Salmonid Restoration Federation

February 17, 2022

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Planner II
Humboldt County Planning & Building Department
3015 H Street
Eureka, CA 95501

Submitted by email to CEQAResponses@co.humboldt.ca.us

RE: Nordic Aquafarms DEIS, Case Number PLN-2020-1669

Dear Mr. McNamara:

The Salmonid Restoration Federation (SRF) appreciates the opportunity to provide further comments on the proposed Nordic Aquafarms (Nordic) facility (Project) in Humboldt County. The Draft Environmental Impact Report (DEIR) did not respond to concerns we raised in our earlier comment letters. It is our hope that the data collection and modeling needed to quantify effects to wild salmonids is completed prior to finalization of the Environmental Impact Report (EIR). The mission of SRF is to promote restoration and stewardship of California's native salmon, steelhead, and trout populations and their habitat. In support of our mission, we urge the Humboldt County Planning & Building Department and the Planning Commission to reduce Project impacts on wild coho salmon, Chinook salmon, and steelhead.

On May 24, 2021 (May 24 comment letter), we commented on the Initial Study/Mitigated Negative Declaration (IS/MND) for the Project and raised concerns regarding: (1) Project impacts from treatment chemicals and cleansers to juvenile salmonid rearing habitat; (2) the effectiveness of the proposed biofilm reactors for removing viruses and bacteria; (3) effluent dispersal into salmonid critical habitat; (4) exposure of juvenile salmonids to effluent; (5) potential salmonid habitat impacts in the Mad River during drought events; (6) potential fish escapes, and (7) seismic concerns. Although SRF appreciates Nordic's attempt to reduce impacts to salmonid habitat and to build a project that has fewer aquatic impacts than traditional net pens, we are concerned that Project effects to juvenile salmonids continue to pose risk to wild salmonid populations.

On July 6, 2021 (July 6 comment letter), we commented on the Notice of Preparation (NOP) for the DEIR, and urged the Humboldt County Planning & Building Department and the Planning Commission to reduce Project impacts on wild coho salmon, Chinook

salmon, and steelhead. The July 6 comment letter is not included in the DEIR, and none of the concerns that we raised in that letter have been addressed. The letter was filed in a timely manner according to the directions in the NOP. We are including our July 6 comment letter in this filing as a reference and for its inclusion in the Final EIR.

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The DEIR has brought to our attention three emerging concerns regarding Project effects to wild salmonids: (1) a lack of biosecurity in preventing viruses from entering the facility, proliferating in the facility, and being discharged into wild salmonid habitat; (2) the seawater intakes in Humboldt Bay have the potential to significantly disrupt the food web and reduce food resources for juvenile salmonids through prey biomass reduction, and (3) the exposure time for juvenile salmonids migrating through the potentially lethal ammonia discharge at the sewage outfall pipe has not been fully investigated.

Outfall Chemicals

In our July 6 comment letter, we urged the County to require enhanced treatment of the Project's effluent streams. Our concerns regarding the need to further reduce nutrient loading in the Project's effluent streams has not been addressed. Further removal of orthophosphate, ammonia, reduced inorganic nitrogen, oxidized inorganic nitrogen, fungicides, hormones, and oxidants should be undertaken to reduce impacts to wild salmonids and to conserve the remaining habitat for threatened and endangered species.

In our May 24 comment letter, we recommended that Nordic fully analyze the effect of their treatment chemicals on macroalgae and eelgrass in the marine environment and in Humboldt Bay. We continue to be of the position that the Project should include mitigation for loss of juvenile salmonid habitat caused by miscible cleaners, solvents, antibiotics, fungicides, or dissolved nutrients entering the marine and estuarine environment where smolts shelter and where they disperse.

The DEIR and does not include any analyses on the effects of treatment chemicals on the local sugar kelp (*Laminaria saccharina*), rock weed (*Saccharina dentigera*), sea cabbage (*Saccharina sessilis*), sea lettuces (*Ulva* spp.), or on any other sensitive macroalgae or kelp species that may be chronically exposed to Project effluent. Without these analyses, generalized determinations about Projects effects on macroalgae are unsupportable. The local kelps and macro-algae are important habitat for marine invertebrates that listed salmonids depend upon for their survival. Regarding the importance of kelp ecosystems to juvenile salmonids and the ongoing biodiversity risks to kelp ecosystems, we referenced: Haugland (2019), McPherson et al. (2021), Rogers Bennett and Catton (2019), Shaffer (2002), Shaffer (2004), Shaffer et al (2019), Shaffer et al (2020). The DEIR did not make any references to the important issues raised in these papers. Instead, the discussion was on the distance of kelp communities from the outfall pipe and the 2000:1 dilution factor. The former position is not based on dispersal modeling, and the second position does not take into consideration the LD-50 for kelp and sea lettuce spores, gametophytes, or zoospores (the pelagic life-history stages of

kelp and sea lettuces).

