



US Army Corps of Engineers  
New England District  
Maine Project Office  
42 Civic Center Drive, Suite 350  
Augusta, ME 04330  
File Number: NAE-2019-01481  
Date: March 4, 2020

Dear Mr Tischbein, and Mr. Clement,

The Sierra Club is the oldest environmental advocacy organization in the US. Sierra Club Maine represents 28,000 members and supporters in Maine. We are one of 64 chapters nationally with greater than 2.5 million members and volunteers.

Sierra Club Maine has deep concerns that the evaluation of the application by Nordic Aquafarms (NAF) and its effect on the wetlands, Little River and Penobscot Bay marine environment has been inadequate to show the full extent of the large-scale impacts of this project. Even as late as this week, the applicant has put forth brand new material on the dredge proposal which will impact the fisheries with little to no opportunity to evaluate before close of the comment period. We urge that the Army Corps of Engineers require a full and transparent Environmental Impact Statement on those impacts that includes a **regional cumulative ecosystem risk assessment** as it relates to the NEPA filing. It has clearly reached the level of controversy locally that achieves that bar. And broad impacts of this project are far from known. Our environment, and all the living creatures that depend on it, deserves much greater scrutiny than is currently evident in the process to date.

*ACOE: "The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest."*

1) **CAFO**: Nordic Aquafarms (NAF) qualifies as a Contained Animal Feeding Operation (CAFO). Sierra Club's national policy is to oppose CAFO's in general because:

*"CAFOs congregate large numbers of animals in relatively small and confined places, and substitute intensive management, an artificial diet, and heavy application of prophylactic antibiotics and artificial hormones for traditional land and labor practices. Negative impacts include the release of toxic bioactive substances into the environment and food chain, air and water pollution from animal wastes, chronic inhumane treatment of animals, health hazards from noxious fumes. CAFOs also accelerate climate change by their disproportionate production of greenhouse gases. The Sierra Club opposes the establishment of new*



*CAFOs, and supports the phasing out of existing operations as expeditiously as possible.”*

Nordic Aquafarms has based its advocacy on a proven, proprietary process to assure the City of Belfast and the State of Maine that it will **do no harm** environmentally. However, over the past two years, in checking their **own** website, NAF fails to have produced a single pound of salmon in their flagship salmon production farm. In fact, the date planned to provide that salmon has changed repeatedly. Proof of efficacy of their proprietary filtration system is not in evidence. Removal of feed, antibiotics, growth hormones and pathogens are yet to be proven. Water will be transiting the filtration system at a rate of 320,000 gallons per hour. Endocrine disruptors along with antibiotics are present in water systems worldwide, and causing downstream impacts. There is no proof that this filtration system, the nutrients and chemicals are actually removed nor that they have no impact even in their original plant. (<http://www.nordicaquafarms.com/business-units>) And, the discharge outflow in Norway is in far deeper waters. No analysis of the impact on Norwegian waters is presently in evidence. Additionally, the thermal gradient impact, the salinity impact, have not been adequately studied there.

**2) Is NAF a RAS, or an Hybrid RAS?** *“Definition: In a recirculating aquaculture system (RAS) the culture water is purified and reused continuously. A recirculating aquaculture system is an almost completely closed circuit.”* This project intends to flow through 7.7 million gallons of water per day 365 days a year. That is approximately 18% of the total water per day or about 320,000 gallons per hour—approaching 3 billion gallons/year. It does not appear to be a closed recirculating system (RAS). Therefore, the through-puts are not minimized as suggested in the application, from the applicants own admission. What will they be? We don’t know and there needs to be much further study.

The size of this project to deliver 30,000 tons of salmon carcasses per year is enormous and at least five times the size of the yet to be proven NAF Fredrikstad project. The amount of fresh water daily infused is 1.7 million gallons, only 500,000 of which come from the city water supply as per agreement with the City of Belfast. The remainder comes from the local aquifer that has been feeding the Little River. The hydrology of that system is not adequately studied to assure neither hardship with local homeowners and farmers, nor impacts on the functions and values of the Little River wetlands and estuary. Scale matters and especially when new technologies are introduced. Starting a project of this large, since they have no actual experience with salmon farming, in this hybrid of “Flow-through and RAS” technology, as an “experiment” is scaled too large to put this whole ecosystem, and and the dependent local economies of Penobscot Bay at risk.



Penobscot Bay is the largest embayment on the coast of Maine and is intrinsically important to the impact of the gyre beginning with the Scotian Current that flows in and around Penobscot Bay and feeds the entire Gulf of Maine. Existing ecosystem values may very well be put at grave risk due to the impact of this project by itself, and particularly cumulatively. The economy of Penobscot Bay region is intertwined with the estuary and thus negatively impacting it would have broad reaching effect on our entire bay from Port Clyde around to Stonington as the water circulates throughout.

