Salmonid Restoration Federation

Humboldt County Planning and Building Dept.
3015 H St.
Eureka, CA 95501

ATTN: Alyssa Suarez, Planner, "Submitted by email" to planningclerk@co.humboldt.ca.us

RE: Nordic Aquafarms Permits

Dear Mr. John Ford, Director, Humboldt Co. Planning Dept., and Planning Commissioners:

The Salmonid Restoration Federation (SRF) appreciates the opportunity to comment on the Initial Study/Mitigated Negative Declaration (IS/MND) for the proposed Nordic Aquafarms facility in Humboldt County. 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 have not been fully addressed.

Juvenile salmonids use of kelp beds for foraging and shelter from predators has been well established (Shaffer 2002, Shaffer 2004, Shaffer et al. 2019, Shaffer et al. 2020). Kelp beds in California have been subject to extreme weather conditions resulting in reduction of up to 95 percent of kelp forest habitat from Mendocino to Marin counties (Rogers-Bennett and Catton 2019, McPherson et al. 2021). Wernberg et al. (2019) found that diverse kelp forests were consistently more resilient to marine warming events than kelp forests lacking diversity.

The IS/MND fails to address the importance of the kelp ecosystem to survival of juvenile salmonids. Kelp forests are essential for smolt survival, because they provide food and cover when the juvenile fish enter the marine environment. The IS/MND does not include an analysis or explanation of the effect of miscible cleaners, solvents, antibiotics, fungicides, or dissolved nutrients on the diverse macroalgae in the kelp forest ecosystem. For example, *Saccharina latissima* (sugar kelp) is highly sensitive to hydrogen peroxide (Haugland 2019). Although Nordic does not plan to use hydrogen peroxide, they plan to use sodium hypochlorite, which is a strong oxidizing agent. There is no reporting on the LD50 for sodium hypochlorite on *S. latissima*, or other sensitive macroalgae. Of particular concern are the effects of the powerful fungicide Virkon, which includes the powerful oxidizing agent potassium peroxymonosulfate, on the vulnerable kelp forest ecosystem or on individual species of kelp. As a fungicide, Virkon may adversely affect many kelp species that juvenile salmonids depend upon for their survival. The extent of macroalgae and eelgrass beds that could be exposed to effluent and oxidizing agents from the project has not been determined. The baseline and extent of macroalgae and eelgrass beds should be determined, and an exposure profile and risk assessment should be included in subsequent environmental documents.

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Effluent Stream Concerns

The IS/MND and its supporting documents are not clear about where the cleansers, blood and other body fluids, antibiotics, and antifungals from the factory floor in the fish processing area enter the effluent stream. Nordic's effluent schematic for their similar, but smaller, RAS facility in Maine shows a separate waste stream for effluent in the fish processing area (Figure 1).

The fecal material in the effluent stream will be filtered with biofilters that could be degraded by industrial cleansers. Such degradation could reduce the efficiency of the biofilm reactors, allowing for viruses and bacteria to pass through, and potentially increasing the dry material load in the effluent. To avoid damage to the biofilm reactors, the effluent stream from the fish processing appears to follow a different path. If the drains in the factory floor are comingled with effluent leaving the facility, industrial cleansers, blood and other body fluids, antibiotics, and antifungals could be introduced into juvenile salmonid habitat the marine environment. Nordic should clearly describe how waste from the factory floor will be treated in a way that maintains the integrity of the biofilm reactors and protects sensitive marine habitat.

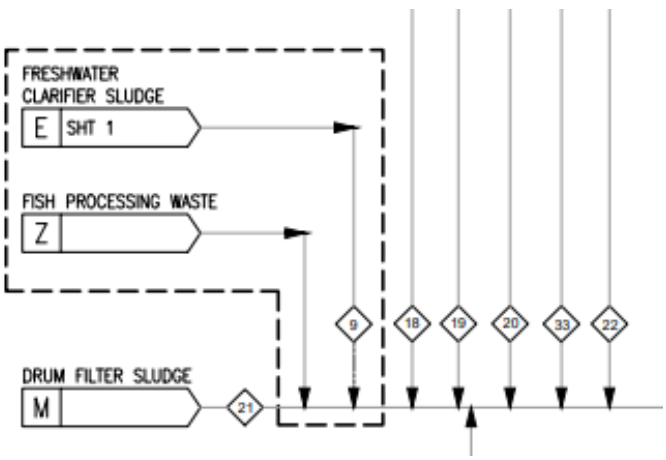

Figure 1. Excerpt from Nordic Aquafarms Preliminary Process Flow Diagram for NAE Belfast, Maine, USA. Dated March 23, 2021.

The *Nordic Aquafarms California LLC Samoa Peninsula Land-based Aquaculture Project Numerical Modelling Report* (GHD 2020a, Figure 7) clearly shows that effluent can enter Humboldt Bay. The impact of project chemicals and effluvia on critical habitat, and its effect on the feeding and sheltering of listed salmonids, should be analyzed.