The DEIS posits that kelp communities are too far away from the Project Study Boundary to be affected by Project effluent, and therefore considered the risk to kelp communities to be negligible. Without the dispersal modeling and the upwelling

modeling needed to ascertain the reach of Project effects, the DEIS conclusion that the Project would have a negligible risk to kelp communities is premature.

We would like to add that not only bull kelp should be addressed through monitoring. The bull kelp monitoring required by the NPDES (National Pollutant Discharge Elimination System) permit is a step in the right direction; however, the more vulnerable macroalgae that may be exposed to Project effluent should also be monitored. Selecting potentially more robust species for monitoring, such as bull kelp, can disguise impacts to fragile kelp ecosystems.

Lack of Biosecurity

The DEIR does not offer to test broodstock or in-facility Atlantic salmon using the best available scientific methods. Atlantic salmon eggs continue to be "certified free of diseases or pathogens of concern" yet salmon viruses continue to infect salmon in fish farms around the globe. The DEIR does not commit to pathogen screening using modern molecular techniques that are shown to detect salmon pathogens before a diagnosis. (For in-depth descriptions of modern molecular screening techniques, see Bateman *et al.* 2021, Miller *et al.* 2017, Mordecai *et al.* 2019, Mordecai *et al.* 2020, and Mauduit *et al.* 2022). These methodologies detect pathogens earlier than can be made by a veterinarian familiar with external symptoms of salmonid diseases. Veterinary diagnostic labs, such as referred to in the DEIR, are not known to use these methods.

Failure to monitor for salmonid pathogens using molecular screening techniques, as described above, is a biosecurity risk. The lack of testing for salmonid pathogens in the fish processing effluent and waste, the lack of monitoring biofilter efficiency, the lack of a remediation plan for when the biofilters become degraded of fail, and the lack of spill protection for waste solids all add up to a lack of biosecurity. We recommend that the final EIR contains a commitment to screen for the 47 known pathogens that can infect farmed salmon (Mauduit *et al.* 2022).

Risk from Viruses

The risk of wild salmonid exposure to the viruses that originated in Atlantic salmon farms continues to be one of our greatest concerns. No measures were included in the DEIR to monitor for the high-risk viruses we identified in our July 6 comment letter. These viruses are likely to proliferate at Project facilities as they have in other salmonid high-density fish farming around the world (Kibenge 2019, Kibenge et al, 2019). The fish disease that we consider the greatest risk from Project operations are: Infectious

Pancreatic Necrosis Virus, Infectious Salmon Anemia Virus, Salmonid Alphavirus, Piscine Orthoreovirus and its new variants, Novel Totivirus, and bacterial kidney disease. All of these diseases pose a risk to juvenile salmonids growing to adulthood in the marine habitat in the area of the outfall "diffuser" pipe and exposed to effluent during tidal cycles in Humboldt Bay, the Mad River estuary, and the Eel River estuary. As we stated in our July 6 comment letter, exposing young fish to disease can destabilize salmonid populations and lead to run and cohort failure in wild fish. This is a significant

threat to salmonid survival and recovery that needs to be addressed through prevention, monitoring, mitigation, and remediation. We recommend that the final EIR contain a sophisticated screening program, such as used by Bateman *et al.* (2021), Mordecai *et al.* (2019), Mordecai *et al.* (2020) and Mauduit *et al*. (2022).

In our May 24 comment letter, we expressed concern regarding seismic stability of the Project and we also expressed concern regarding fish escapes. Although we considered disease as an issue with fish escapes, we did not limit our concern to disease being spread to wild salmonid populations from fish escapes. In our July 6 comment letter, we expressed concern regarding effluent treatment in the fish processing area and we included a list of viruses that are known to proliferate in Atlantic salmon farms: Infectious Pancreatic Necrosis Virus, Infectious Salmon Anemia Virus, Salmonid Alphavirus, Piscine Orthoreovirus and its new variants, and Novel Totivirus. The DEIS has conflated the issue of fish escape (which has many risks to wild salmonids) with pathogen escape (which has a different set of risks and higher mortality factors).

