

OUR SOUND, OUR SALMON

Comments on Cooke Aquaculture's NPDES Application to rear *Oncorhynchus mykiss* in Puget Sound open water net pens

Our Sound, Our Salmon
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Wild Fish Conservancy

Our Sound, Our Salmon is a campaign coordinated and overseen by the Wild Fish Conservancy
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Signed by:

Wild Fish Conservancy (WFC) and the coalition of groups operating under the banner of Our Sound, Our Salmon (OSOS) have long raised serious concerns about the risks posed by open water net pen aquaculture in Puget Sound. The catastrophic collapse of Cooke Aquaculture's Cypress Island pen in 2017 bore out many of those fears. In response, the state legislature passed legislation which phases out Atlantic salmon aquaculture by 2020. That legislation also charges the Department of Ecology and other agencies regulating these pens: "to eliminate commercial marine net pen escapement and to eliminate negative impacts to water quality and native fish, shellfish, and wildlife" and to implement new rules and standards for achieving that goal. The legislature passed the legislation with language emphasizing that "evidence [has] emerged that marine finfish aquaculture in general may pose unacceptable risks not only to Washington's native salmonid populations but also to the broader health of Washington's marine environment." While that section of the law was vetoed by the Governor, it is clear that the people's representatives have grave concerns about the safety of marine finfish aquaculture, and set a clear expectation that ongoing operation of these pens should be subject to heightened scrutiny.

The passage of HB 2957 created a new and stricter regulatory regime for marine net pen aquaculture. In reviewing Cooke's submissions and other materials submitted through this public process, we urge that the standard of review be specifically on whether the policies in place achieve the state's goal to "eliminate... escapement and to eliminate negative impacts to water quality and native fish, shellfish, and wildlife."

In light of those new legal mandates, and the different risk profile presented by rearing a domesticated and biologically-altered form of a native species as opposed to a non-native species, this permit application should be considered not as an extension of past practices, but as if these pens were starting anew. HB 2957's new standards require re-examining past decisions, and holding Cooke Aquaculture to that higher standard of eliminating risks.

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Ensuring compliance is crucial

In the wake of the Cypress Island collapse, Wild Fish Conservancy sued under the Clean Water Act (CWA). That suit resulted in rulings that Cooke Aquaculture had violated the terms of its permits, including by failing to conduct required inspections of net pen moorings and anchors, to accurately monitor and report the number of fish escaping from pens, to develop operational plans that include necessary procedures for inspecting cages, storing chemicals, disposing of harvest blood, and to track the number of fish in its cages and lost to predation. Cooke's history of CWA violations is important to consider in this process, if nothing else to ensure that the permits are drafted to ensure that violations are detected before catastrophe ensues.

Incidents like the partial sinking of the Orchard Rocks pen in October, 2019 demonstrate that the risks of additional escapes are very real, given the state of the existing pen structures. The response to that incident was conducted by the Department of Ecology, Department of Natural Resources (DNR), and Department of Fish and Wildlife (WDFW), and the records from that incident and state agencies' documentation of Cooke's inadequate emergency response should be included in this record to ensure that emergency plans incorporate lessons learned, and acknowledge the degraded state of the surviving pens as identified by state inspectors and Cooke's own contractors.

New concerns from the change in species

The change in species poses new and different risks, in addition to the harms open water net pen aquaculture has caused for decades. Some policies which may have been permitted for Atlantic salmon under the pre-2018 status quo, pose additional risks with the proposal to introduce domesticated, biologically-altered, steelhead/rainbow trout. The differences in this circumstance were considered as far back as 1990, when the last comprehensive Environmental Impact Statement (EIS) was drafted. The prior permitting for these pens and their operations all addressed risks associated with a non-native species. In dealing with biologically-altered, domesticated *O. mykiss* and Puget Sound's federally-listed steelhead population, different risks apply, and standards laid out in the 1990 EIS have not been met for these purposes.

In particular, "a minimum distance of separation between farms and river mouths" has never been considered and adopted in state policy, as section 5.7.2.2 of the 1990 EIS would require for aquaculture involving native fish (and as is required in other nations). Since escapes, and their risks to threatened conspecifics, constitute pollution and are within the scope of Ecology's review, this guidance and an analysis of the proximity of pens to steelhead spawning rivers should be included in Ecology's review of these NPDES permits. In addition, the assessment of risks from pollution (including diseases) should account for the migration corridors in areas like Rich Passage, which may concentrate wild salmon near the pens.