We recommend that Nordic fully analyze the effect of their treatment chemicals on macroalgae and eelgrass in the marine environment and in Humboldt Bay. 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. Mitigation for habitat loss in Humboldt Bay, which is critical habitat for Chinook salmon, coho salmon, and steelhead should be included.

The IS/MND concluded that project impacts were “Less than significant” (IS/MND, page 4-73) for Southern Oregon/Northern California Coast Coho Salmon Evolutionarily Significant Unit (ESU), California Coast Chinook Salmon ESU, Northern California Steelhead DPS. This is a premature conclusion that was based on inadequate analysis. The IS/MND misrepresents the life history requirements of Chinook salmon, coho salmon, and steelhead. It is true that salmonids migrate quickly through Humboldt Bay during their upstream migration, however the juveniles rear and grow in the estuary. The life history strategy of estuarine rearing for coho salmon has been well documented (NOAA Fisheries 2014), as has the importance of estuary/lagoon habitat complexity (shelter) for California Coastal Chinook salmon (NOAA Fisheries 2016a) and Northern California steelhead (NOAA Fisheries 2016b). Effluent from the diffuser is likely to come into Humboldt Bay when there is a combination of a southbound current and incoming tide, exposing the critical habitat and listed juvenile salmonids to nitrogen compounds, phosphorus, and miscible chemicals.

Because juvenile salmonids may rear for up to a year in the estuary, the exposure to diffuser effluent is likely to be prolonged. The results of long-term exposure may harm or injure juvenile salmonids, making this exposure significant. Effluent entering the estuary is contrary to the recovery plan strategies for Chinook salmon, coho salmon, and steelhead. With incoming tide and northward marine flows, effluent is likely to enter the Mad River estuary. With incoming tide and southbound marine flows, effluent is likely to enter Humboldt Bay and the Eel River estuary.

While it is true that “Critical habitat for California Coast Chinook and Southern Oregon/Northern California Coast Coho Salmon does not extend into the open ocean” (IS/MND p. 4-74) and “Critical habitat for Northern California Steelhead also does not extend out into the open ocean” (IS/MND p. 4-74), it is not equally true that project effluent will not enter critical habitat on the incoming tide and potentially remain in the estuary for multiple tidal cycles. The project study boundary is constrained and does not include the full dispersal of effluent into sensitive estuarine habitat such as Humboldt Bay and the Mad River estuary. Therefore, the conclusion that “there would be no impact to critical habitat for salmonids” is premature.

Need for adequate effects analysis and ESA consultation

Nordic proposes to withdraw 2 million gallons per day (MGD) from the Mad River for their freshwater source. They are depending on an existing habitat conservation plan (HCP) agreed upon by NMFS for Humboldt Bay Municipal Water District (HBMWD) withdrawals from the Mad River. The implementing agreement for the HCP was issued December 7, 2004. In order to address take of listed species under the HCP, NOAA Fisheries wrote a biological opinion (BiOp). The NOAA Fisheries BiOp exempted take under the ESA of listed Chinook salmon and coho salmon from HBMWD water withdrawal, and it was signed on March 10, 2005. Nordic expects HBMWD capacity will be increased through intake modification: “The HBMWD is currently conducting a project to ensure necessary upgrades of this infrastructure for NAFC and other future users at the Peninsula” (GHD 2021, page 2-16).

On January 2, 2006, NOAA Fisheries designated Critical Habitat went into effect for the conservation of California Coastal Chinook salmon in the Eureka Plain Hydrologic Unit (including the lower Mad River) and Northern California steelhead in the Mad River Hydrologic Unit. In August of 2008 the Mad River had extremely low flows during a drought event. It is unclear how NMFS addressed the Critical

Habitat designations or the extraordinarily low flows in 2008, but the March 10, 2005 BiOp is clear in this regard. “[R]einitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained…and if: (1) the amount or extent of take is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent to previously considered in this opinion, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action” (NMFS 2005 BiOp, page 73).

The Nordic withdrawals of 2 MGD equate to approximately 3 cubic feet per second. The burden of this level of withdrawal during an extreme drought event in the Mad River is likely to result in death and injury to juvenile Chinook salmon and steelhead in a manner that has not been analyzed, addressed, or considered. During an extreme drought, algal blooms, anoxia, fish die-offs downstream of Station 6 on the Mad River are likely to occur. Increased reduction of Mad River flows by as much as 30 percent (such as would occur in an August 2008 type drought scenario, see Figure 2) could reduce juvenile salmonid rearing habitat by greater than 50 percent. The IS/MND referred to the 1976-1977 hydrology, but quantifying riparian and estuarine impacts from reduced flows has evolved substantially since then. Instream flow incremental methodology (IFIM) allows for a deep understanding of bathymetry and habitat parameters that can be modeled at targeted flows. Using modern methodology and modeling is essential for quantifying habitat loss in the Mad River that would result from project withdrawals in dry and very dry water years. Although August 2008 was an extreme event, other drought events, such as in 2020 and upcoming in 2021, should be closely examined.