The DEIR has several confident statements regarding "zero probability of escape" but also includes an "Escape Response and Reporting Plan." At a very minimum, the results of ongoing molecular screening of salmonid viruses should be included in the reporting section of this plan. While NMFS and CDFW should receive these reports, we request that SRF be included in reporting for any positive test results so that we can monitor our restoration populations for signs of infection.

Mad River Habitat

In both our May 23 and July 6 comment letters, we expressed concern regarding water withdrawal in the Mad River during a *low-flow event* such as the one that occurred in August 2008. We are fully aware that Ruth Reservoir, on the Mad River, has the capacity to supply water to the Project; however, it is not clear how the cumulative effect of an episodic low-flow event will be addressed. The DEIR discussion of the 1976-1977 drought does not address this concern.

It is not enough to reference the will-serve letter from the Humboldt Bay Municipal Water District—a letter that was referenced but not included in the DEIR. The cumulative impact of a low-flow event and Project withdrawal could be significant to salmonid cohort survival. The DEIR should address the potential impact of a low-flow

event to the physical and biological features of critical habitat for coho salmon, steelhead, and eulachon (an important forage species). Specifically, how the physical and biological features will be affected by the cumulative effects of a low-flow event and Project withdrawal of 2.5 million gallons of water per day.

Rather than address the issue of how the Project may affect critical habitat, the DEIS makes an argument that eulachon are no longer found in the Mad River. We would like to point out that critical habitat does not need to be occupied in order to be protected under the ESA. The DEIS failed to address steelhead, coho salmon, and Chinook

salmon critical habitat by limiting their analysis to within 1680 feet of the Project's outfall pipe and not including Project effects to critical habitat in the Mad River and Humboldt Bay. The DEIS did not address either dispersal of effluent under local flow conditions or the cumulative effect of upwelling that could impact salmonid habitat in the Mad River.

Effluent Modeling Needs

In our July 6 comment letter, we noted that the current modeling on the Project's effluent dispersal was incomplete and not sufficient to do a full analysis on the effluent effects on the Mad River and Eel River, critical habitat protected under the Endangered Species Act, as well as dispersal into the Samoa State Marine Conservation Area, Trinidad Head Area of Special Biological Significance, or the South Cape Mendocino State Marine Reserve. The preliminary modeling in the IS/MND was only based on a southbound current and did not include northward flows or marine upwelling. The DEIR now includes modeling of northward flows, but only for a distance of 1680 feet. Nutrients, pathogens, and treatment chemicals will not stop at the Project Study Boundary described in the DEIR, but will continue to flow along local currents until they precipitate out of the water column.

On July 6 we recommended upwelling modeling to address the combined impact of effluent-laden sediments, marine upwelling, tidal surge, and daily south to north current changes. We specifically recommended the BEUTI model (Biologically Effective Upwelling Transport Index), because it is an appropriate model to determine the cumulative effect of upwelling and effluent dispersion. We continue to recommend that the BEUTI model be used to estimate upwelling and nutrient transport within the full dispersal area of Project effluent. The modeling results should be included in the final EIR.

In our May 24 letter, we also postulated that mitigation for habitat loss in Humboldt Bay, which is critical habitat for Chinook salmon, coho salmon, and steelhead should be included as part of the Project. We based our recommendation on the likelihood of prolonged exposure to dilute effluent. Juvenile salmonids that rear in Humboldt Bay for up to a year could be harmed or injured from chronic, long-term exposure as well as from impaired prey base. We discussed the tidal patterns and currents that could draw effluent into the Humboldt Bay estuary and noted that effluent entering the estuary is

contrary to the recovery plan strategies for Chinook salmon, coho salmon, and steelhead. We included a reminder that with incoming tide and northward marine flows, effluent is likely to enter the Mad River estuary, and with incoming tide and southbound marine flows, effluent is likely to enter Humboldt Bay and the Eel River estuary.

We continue to recommend that upwelling and effluent dispersal modeling be included in the final EIR. We further recommend that the final EIR addresses the entire area likely to be affect by the Project and not just the smaller Project Study Boundary delineated by the DEIR.