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Furthermore, the behavioral response of wild steelhead to a large aggregation of conspecifics may be different than it was to Atlantic salmon. If wild schools are attracted to the captive domesticated steelhead in pens, the pollution from the pens may do greater harm to recreationally- and commercially-important hatchery-reared steelhead and to threatened wild Puget Sound steelhead.

New material to review

During the emergency response to the Orchard Rocks partial sinking, Cooke told DNR that they planned to replace some existing net pens in Puget Sound. If indeed that plan is under way, the NPDES review should include engineering data on the new pen structures in order to assess the adequacy of those pens for Puget Sound's dynamic conditions, and the escape risk and other risks the new pens might pose to Puget Sound.

The Mitigated Determination of Nonsignificance (MDNS) issued by WDFW in January 2020, requires Cooke to prepare and submit a plan for marking steelhead in ways that will distinguish fish from their pens from hatchery-raised fish swimming freely in Puget Sound. That plan is not part of this record, and review of the NPDES permit application should await that filing.

The MDNS also requires Cooke to submit a plan for a "no-recovery response" to escapes. That plan is not part of the escape plan submitted in Cooke's application, and it is impossible to assess the adequacy of Cooke's pollution prevention plan until that plan is included in the application.

The State Environmental Policy Act (SEPA) review led by WDFW which produced the MDNS is currently being appealed. That challenge is likely to generate new information pertinent to the NPDES review, and it would be appropriate to delay drafting any NPDES permit until the evidentiary record and ruling can be incorporated into this review.

Eliminate negative impacts to water quality

Decades of experience shows real effects on water quality in a plume around the net pens, which the terms of Cooke's current permit application does not eliminate. This NPDES review should re-examine existing data on effluents from industrial products, medicines, feed, fish waste, and dead and rotting fish to assess whether the current plans eliminate all of those risks. It should also examine new data on antibiotic resistance in protected marine mammals (research discussed in [this recent report from High Country News](#)). These risks were discussed in the SEPA comments submitted by WFC and the Our Sound, Our Salmon coalition in 2019, and comments to the previous Atlantic salmon NPDES review. We have attached both documents for reference, and summarize the major concerns below. The review should also draw on the Pacific Northwest National Laboratory's Salish Sea Model (<https://salish-sea.pnnl.gov/>) to assess how effluents will flow through Puget Sound and affect sensitive habitats and areas designated as critical habitat for Southern Resident killer whales, salmon, and other threatened and endangered species.

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Food effluent

Open water finfish net pens routinely disperse large volumes of feed into public waters within the boundaries of the net pens. Some portion of the feed may not be consumed by penned fish, and thus makes its way into, and has an impact upon, the surrounding marine environment. The high-energy tidal zones in which net pens are located may drive broad dispersal of unconsumed feed and other dietary supplements, including medicines. This dispersal of feed into public waters represents a continuous and constant act of chumming, which attracts native fish species and other wildlife. Divers near net pens have observed large schools of fish swimming in and out of the pens, and reports from British Columbia on bycatch and incidental take of wild species during harvest operations indicate that many native species enter the pens, likely because of the food attraction.

Physically small fish species, such as baitfish and out-migrating and rearing salmonids (including ESA-listed Chinook and steelhead), may be attracted by net pen feed to the point where they physically enter a net pen facility and are vulnerable to predation from farmed Atlantic salmon in the pens. The constant dispersal of feed may also cause disruptions in the natural migratory patterns of native salmonids, as the pens provide a constant and unnatural food source that may cause salmonids to occupy a single location for a longer period of time than is typical, and deter rearing or migrating salmonids from developing key feeding strategies which are critical to their early growth and development. This constant source food is also likely to draw native species (including ESA-listed Chinook and steelhead) from their protective shallow nearshore habitats to net pens.