The IS/MND (Table 4-4) statement that the “Project’s effluent discharge would not discharge into a coastal wetland area or area of special biological significance, marine reserves, or kelp beds” is not precisely correct. The discharge pipe will allow flow of effluent into the Samoa State Marine Conservation Area (SSMCA) when the current is in a northbound direction. SSMCA is a Marine Conservation Area protected under the California Marine Life Protection Act of 1999. Sensitive kelp and macroalgae ecosystems that are found in the SSMCA may be degraded by the effluent stream from the Project resulting in lower macroalgae diversity and reduced forage and cover for juvenile salmonids. The existing modeling is not sufficient to determine how much effluent will reach the Trinidad Head Area of Special Biological Significance (THASBS) or the South Cape Mendocino State Marine Reserve (SCMSMR). There has not been an adequate analysis to determined how the Project will affect water quality in these protected areas or whether the ecosystems in these areas will be injured or damaged. Because there has not been a full analysis on the effluent effects on the SSMCA, THASBS, SCMSMR, or on critical habitat, nor has there been an exposure or risk analysis for toxic chemical discharges on rearing habitat for salmonids, it is premature to conclude that these areas of special biological significance would not be significantly impacted.

Seismic and Fish Escapes Concerns

Føre and Thorvaldsen (2021) analyzed Atlantic salmon and rainbow trout fish escapes from fish farms in Norway from 2010 through 2018. They found that 7% of escapes came from land-based fish farms. SRF is concerned that fish escapes from the Nordic facility in Humboldt County could impact wild, native fish through competition, disease introduction, and predation.

In addition to the human error component of fish escapes identified by Føre and Thorvaldsen (2021), seismic events could also precipitate fish escapes. The IS/MND states that a “site-specific seismic study is underway” (p. 2-20), and concludes that seismic related ground failure, including liquefaction, is “less than significant with mitigation incorporated” (pp. 4-49, 4-90). It is premature to conclude less than significant effects prior to completing the seismic study. We recommend that a third-party seismic review be conducted that addresses liquefaction of saturated substrate, load from at-capacity rearing tanks, and the potential for shear and buckling of tanks and pipes.

In the IS/MND Nordic has addressed human safety, and protection of fuels and generators, during a tsunami event; however, it is not clear how fish escapes will be prevented or how the powerful oxidants and other operational chemicals will be walled-off and anchored in preparation for a tsunami. The conclusion that “impact of pollutants released as a result of a tsunami would therefore be less than significant” (p. 4-119) is not consistent with the fact that many of the chemicals proposed for project operation are highly toxic to macroalgae and can damage the fragile kelp ecosystem adjacent to the project.

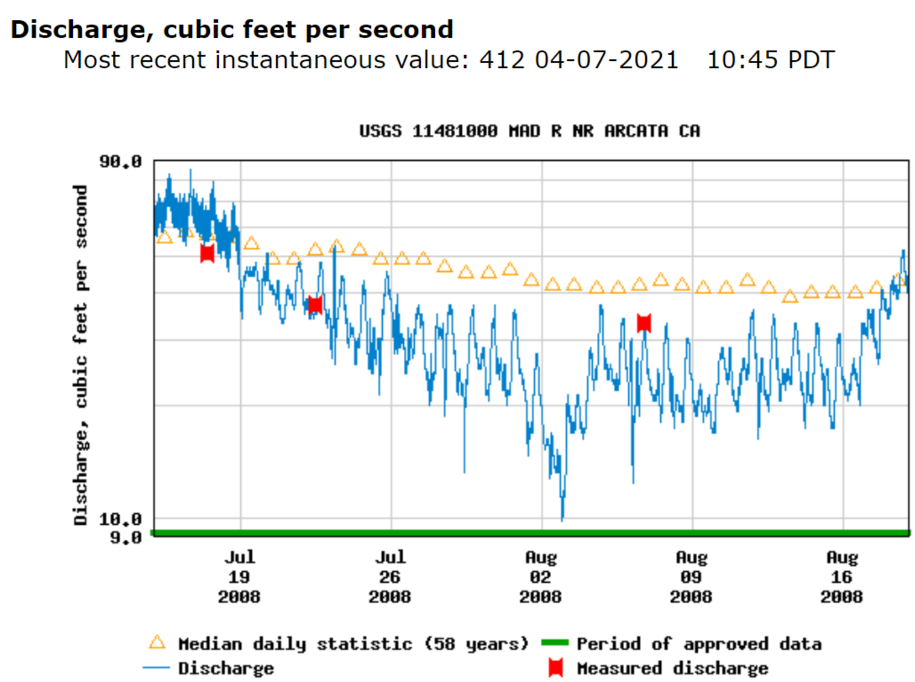

Figure 2. Mad River discharge at USGS station 11481000, near Arcata, California

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Conclusion

We respectfully ask that the Humboldt Planning Commission delay decision-making on the project until a final EIR is prepared that fully addresses the impacts of the project on salmonids and the sensitive ecosystems salmonids depend upon for their survival.

Sincerely,

Dana Stolzman

Dana Stolzman, Executive Director
Salmonid Restoration Federation

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