

## McNamara, Cade

---

**From:** David Sopjes <ferndalescience@yahoo.com>  
**Sent:** Monday, February 14, 2022 9:50 AM  
**To:** CEQAResponses  
**Subject:** CEQA Response to Nordic DEIR  
**Attachments:** Nordic fish factory is not sustainable.pdf

Hello Cade

I am attaching my comments about the Draft EIR for the Nordic fish factory. There are too many unknowns to proceed to a final EIR. This DEIR only addresses local impacts. This factory will need a huge feed stock source and will produce the waste equivalent of a city of around 300,000 people. These aspects will produce significant environmental impacts wherever they occur. These issues represent glaring discrepancies in the scope of the DEIR.

David Sopjes  
3703 Grizzly Bluff Rd  
Ferndale, CA 95536



To Humboldt County Planning Department

Attention: Cade McNamara

CEQA Comments on Nordic Aquafarms Facility

My name is David Sopjes and I have lived In Humboldt County for 40 years. I have Degrees in Physical Science and Life Science from Humboldt State University and I have taught high school and AP science classes for 22 years. I am concerned that this RAS facility is too large by an order of magnitude and that the parts of the project with the **highest potential for environmental damage (sourcing of feed stocks; CO<sub>2</sub> and methane emissions and salination of ground water associated with salty fish sludge disposal; destruction of larvae and juvenile aquatic species at the salt water intake) are not addressed in this Draft EIR.** The report acknowledges these omissions and recommends that they be addressed in the final EIR. I would suggest that these discrepancies be addressed in a second draft EIR since they account for processes that pose serious environmental risk.

David Sopjes

3703 Grizzly Bluff Rd

Ferndale, CA 95536

707-617-0122



## CEQA Comments on Nordic Aquafarms Facility

### Is the proposed Nordic fish factory sustainable?

Nordic claims that their operation proposed for the Samoa peninsula will be sustainable. To me, a sustainable farm means the farmer grows her feed on her land, raises herbivores (farm animals) as a product, and disposes of the wastes produced on the farm, using the manure on the fields to fertilize the feed crops. This sustainability depends on biological processes driven by sunlight energy. **A sustainable fish farmer would be using wetlands to supply the feed stocks and dispose of the waste produced by their herbivores.** This is called an Integrated Multi-trophic Recirculated Aquaculture System (IMRAS) and is currently being done on, state of the art, Tilapia fish farms in Thailand. It does however **require a significant area of functioning wetlands to support a small production of fish.** Herbivores (tilapia fish) are preferred because only about 10% of the energy at one level of the food chain is passed on to the next level.

Now let's look at Nordic. **They do not have the wetlands required for a sustainable operation** at the site they have chosen on the Samoa peninsula. The massive size of their fish production, projected to be at least 25,000 metric tons (55million lbs)/year, would require a huge wetland associated with it in order to use sustainable, biological processes driven by sunlight energy to support the facility. Instead, **Nordic has opted for an approach that trucks in the feed stocks and trucks out its manure, while dumping its treated liquid effluent waste into the ocean.** This is the same approach taken by Confined Animal Feeding Operations (CAFO's) at feed lots and large hog or poultry raising facilities. The EPA defines a CAFO as an agricultural facility where "animals have been, are, or will be stabled or **confined and fed** or maintained for a total of 45 days or more in any 12-month period". The EPA says a large CAFO is 1000 steers (1200 lbs each). That would be 1.2 million lbs of beef. Mammals (warm blooded) have about 1/5 the feed conversion efficiency ratio (animal kg/ feed kg) than fish have, so that would be equivalent to about 6 million pounds of fish (cold blooded), from a feed to animal point of view. At 55 million pounds of fish **Nordic's operation would be 9X (9000 steers) the EPA size for a Large CAFO.**

**Nordic also does not raise herbivores.** They raise carnivores (salmon) that are at least one level higher in the food chain, resulting in another 90% loss of the energy available at the herbivore level. Nordic has chosen to target 1<sup>st</sup> world markets with a high-priced commodity. They are not feeding the world through aquaculture. **The draft EIR does not address where these feed stocks will be sourced or any of the environmental consequences associated with the production of that feed.** Nordic would use **2.5million gallons of fresh water** per day supplied from the Mad River, but they stipulate that it must go through a **2million dollar water treatment plant** before it is ready for their fish. This treatment plant would be **paid for by the Humboldt Bay Municipal Water District.** Nordic would use **10 million gallons per day of sea water** from Humboldt Bay. This seawater contains the larvae and juveniles that make up the next generations in the Bay ecosystem. The Harbor District owns the intakes for this bay water and would have to file their own EIR showing that they are not damaging the Bay ecosystem and pay for improvements. The **ocean disposal pipe**, for their waste effluent, is currently in need of **1 million dollars in repair**, that will be paid for by the Harbor District. **That alone is 10**

years rent at \$100,000 per year not counting the unknown cost of refurbishing the salt water intakes.