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Biomass Reduction

After reviewing Appendix P of the DEIR, it has become clear that impacts to the Humboldt Bay ecosystem were obscured by a modeling scenario that did not consider the loss of prey biomass from removing 10 to 12 million gallons per day of seawater from the ecosystem. The modeling effort in Appendix P did not consider biomass loss from impingement. It also used one of the larger invertebrates in the ecosystem, Dungeness crab megalopae, for analyzing invertebrate entrainment. Using megalopae introduced a modeling bias, in that the smaller Dungeness crab zoea would be easily entrained. Entrainment and impingement of micro-invertebrates removes the foundational biomass of the ecosystem, which in turn removed prey biomass for salmonids. In addition to our earlier position that mitigation for habitat loss should be included to address the effects of Project effluent, we now recommend that mitigation for loss of salmonid prey base in Humboldt Bay be included in the final EIR.

Reduced Study Area

In both our May 24 and July 6 comment letters, we expressed concern over Project impacts to critical habitat for listed salmonids. Now, the Project Study Boundary in the DEIR is constrained to an area that is less than eight percent of the dispersal area described in the IS/IMD. Without the upwelling modeling and a full dispersal model, the conclusion that “there would be no impact to critical habitat for salmonids” is premature.

We are very concerned that with a southbound current and incoming tide, critical habitat and listed juvenile salmonids will be exposed to nitrogen compounds, phosphorus, and miscible chemicals—including chemicals that are toxic to marine invertebrates. Loss of marine invertebrates in the eelgrass in Humboldt Bay, and in the full dispersal area of the effluent, would have a significant ecological impact on the Humboldt Bay ecosystem. The Project should include baseline monitoring of eel grass, baseline monitoring of the invertebrate community found on eelgrass, and long-term monitoring of the eelgrass beds and invertebrate community in the vicinity of the seawater intakes—based upon the impacted area from effluent that is determined after the BEUTI

modeling.

The DEIR has included a description of chemical containments, which we appreciate. It has come to our attention that sewage spill of the waste solids could be an issue. Please describe in the DEIR how waste solids will have a level of containment that is as protective as the chemical containment. Please also describe how a spill response for waste solids will be conducted. We are also concerned that the waste solids may impact aquatic ecosystems in other watersheds that support salmonids (*e.g*., Eel River, Mad River, Yuba River, Feather River). End-point disposal protection for salmonids should be described in the DEIR, and extra measures should be described for waste solids that are known to contain fish viruses.

Exposure to Toxic Levels of Ammonia

With the daily changes in currents in the area of the outfall pipe, juvenile salmonids could be repeatedly exposed to toxic levels of ammonia. Depending on current and outmigration timing, juvenile salmonids could be exposed to toxic levels of ammonia for a period of 15 minutes to several hours. The DEIR concludes this level of exposure to be less than significant. We are concerned that this potentially lethal exposure to Project effluent, combined with loss of prey base at the seawater intakes, risk of escape of salmonid viruses, potential dispersal of Project effluent into critical habitat, potential adverse effects to salmonid and eulachon critical habitat in the Mad River, and upwelling events leading to redistribution of nutrient and chemical laden effluent all pose the risk for listed salmonids to be harmed, harassed, injured, or killed as a result of Project operations. In our May 24 and July 6 comment letters, we requested that ESA and CESA consultation be completed prior to finalization of the Environmental Impact Report. We further request that the ESA and CESA consultations consider all of the potential Project impacts that we have described in our comments.

Conclusion

The DEIR makes determinations that the project will have less than significant impact on six sensitive salmonid species or runs: *Oncorhynchus kisutch* (Coho Salmon – southern Oregon / northern California Evolutionarily Significant Unit (ESU)), *Oncorhynchus clarkii clarkia'* (Coastal Cutthroat Trout), *Oncorhynchus mykiss irideus* (Steelhead – northern California DPS), *Oncorhynchus mykiss* (Steelhead – summer run), *Oncorhynchus tshawytscha* (Chinook Salmon – California Coastal ESU California Coastal ESU), and *Oncorhynchus tshawytscha* (Klamath River Spring Chinook Salmon). These less than significant determinations for Project effects to these salmonids are made throughout the DEIR, but are not supported by the analyses described in the DEIR.

In our July 6 comment letter, we respectfully asked that the Humboldt County Planning Department ensure that the Project draft and final Environmental Impact Reports include measures to protect wild salmonids from exposure to Project effluent. We further requested that ESA and CESA consultation and modeling of Project impacts is completed prior to the final EIR. It is our continuing hope that impacts of the Project on salmonids and the sensitive ecosystems salmonids depend upon for their survival are fully addressed and mitigated.

Sincerely,

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Executive Director
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