3) Forested wetlands in the Little River aquifer have a value locally and to the bay. We must carefully assess the functions and values of these hyper-important areas as we move ever more quickly into greater dramatic climatic impacts from temperature rise, sea level rise, flash flood and flash drought. While the Army Corps itself may not have a directive to assess the climatic value of these lands, the Pentagon has stated that climate change is the most serious security threat we face. One very important counteracting force is that of the services provided by our forested lands and wetlands both in situ and downstream. These functions and values have not been adequately evaluated by the applicant.

4) **Dredge Plan.** The new plan for removal of the dredging material was introduced to the public at a Maine DMR hearing March 2, 2020. There is not adequate time to render a full analysis particularly because of the very inadequate core sampling done outside of the planned route. In no way was the core sampling of the planned disposal dredge done properly. Commingling of the strata samples corrupted the core information and no analysis was done in the intertidal zone. The fact that the Engineering Firm didn't have an amphibious boat that could deposit the tester on land is not an excuse for omitting that data. Simply walking out on the mudflat to take cores at low tide is the solution that problem. In addition the photos provided beg the question about what the researcher was actually looking for since they opened the core sample, thereby causing contamination of the core. It is known that there is a deposited residue of Mercury in the upper Penobscot Bay. Re-suspending that mercury, which has already caused major closure of fishing ground in the mouth of the Penobscot River, **is a hazard we must not allow.** More work must be done to evaluate the sediment as per the standards required by the HoltraChem/ Mallinicrodt adjudication. This fact alone should prompt the ACOE to require an Environmental Impact Statement (EIS) with much greater analysis of the issues at hand.

The impact of the planned dredge on the benthic habitat, including allowing the spoils to sit on the bottom to be "washed", indicates a lack of understanding of the impacts of water column suspension of toxics including mercury. It strains credulity



that a barge filter on the de-watered dredge material would sufficiently collect suspended mercury and other toxins now covered by silt. We know that the waters in Penobscot Bay mix. The risk of suspension of mercury in the water column and thereby throughout the food chain to human health is great enough that there needs to be more scrutiny of the project. We ask again that the ACOE require an EIS.

**5) Discharge temperature and salinity:** Inadequate analysis of discharge volume and temperatures in the existing Penobscot Bay has been done. NAF states that their discharge waters will be between 5 and 27 degrees higher than ambient. While NAF indicates that the effluent temperature and salinity are comparable to the Belfast City Water Treatment discharge, an analysis of the cumulative impact of the two systems on the existing benthic habitat of the entire bay is essential. Thermal discharge is increasingly causing anoxia in other ocean aquatic systems that results ultimately in significant die-off. We cannot let that happen here. Stratification is likely with the thermal pollution trapped underneath. It strains credulity that this volume (7.7mgd) of higher temperature water in an aquatic environment that includes not only some rebounding anadromous species such as salmon, alewives and blue backed herring, but also American Sturgeon, will have no impact. The fact that the marine species that these signal animals feed upon are extremely vulnerable to temperature increases of only one degree is well-known. Five degrees 24 hours a day 365 days a year is bad enough, Thirty degrees more than ambient is unacceptable.

The analysis of the area of impact has been quite limited. It was surveyed only by a diver pulled behind a boat and only in the sub-tidal zone. A single-day analysis that included a diver dragged along the bottom is not an indication of the actual species that exist in this zone, or along side that zone throughout the year. *“The bottom line is that one has to conduct a **regional cumulative ecosystem risk assessment** to provide a context for the NAF proposal, since there are shifts in the ecosystem baseline in the Gulf of Maine and a multitude of human-based stressors from conflicting ocean uses.”* (David Dow, Retired Woods Hole Oceanographic and Sierra Club Marine Team)

Existing systems in fish hatcheries and wastewater discharge systems may not be up to snuff, but adding this kind of volume in one fell swoop bears much more scrutiny than presently required. Without thorough analysis the cumulative impact of this project may be **the tipping points** we really cannot afford to allow in Penobscot Bay.



**6) Essential Fish Habitat/ Endangered Species Anadromous fish and bottom of food impacts-**According to ACOE, “*This project will have an adverse effect on a total of 14.62 acres of EFH.*” This project will impact a greater area in Penobscot Bay than simply the disrupted pipeline area. One can’t isolate the rest of the bay from the impact of the construction and nor from the outflow. All of the impacted species exist in an aqueous environment that depends upon its cleanliness and freedom from toxic substances including antibiotics, growth hormones and bioactive substances. Anadromous species are rebounding. Sightings of Sturgeon and Salmon are reported from West Penobscot Bay to Pulpit Harbor, North Haven and up the Penobscot River. Their habit of upstream movement is preceded by periods of time along the coast as they migrate. In addition, the spawn of anadromous species seem to live in the waters adjacent to river outflow for a period of time prior to their dispersal to the open ocean. The animals they feed upon live in the sub tidal and inter-tidal zones. Impact to these areas must be analyzed. We have spent too much time and effort with the removal of the five dams on the Penobscot River and the subsequent return of schooling anadromous fish to allow NAF to build without much more proof that they will do no harm to our aquatic environment.