**What landlord would spend 10+ years rent from the 30 year project just to satisfy the needs of the renter?**

**Based on the size of the project that Nordic is proposing, this 3-4 million dollars is “pocket change”. They will, no doubt, fund all this cost if any of it stands in the way of their profits. They have chosen to try to get these local entities to “go all in” on the project. Nordic expects that these entities will not be willing to protect the environment from the project because they will be invested in the project and the “big payoff”.**

Nordic has chosen to use traditional waste treatment facilities, similar to those used by urban areas. Nordic’s waste stream will be at least **12.5 million gallons per day of effluent discharged through the ocean outfall pipe** located at this facility. They published a Project Design document (rev 2 Nov 2020) which claims: *“The total RAS and wastewater design delivers the following performance:*

- 1. 99 percent reduction of total suspended solids, BOD, and phosphorous*
- 2. 90 percent reduction of nitrogen discharge (page 30)”*

They present the following table on page 32

*“Table 2-5 Project Daily Maximum Effluent Summary*

***Effluent Discharge***

*Total Water volume 12.5 MGD*

*Total Suspended Solids (TSS) 18 KGD*

*Biochemical Oxygen Demand (BOD) 162 KGD*

*Total Nitrogen (TN) 673 KGD*

*Ammonium Nitrogen (NH4) 0.07 KGD*

*Phosphorus (P) 5.8 KGD*

*Notes:*

*1. MGD = Millions of Gallons per Day*

*2. KGD = Kilograms per day”*

**RAS = Recirculated Aquaculture System**

**If these values for effluent production(kg/d) are based on the percentage waste reduction values stated above in the Project Design Rev. 2 document, then we should be able to use those waste reduction percentages to calculate the original (100%) amount of waste produced by the facility and**

presented to the waste treatment plant by 5 million salmon (5kg each). I wanted to compare the waste stream from 5 million salmon to the waste stream from the 45,000 citizens of Eureka before it enters the waste treatment plant and to the waste stream of other smaller RAS facilities to get some idea of the size of Nordic project. I am also using a report, prepared by SHN engineering for the County of Humboldt in 2016, assessing the possibility of using The Redwood Marine Terminal II (RMTII), Nordic's proposed location, as a land-based aquaculture facility.

I present my numerical analysis followed by a summary.

<b>Comparison of Nordic's waste stream with City of Eureka and SHN Report for RMTII expected results</b>					
<b>Total Suspended Solids (TSS)</b>					
1% of TSS (kg/d)(Nordic)	100% of TSS (kg/d)(Nordic)				inflow to Eureka Treatment plant
					TSS (Kg/d) July 2017
18kg/d	1800 kg/d				200.9kg/d
Nordic would be producing 9X the TSS that the City of Eureka (45,000 people) produces (400,000 person waste equivalence)					
<b>Biological Oxygen Demand (BOD)</b>					
1% of BOD(Kg/d) (Nordic)	100% of BOD(kg/d) (Nordic)				inflow to Eureka Treatment plant
					BOD (Kg/d) July 2017
162kg/d	16200 kg/d				4,175kg/d
Nordic's BOD waste production would be 3.88X the City of Eureka (45,000 people) or 174,610 people					
<b>Total Nitrogen (TN)</b>					
10% of TN (kg/d)(Nordic)	100% of TN (kg/d)(Nordic)	TN per year	Fish production per year	Waste production ratio Nordic	SHN report
		(TN/d X365)		(TN kg/ ton Fish prod.)	Waste prod. Ratio
673kg/d	6730kg/d	2.33X10 <sup>6</sup> kg/yr	25,000 tons	93.0 kg TN/ton of fish produced	55.8kg/ ton
Nordic's system would produce 1.66X the Total Nitrogen waste as SHN report expected					

<b>Ammonium NH<sub>4</sub></b>						
1% of NH <sub>4</sub> (kg/d)(Nordic)	100% of NH <sub>4</sub> (kg/d) (Nordic)					inflow to Eureka Treatment plant
						NH <sub>4</sub> (Kg/d) July 2017
.07kg/d	7.0kg/d					115.3kg/d
Nordic would produce 6% of the mean Max NH <sub>4</sub> effluent of the City of Eureka.						
<b>Phosphorous (P)</b>						
1% of P (kg/d)(Nordic)	100% of P (kg/d)(Nordic )	P per year Nordic	Fish production per year	Waste production ratio Nordic	SHN report	
		(P/d X365)		(P kg/ ton Fish prod.)	Waste prod. Ratio	
5.8 kg/d	580kg/d	211,700kg/yr	25,000 tons	8.468kg/ton	8.9kg/ton	
Nordic's system would produce 95% of the phosphorous expected by SHN at RMTII						

