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Industrial Shellfish Aquaculture Practices Degrade Water Quality Standards Essential for a Healthy Puget Sound and Salmon Recovery

Section 1—Examples of Water Quality Degradation from Industrial Aquaculture

A. Intertidal Geoduck Aquaculture

- Clearing, purging and eliminating native animals and vegetation to prepare shorelines “like a pasture,” resulting in loss of natural biodiversity

See Shellfish Industry “Pest Management Plan”

<http://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u591/OR-WAabivalvePMSP.pdf>

- Placing tons of marine plastic pollution (PVC, nets, plastic bands, zipties) into Puget Sound that degrades on site and when lost in deeper waters

<http://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u591/SC-Industrial-Aquaculture-Marine-Plastic-Pollution-June2012.pdf>

- Using large canopy nets for clam and geoduck aquaculture that reduce biodiversity, accumulate greater amounts of organic matter and silt. WDFW scientist advises not to use canopy nets as documented below:

WDF&W Scientist Opinion

http://www.caseinlet.org/uploads/Netting-Pierce-Aquaculture--WDFW_Opinion-RE_Shoreline_Substantial_Development_Permit_SD..._1_.pdf

Published Studies

http://www.caseinlet.org/uploads/Bendell-Aquaculture-Netting_Study.pdf

http://www.caseinlet.org/uploads/Bendell-Aquaculture_GIS_Study.pdf

http://www.caseinlet.org/uploads/Bendell-Aquaculture-geochemical_study.pdf

http://www.caseinlet.org/uploads/Bendell-Aquaculture-Euspira-Predator_Study.pdf

- Using high pressure water hoses for harvesting at low tides that create significant sediment plumes for perpetual operations with cumulative impacts from multiple locations
- Conducting dive harvesting in the intertidal zones. DNR does not allow dive harvesting for commercial wild geoduck harvesting on state lands below -18 ft

MLLW to protect juvenile salmon and eelgrass from adverse impacts according to Charles Simenstad's scientific research-Page 82-83 of DNR SEIS
www.dnr.wa.gov/Publications/aqr_geo_lowres2001_final_Seis.pdf

- Depleting zooplankton (crab, fish eggs and larvae) in intertidal nursery
<http://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u591/SC-Shellfish-Reduce-Zooplankton-May2012.pdf>
- Degrading habitat and prey resources for ESA salmon and other native species-Page 4
<http://www.wsg.washington.edu/research/pdfs/reports/GeoduckReport2010.pdf>

B. Industrial Oyster Operations

- Using plastic grow bags in high densities that blacktop tidelands smothering organisms that are prey for native species, especially salmon
- Scraping tidelands by barge using metal construction bucket that eliminate all natural aquatic animal and plant life

C. Mussel Rafts in Large Scale Operations

- Reducing dissolved oxygen in summer months essential for healthy fish populations--
Totten Inlet Mussel Raft EIS :

http://www.caseinlet.org/uploads/Mussel--Taylor_EIS-Water_Column_study_Oct_08_1_.pdf

At periods of low ambient DO (late August and early September), dissolved oxygen concentrations below 5.0 mg/L would be expected to persist some distance downstream from the raft edge. However, once the water exits the raft, it will likely recover to ambient DO concentrations within 70 m to 200 m, due to dilution from the entrainment of surrounding waters and from turbulence arising from the presence of the raft structure and horizontal diffusivity. Page 23.

- Creating beggiatoa bacteria in low flushing waters under rafts creating "dead zone" for native species as described below:

An Overview of Factors Affecting the Carrying Capacity of Coastal Embayments for Mussel Culture, Graeme J. Inglis, et al. Ministry for the Environ

<http://www.govdocs.aquaculture.org/cgi/reprint/2004/628/6280090.pdf>

8/2000, P. 9

Article suggests parameters for determining phytoplankton abundance, and the effects of intensive farming locally and of the benthic community. Article reports that the *Mytilus galloprovincialis* is a fouling organism and that it is especially noticeable in poorly flushed waters.

--P. 9 "...organic enrichment of sediments by mussel faeces and pseudofaeces can cause increases in the rates of respiration and oxygen consumption by benthic microorganisms." "Severely affected areas are characterized by films of chemoautotrophic sulphur bacteria (Beggiatoa) at the sediment-water interface..."

--P. 13 "Changes in the pattern of nutrient cycling have been linked to outbreaks of toxic red tide organisms (Cembella et al. 1997) and may indirectly affect recruitment of other important marine species. For example, it appears that blooms of the red tide dinoflagellate, *Gymnodinium mikimotoi*, in Japan are stimulated by increased release of ammonium and other micronutrients from the sea floor."

Picture documentation is provided on our following Sierra Club website:

<http://washington.sierraclub.org/tatoosh/Aquaculture/SierraClub-Aquaculture-2010-Jul-R08-final.pdf>

Section 2--The Law—RCW 90.48

Under RCW 90.48, the Water Pollution Act, Washington Department of Ecology is tasked with the duty of controlling and preventing the pollution of Washington State’s waters – both surface and ground (RCW 90.48.030). The declared policy of the Water Pollution Act is:

<http://apps.leg.wa.gov/RCW/default.aspx?cite=90.48.010>

- “to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wildlife, birds, game, fish, and other aquatic life, and the industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington” (RCW 90.48.010).
- By definition, the State’s waters include “salt waters” (RCW 90.48.020).
- The word “pollution” encompasses both contamination or “other alteration of the physical, chemical, or biological properties, of any waters of the state, ... as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to ... wild animals, birds, fish or other aquatic life” (RCW 90.48.020). This language opens a broad door to addressing water quality issues based on geoduck operations.
- In addition, RCW 69.30, the Sanitary Shellfish Act, states that all water pollution laws/rules are applicable in the control of pollution of shellfish growing areas. RCW 69.30.130. The intent there may be to keep pollution out of the growing areas (e.g. sewage), but it isn’t worded like that – it just applies all the laws/rules.

