



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Northwest Fisheries Science Center
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Dear Mr. Lynn,

Thank you for your email dated November 22, 2011, requesting current scientific information about finfish net pen aquaculture. We understand that this request is made in response to Jefferson County's findings on net pen aquaculture drafted as part of their Shoreline Master Program (SMP) update.

NOAA supports the development of sustainable marine aquaculture within the context of our multiple stewardship missions and broader social and economic goals. As with any activity, there are risks associated with marine aquaculture. However, with existing regulations, proper farm management practices, appropriate siting, and consistent monitoring, these risks are manageable, as is documented by the 40 year track record of net pen facilities operating in Washington State.

NOAA has published two scientific technical memorandums analyzing the effects of net pen Atlantic salmon farming in the Pacific Northwest (Nash 2001, Waknitz 2002). Together, these documents assess the risks associated with salmon farming, identify best management practices to minimize risks, and find no harm to ESA-listed salmonids from the operations of existing farms. The Jefferson County analysis acknowledges these documents, but also comments that they are dated and newer literature should be considered. NOAA agrees that newer literature must be considered, but maintains that the science in the technical memorandums is still valid. NOAA is in the process of producing an updated and expanded review of the environmental effects of marine finfish aquaculture that should be ready for the public this summer. In addition, computer models to aid aquaculture siting have been developed and are being used to understand single farm and cumulative impacts to marine areas due to fish farming. Nothing in the newer literature negates the findings in the two older NOAA documents. In fact, new technologies and practices have actually reduced many of the risks identified. Furthermore, new frameworks are available for integrated management of cultured and wild fish populations (cf K. Lorenzen et al. 2012, Biological Reviews).



We offer the following in response to the risks called out in the Jefferson County analysis:

1. Biodeposits – food and feces

Technological advances in both feeds and feeding practices have minimized these risks. New feeds are well assimilated by fish leading to a reduction in waste production. Farms utilize underwater cameras to monitor feeding behavior of fish. This allows managers to reduce feeding rates as fish are satiated, reducing the amount of excess feed that can reach the benthos. Since feed costs can amount to over half the cost to raise fish in captivity, there is strong financial incentive for companies to insure that feed is not wasted. Farms pay a third party to conduct video surveys and collect benthic samples to demonstrate that sites do not have any net increase in bio-deposits under cage lease areas. All sediment monitoring reports are submitted to Washington State Departments of Ecology (Ecology) and Natural Resources.

2. Chemical Use - pesticides, pharmaceuticals, etc

For the most part, antibiotics are no longer used by Atlantic salmon farmers in Washington State. Instead, fish are vaccinated for specific diseases that are known to cause problems. If salmon farmers wanted to use antibiotics they have to be prescribed on a case by case basis by a veterinarian and are only approved to treat an identified condition. Antibiotics are not used prophylactically with fish in the US.

3. Disease - bacteria, viruses

Monitoring of fish health and vaccinations reduce risk of disease. In addition, better husbandry, diets and selectively bred fish, reduce the susceptibility of farmed fish to diseases. Treatment has already been discussed. National Pollutant Discharge Elimination System (NPDES) permits issued by Ecology call for the mandatory reporting of approved chemical use and reporting of emergency disease occurrences.

4. Parasites - sea lice

We don't generally find sea lice in Puget Sound because of its relatively low salinity (salinity disrupts sea lice reproduction). If sea lice became an issue then treatment could be authorized by a veterinarian using either a mix of freshwater and hydrogen peroxide, or a commercial product such as Slice. Other parasites are treated with freshwater baths sometimes with hydrogen peroxide added or another FDA approved method. NPDES permits issued by Ecology call for the mandatory reporting of approved chemical use and reporting incidence of sea lice infestations.

5. Escapement - GMOs, breed/compete with natives

No GM fish are approved to be grown in the US. The current petition before the FDA to allow GMO fish to be sold in the US does not include a request to grow them here. The request is to grow them in closed land-based systems in Panama, and import the fillets. There is no request to raise GMO fish in the US and it is unlikely that one will be made for salmon in net-pens.

There is no evidence of escaped Atlantic salmon breeding or outcompeting native Pacific salmon (Waknitz 2002) in the Pacific Northwest. Atlantic salmon are a different species and cannot hybridize in nature with Pacific salmon. Genetic impact models for native fish escaping in to the wild have been developed and can be used to determine the potential impacts and risk of these escapes. Should they become necessary, management strategies to reduce the risk of escape of native fish can be developed.

Finally, Aquaculture Finfish permits issued by the Washington State Department of Fish and Wildlife and NPDES permits issued by Ecology require the development of Employee Fish Escape Prevention Plans, Fish Escape Reporting Procedures and Accidental Fish Escape Rapid Recapture Plans.

6. Impacts to Puget Sound – low dissolved oxygen, shellfish beds, forage fish, kelp & eelgrass, mammals, ongoing restoration efforts
Existing regulations, proper siting, and ongoing monitoring minimizes ecological risk of farms. The effectiveness of this three pronged approach is demonstrated by findings showing that there are no effects to these marine resources by existing farms. The amount of oxygen removed, and nutrients added to the water by a salmon farm are very small. Typically it is not possible to detect a change in any of these variables farther than 100 meters from the net-pens.
7. Conflicts with adjacent shoreline uses such as aesthetics, lighting, glare, noise, and odor. NOAA concurs that such risks are present and are site specific. Appropriate mitigation measures could be developed on a case by case basis.

The ongoing debate in the scientific literature about the effect of net pen aquaculture can cause confusion about these issues, particularly when problems in other geographic locations are extrapolated to Washington State. To assist in interpretation of the literature, we offer to meet with interested County Commissioners and answer questions about the science surrounding net pen aquaculture.

We would also recommend a regional working group to assist in reviewing and updating guidelines for sustainable marine net pen aquaculture and would offer our participation in such a group. In order to document existing regulations, this group should consist of appropriate staff from State agencies with regulatory authority over net pen aquaculture, specifically Department of Ecology, Department of Natural Resources, and Department of Fish and Wildlife.

Finally when the upcoming publication about marine cage culture and the environment is finished we would be happy to provide you with a copy. This publication offers a comprehensive review of water quality, benthic sediment, marine life, contaminant, and management issues associated with net pen aquaculture. It is expected to be released in the next 6-8 months and will be valuable for use in establishing regional guidelines. We also would welcome your agency's involvement with impact and siting models as they evolve.

NMFS is one of the lead agencies in Puget Sound involved in protecting, improving, and restoring marine species, habitats, and ecosystems. We look forward to continued coordination with the Department of Ecology and Jefferson County in support of the timely and successful implementation of the LA-SMP.

Sincerely,



Walt Dickhoff
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Michael Rust
Science Coordinator
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Literature Cited

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