shorter reach assessment unit 10.06 (AU 10.06) that was characterized by “high relative habitat quality” with a score of 93 from the Tidal Habitat Model that studied approximately 179 miles of shoreline in Pierce County that produced an overall mean score of 51. AU 10.06

was also characterized as being mostly feeder bluff with negligible eelgrass present below the low tide line. Allowing the proposed facility to be carried out without better understanding of the potential impacts to this rich area does not appear to be proper shoreline management.

Additionally, if there is any chance that the means by which this application is considered and possibly permitted is used as a precedent for additional intertidal, aquaculture facilities, it becomes much more important to ensure that the impacts are well understood prior to permitting and the proposal is either denied or impacts are mitigated to the greatest extent possible. So far, it is not possible to determine that impacts will be low or negligible based on the large number of unknowns, and is therefore recommended to require additional, rigorous, scientifically-collected data be obtained and used, or to deny the application.

Coastal Geologic Services, Inc.

Jim Johannessen,
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