Surveys of aquatic diversity at sites near these net pens indicate substantial numbers of threatened and endangered juvenile salmonids, and forage fish. State-funded surveys including “West Sound Nearshore Fish Utilization & Assessment (SRFB Grant: 07-1898)” (2010), “Cypress Island Aquatic Reserve Pilot Nearshore Fish Use Assessment” (2011), “West Whidbey Nearshore Fish Use Assessment” (2007), and the ongoing “Hood Canal Nearshore Juvenile Fish Use Assessment” find substantial populations of threatened coho, Chinook, pink, and chum salmon in near-shore waters at sites near and similar to those where net pens operate. Those surveys also demonstrate substantial variation in total species diversity and population sizes from site to site, and between surveys at the same site over time. Salmonid populations could vary by orders of magnitude from month to month, and between years. This highlights the difficulty of monitoring and predicting what species will be attracted to the pens as a food source, and how pollutants in and near the pens will affect Puget Sound’s ecology.

Fish waste

Fish waste, excess food, dead fish, and tissue sloughed off of live fish, all flow from net pens into surrounding waters. This nutrient imbalance in the vicinity of pens can be harmful to some wild species, and can cause unhealthy growth of other species, including algal blooms.

On November 15, marine aquaculture net pens in Clayoquot Bay began seeing die-offs due to a bloom of diatomaceous algae (<https://thetyee.ca/News/2019/11/20/Algal-Blooms-Tofino/>). The

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concentration of fecal material, excess food, and fish flesh near pens may exacerbate these blooms, and the resulting fish deaths then produce additional pollution as they cannot be extracted from the nets quickly enough. Observers near the recent die-offs report that the waters near the pens turned “a dark brown muddy river-like colour,” due to the rotting flesh.

These die-offs are likely to be more frequent in the future, since these algal blooms “have expanded their range and frequency as climate change has warmed, acidified and robbed coastal waters of normal oxygen levels.” The inability to quickly empty the pens in the event of massive deaths or a disease outbreak poses significant risks to Puget Sound at large. One such risk is that the weight of the dead fish itself can add stresses to the pens’ structure, making a collapse more likely during those emergency operations, and when the contents of the pens pose the greatest risk to the environment.

WFC modeled the additional phosphorus and nitrogen emissions resulting from net pens (<https://wildfishconservancy.org/estimation-of-total-phosphorus-and-nitrogen-waste-during-a-20-month-grow-out-period-for-puget-sound-atlantic-salmon-net-pen-aquaculture-facilities-1>). The additional pollution is more than the permitted emissions from large communities, and without any of the waste treatment requirements placed on human populations or land-based feedlots.

Open-air salmonid net pens chronically discharge particles of decaying fish flesh that are often consumed by native fish and birds. These particles may be contaminated with pathogens, parasites, pharmaceuticals or chemicals that may be ingested by native fishes, including conspecific steelhead and other salmonids. Studies have shown that these particles are potential vectors for pathogens. While Cooke now is required to recover dead fish and transport them upland for disposal, there is currently no mandate that those mortalities be submitted to the state for testing before disposal.

Antibiotic/medical effluent

In order to treat specific diseases of fungal occurrences or to prevent infection, chemicals and pharmaceuticals are often applied by the industry to the fish, water, or feed in the net pens. Among the potential and likely harmful impacts to designated uses of surrounding water is the use of these chemical or pharmaceuticals for treating infections, parasites or diseases such as “yellow mouth” where the U.S. Food and Drug Administration (FDA) requires a 30 day waiting period before treated fish may be approved for human consumption. Native fishes in the immediate vicinity of the treated pens may also be exposed to or consume the very same chemicals and pharmaceutical treatments (including fish that may enter the pens attracted by the presence of feed and fish odors). These fish may then be caught in recreational or commercial fisheries and unknowingly be consumed by the public within FDA’s required 30 day waiting period. This risk to the public and to wild fish must be addressed in the NPDES review.

The SEPA checklist submitted by Cooke Aquaculture and included in this record refers to the use of unspecified probiotic supplements. These unspecified introduced microbes are likely to colonize the microbiome of native fish and the environment near net pens. Given the growing

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scientific appreciation of the role of the microbiome in health and development of fish and other animals and plants, these supplements should be detailed, and a plan for monitoring surrounding areas and fish populations for colonization or excess growth of these bacteria should be required. This monitoring should also test for growth of antibiotic resistance in nearby areas, and in wildlife found in and near the pens.