**7) Impacts on the Existing Marine Fisheries Economy-** The lobster and shellfish industries that exist in Penobscot Bay are at risk from this project should the mercury sediment be suspended in the bay at significant levels. The fishing industries are mostly smaller scale and family owned businesses that support a much broader swath of our local economy. It is cavalier to consider a proposal of NAF’s scale which seeks to hire at best 100 individuals without considering the thousands of individuals employed around Penobscot Bay providing service to and working on the water associated with these industries. That analysis is not in evidence anywhere. We do not have the luxury to allow a large industrial entity to put Penobscot Bay at risk without doing the due diligence to evaluate the impacts. Simply saying it isn’t going to have an impact is not enough.

**8) Climate Change:** The Gulf of Maine is at risk due to Climate change and is one of the most quickly warming bodies of water on the planet. From Sierra Club’s policy statement:

*“ Climate Change and Agriculture: Climate change threatens the stability of our global food systems, as farmers depend upon relatively stable climate systems to plan for production and harvest....Industrial agricultural and food system practices are a significant contributor to climate change, and it is essential that they be transformed to minimize generation of greenhouse gases and maximize carbon sequestration in plants and soils...The non-therapeutic use of antibiotics in livestock should be eliminated.”*



NAF application promises to minimize impacts on our changing climate. They have not convinced us that their management plan meets the projected carbon footprint in either the construction or operation phases, the impact of the transportation of goods to and from the factory, the forested wetlands impacts, or the bioactive chemical, thermal and salinity impacts on marine life in Penobscot Bay. We fail to take the climate into consideration at our peril and the peril of all life on earth. An independent and transparent life cycle analysis of the project's climate impact must be done to verify the accuracy of NAF's own analysis.

Conclusion:

Sierra Club Maine urges the Army Corps of Engineers to require a full and transparent Environmental Impact Statement of this project that includes a regional cumulative ecosystem risk analysis in its NEPA process. Based upon the application and existing analysis, the impact of this project on Penobscot Bay would be huge. Sierra Club opposes new CAFO construction. Based upon lack of proven technology in their flagship operation, lack of climate impact consideration, the sheer scale of the project, inadequate analysis of thermal and salinity impacts, dredge application specifics and barging, improper core sampling and consideration of the mercury present on site, the potential impact to the burgeoning rebounding anadromous and endangered species and the potential impact on the economy of the lobster fisheries already present in Penobscot Bay, this outsized project has proven itself unqualified for approval at present. Our environment, and all the living creatures that depend on it, deserves much greater scrutiny than is currently evident in the process to date. We urge the Army Corps of Engineers to require a complete, transparent EIS including cumulative risks analyses.

Respectfully Submitted,

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Chapter Leadership





References:

<https://www.maine.gov/dep/ftp/projects/nordic/project-reviews/2020-01-30%20DMR%20Comments.pdf>

From DEP. **Sample collection methods and handling.** *All sampling must be done with core or grab samplers, depending on the depth of the proposed dredging and the nature of the materials. Field notes must be submitted that describe the sample depth, color, horizons, visual grain size, general cohesiveness and any obvious odors of the sediments. Care must be taken to avoid contaminating the sample through improper sampling techniques. Sampling records must be submitted that document the field collection and chain of custody to the time of analysis. Reports must specify the analytical methods followed. Percent recoveries and blanks and the method used must accompany all results. The laboratory QA/QC plan must be filed as required with the ACOE. The Department may request copies of the laboratory QA/QC on a case-by-case basis.*

- \* Endocrine disruption: <https://benthamopen.com/FULLTEXT/TOBIOTJ-10-131>
- \* “Accounting for shifting distributions and changing productivity in the development of scientific advice for fishery management” by Melissa A. Karp et al. ICES Jour. Mar. Sci. (2019) (<https://doi.org/10.1093/icesjms/fsz048>)
- \* “Future ocean observations to connect climate, fisheries, and marine ecosystems” by Jorn O. Schmidt et al. Front. Mar. Sci. (2019); doi.10.3389/fmars.2019.00550
- \* “Challenges to natural and human communities from surprising ocean temperatures” by Andrew J. Pershing et al. (2019); [www.pnas.org/lookup/suppl/doi:10.1073/pnas.1901084116/DCSupplemental](http://www.pnas.org/lookup/suppl/doi:10.1073/pnas.1901084116/DCSupplemental).
- \* “Linking biodiversity to ecosystem service supply: patterns across aquatic ecosystems” by Heliana Texeira et al. Sci. Total Environ. 657: 517-534 (2019)
- \* “Societal causes of, and responses to, ocean acidification” by Sverker C. Jagers et al. Ambio <https://doi.org/10.1007/s13280-018-1103-2>
- \* “Projected marine heatwaves in the 21st century and the potential for ecological impact” by Eric C.J. Oliver et al. Front. Mar. Sci. (2019) doi:10.3389/fmars.2019.00734
- \* “A review of cumulative effects research and assessment in Fisheries & Oceans Canada” by Cathryn Murray et al. Canadian Technical Report of Fisheries & Aquatic Sciences 3357 (2020)