Section 3--The Law—WAC 173-201A

Pursuant to the duty articulated in RCW 90.48, Ecology has promulgated water quality standards which, for surface waters, is found at WAC 173-201A.

<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A>

- The purpose of the rules are to protect surface waters by numeric and narrative criteria, designated uses, and an anti-degradation policy. WAC 173-201A-010(1)(a). Like RCW 90.48, salt water is included within these rules and there are established standards specific to marine waters. WAC 173-210A-020; 173-210A-210. It should also be noted that a definition of “wildlife habitat” means “waters of the state used by, or that directly or indirectly provide food support to, fish, other aquatic life, and wildlife for any life history stage or activity.” WAC 173-210A-020.
- Under the Marine Water section, WAC 173-210A-210, the first thing the rules do is list “uses” that are “designated for protection” with the first one listed being Aquatic Life Uses and a requirement for “all indigenous fish and non-fish aquatic species [to] be protected” WAC 173-210A-210(1). Note it is the indigenous/native species that get protected – not cultivated species. This same rule then establishes categories of quality – from Fair Quality to Extraordinary Quality. WAC 173-210A-210(1)(a). Fair Water Quality works for migration but Extraordinary Water Quality is needed for rearing and spawning of fish, shellfish, and crustaceans. See map of marine water quality:
http://www.ecy.wa.gov/programs/wq/swqs/reference_files/MarineWQSMMap.pdf
- Specific criteria is listed by each category for temperature, dissolved oxygen, turbidity, and pH. WAC 173-210A-210 Tables (1)(c)-(1)(f). There are also specific criteria for shellfish harvesting, including bacteria. WAC 173-210A-210(2). Both the Aquatic Life criteria and the Shellfish Harvesting criteria apply WAC 173-201A-260 – Natural conditions and other water quality criteria and applications.

- One of the criteria is “aesthetics” which provides “aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.” WAC 173-210A-260(2)(b).
- Doesn't acre after acre of PVC pipes offend the sense of sight for recreational users and residents? The answer is Yes.

Section 4--Cumulative Impacts Must Be Addressed by Decision Makers

Another criteria speaks to Toxic material concentrations and the requirement that those be below a level having:

- “the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters ...” WAC 173-210A-260(2)(a). This is especially relevant as to juvenile fish which could be termed sensitive. WAC 173-210A-612, Table 612 lists uses, by body of water, for marine waters. As for water quality in regards to aquatic life, only an area of Commencement Bay is in fair condition. Miscellaneous uses, including Wildlife Habitat, are listed for all marine waters.

The June 2012 Thurston County Hearing Examiner decision was upheld by the Thurston County Commissioners in November 2012 as follows:

"The Board further finds, for the reasons stated in the hearing examiner's decisions that the law requires an adequate analysis of cumulative impacts before a SSDP permit may be issued in this case. The legislature enacted the State Shoreline Management Act of 1971 (SMA) to "prevent the inherent harm in an coordinated and piecemeal development of the state's shorelines." RCW 90.58.020. The Supreme Court recognized that "logic and common sense suggest that numerous projects, each having no significant effect individually, may well have very significant effects when taken together" and concluded that "the SMA recognizes the necessity for controlling the cumulative detrimental impact of piecemeal development through coordinated planning of all development. RCW 90.58.020." Emphasis supplied. Skagit County v. Department of Ecology, 93 Wn.2d 742, 750 (1980). Furthermore, our Shorelines Hearing Board understands that "consideration of potential cumulative effects and precedential effects is warranted in any case where there is proof of impacts that risk harm to habitat. Emphasis supplied. Fladseth v. Mason County, SHB No. 05-026 f(2007); Coalition to Protect Puget Sound Habitat v. Pierce Co. and Longbranch Shellfish, LLC SHB No. 11-019 (2012).

Section 5--Anti-degradation Policy

In addition, there is an “Anti-degradation Policy” which creates a three tier level of protection but also states, as one of its purposes, that:

- “all human activities that are likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment”. WAC 173-210A-300(1)(d). As to the tiers, the goal appears to be either to bring waters back to compliant quality standards or to prevent further degrading--WAC 173-210A-310 to -330. Activities are not to be permitted if it would allow degradation that significantly interferes with or becomes injurious to existing or designated water uses or causes long-term harm to the environment--WAC 173-210A-410(1)(c).

- If aquatic life and wildlife habitat is an existing/designated use – does the year-in-year-out cultivation of geoduck result in that long-term harm? The Answer is Yes.

Section 6—The EPA

The EPA assessed a total of 375.9 square miles of Ocean and Near Coastal waters. Of those waters, 175.7 were listed as good (46.7%) with 200.2 being listed as impaired waters. Impairment was based on Fecal Coliform, Dissolved Oxygen, Invasive Exotic Species, Sediment Bioassay, PCBs, various metals (e.g. zinc, copper, mercury), various toxic organics, fish habitat alterations, dioxins, and various pesticides. Of the Impaired Waters, approximately 121 square miles still needed TMDLs (this is 2008 figure).

Section 7—Other Laws

Lastly, there are other laws speaking to water quality such as WAC 173-204 Sediment Management Standards which applies to marine waters and to sediment exposed by human activity.

November 2012