Eliminate negative impacts to native fish, shellfish, and wildlife

Concentrated populations raised in what are effectively aquatic animal feedlots face greater risk of disease, parasitic, and viral amplification than free-ranging, especially wild, populations. When viral, bacterial, fungal, or parasitic diseases break out in net pens, the disease-causing organisms are rapidly amplified in number and leaked to the surrounding aquatic environment in large numbers. Because their conspecifics (and other salmonids of concern, including coho salmon, ESA-listed Chinook salmon and bull trout and as required by WAC 197-11-080) will be swimming in close proximity to the pens, there is likely to be a spread of disease to endangered wild steelhead and other salmonids. In 2017, a British Columbia study documented a strong correlational connection between disease prevalence in net pens and disease transfer to wild fish populations ([Morton et al., 2017 DOI:10.1371/journal.pone.0188793](https://doi.org/10.1371/journal.pone.0188793)). Recent research in British Columbia found novel viruses in endangered salmon, and found evidence that these novel viral infections may originate from farmed salmonids ([Mordecai et al., 2019 eLife 2019;8:e47615](https://doi.org/10.1371/journal.pone.0214615)).

Such pathogens fall within the definition of pollutants, and the NPDES permit review should ensure that Cooke's plans will eliminate the risk of these pollutants harming the integrity of the Sound ecosystem and the biological integrity of its wild species. Given the frequent presence of marine mammals near the pens, including seals and sea lions aggregating near the pens during harvest operations, and recent video of orcas swimming nearby as well, it is all the more important to identify pollutants, including antibiotic resistant bacteria, pharmaceuticals, and other emissions, that might do harm to these protected species.

Eliminate commercial marine net pen escapement

Our SEPA comments (attached) provide a detailed analysis of the risks to the genetic integrity of threatened Puget Sound steelhead stocks in the event of an escape. While the limited data from Troutlodge indicates an average triploidy failure rate of 0.17%, the true rate may be substantially different. Furthermore, a random sample of several hundred thousand fish may contain a larger proportion of fertile females by random chance. In the event of an escape on the scale of Cypress Island, that could mean thousands of fertile females entering Puget Sound, potentially diluting the genetics of threatened wild populations, and competing with wild females for redds. Our attached SEPA comments detail method of assessing those risks that allows an assessment of not only median-case scenarios, but the worst-case scenarios demanded by WAC 197-11-080.

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The escape of rainbow/steelhead from any of the Puget Sound aquaculture facilities, whether from small scale leakage or catastrophic facility failure, will pose risks to native salmonids rearing in nearshore marine habitats and rivers due to competition for food and foraging space. This will be particularly true in the case of triploid individuals because, as noted in Cooke's materials, they will have appetites that are likely to be considerably greater than wild juvenile salmon and steelhead due to the faster inherent growth rate of these triploid fish. This means escapees may outcompete wild steelhead, or indeed predate upon them.

Since escapees would constitute pollutants under the Clean Water Act, escape prevention and the adequacy of Cooke's escape prevention and escape response plans must be carefully considered in this permit process. The SEPA MDNS requires Cooke to develop a "no-recovery" option to be added to their escape response plan, which is not included in these NPDES application materials. The NPDES review must be based on their full escape plan, not this incomplete record. The MDNS also required Cooke to develop a plan for marking their domesticated stock to distinguish them from free-swimming wild and hatchery steelhead. That marking plan is not included in these NPDES materials, but is an important aspect of escape recovery.

Conclusion

Given the new legal standard established by HB 2957, the pending legal challenge to the MDNS issued in January 2020, the large amount of new information that Cooke's application adds to the public record (including fish mortality data, a new fish escape prevention plan which may be further amended to add a "no recovery" option, and a new escape reporting and response plan which may be similarly amended), and the other new information described above that has come out recently, is expected in the near future, or that ought to be added to the record, and the substantial concerns that arise from when raising a native species as opposed to a non-native species, it would be appropriate to initiate SEPA review of this NPDES application, and potentially draft a new EIS after making a determination of significance.

Ecology's NPDES permit review should not begin until there has been thorough consultation with local, state, federal, and tribal governments. Many tribal nations submitted comments to the SEPA review requesting a full EIS, and initiated government-to-government consultations to express their grave concerns about the harm these pens do to the Sound. In addition, many counties and municipalities have established new rules since the net pens were installed, which would prohibit the construction of new net pens in their waters. While the existing pens are grandfathered in, these communities and nations should have a full and open opportunity to air their concerns and ensure that the continued operation of net pens in Puget Sound honors the concerns and needs of their neighbors.