### SUMMARY

Nordic would produce **9X the Total Suspended Solids of the City of Eureka** (45,000people) which is equivalent to **400,000 people**. Nordic claims its NH<sub>4</sub> production per day would be 6 % of the City of Eureka. They are using a **Biological Membrane system to oxidize the Ammonium (NH<sub>4</sub>)** to Nitrate because ammonium is toxic to their fish. This **greatly increases the Nitrate released into the ocean**, possibly resulting in **Harmful Algae Blooms**. Nordic did not choose to use the modern, state of the art technology for dealing with their Ammonium. This technology electrochemically oxidizes the ammonium to Nitrogen gas, which is harmless to living things and bubbles away into the atmosphere, instead of producing Nitrate, and powerful algal nutrient. This modern system is more expensive but it is much safer than the biological membrane system. Electrochemical oxidation of the ammonium is not even mentioned in any proposed alternatives for the project. This is a significant oversight!

With all that Nitrate, Nordic's system would **produce 1.66X the Total Nitrogen waste** as the SHN report had expected. This number has been **challenged as a significant environmental impact by the National Marine Fisheries Service (NMFS) in their response to Nordic's request for a permit from the North Coast Regional Water Quality Control Board**. Nordic's BOD waste production is **3.88X the City of Eureka** (45,000 people) or equivalent to **174,610 people**. This **high BOD** is the result of undigested feed proteins, carbohydrates, and oils in the manure and a significant amount of uneaten feed. That estimate is consistent with the estimates I have seen for waste production ratios in smaller RAS operations. **These nutrients are oxidized by heterotrophic bacteria lowering the oxygen levels in the area of the dump site leading to potential eutrophication**. The Phosphorous waste production ratio is about 95% of the

SHN report's estimate so it is possible that they will achieve this ratio. **Phosphorous availability is essential for Blue-green Algal Blooms (Harmful algal blooms).**

**As you can see this facility will produce the waste equivalent of a medium sized city. Their waste stream would be about 3X as large as all the cities in the county put together.**

Nordic's waste stream also includes **8-12,000 metric tons/year** (dry weight) of settled solids, fish sludge. This **saltwater laden fish sludge** will be removed using 2-4 trucks per day and sent to a facility in Marysville, CA. All urban waste treatment systems produce a type of sludge, which is digested and turned into compost, known as biosolids. This material is then spread onto fields as compost. However, Nordic's fish sludge will be **contaminated with a large amount of salt**, since the adult salmon are raised in salt water. Urban waste treatment plants don't have to deal with the salt since their waste stream comes from fresh water sources. When I asked Nordic's representatives about this, I was told that they would be using a vermiculture process to remove the salt so the biosolids can be used on fields without killing the vegetation. I have not been able to find any peer reviewed literature describing this process. Nordic has a letter from Recology of California that states their facility in Marysville will be expanded to receive 2000 tons of sludge per day. The letter does not state that they will accept salty sludge. The draft EIR does not address any of the environmental consequences of the transport and processing of 12,000 tons of salty fish sludge per year. The DEIR says that turning this sludge into compost will sequester carbon. I disagree! Composting merely delays the start time for the release of this carbon for at most a few months, since the sludge is composed of manure without any humus. Once the first compost starts outgassing, the emissions from this factory will be continuous at full decomposition levels for the next half century. **The CO<sub>2</sub> and methane emissions from this processing must be considered. Where will all the salt end up? In the groundwater?**

**You can see that Nordic's fish factory has many unknowns in its supply chain and waste treatment stream.**

Initially, **Nordic did not think that monitoring** for impacts of their effluent stream on the coastal ocean environment **was necessary and considers it an undue financial burden**. In their draft EIR, they have agreed to do this monitoring. The facility does have electrical generator backup systems to keep everything running, but **they do not have a backup waste treatment system. They cannot stop dumping into the ocean without losing their entire operation**. The draft EIR says that they are prepared to make modifications to their feeds and feeding regimens and the amount of fish processing at their slaughter house, if regulators can prove that the **detrimental environmental impacts** are "(1) directly attributable to the Project and (2) in conflict with the NPDES order for the Project". The inevitable court battle would be lengthy. **Regulators will be forced to weigh the damage to our coastal environment and its fisheries against the billion-dollar fish factory that will plead that it is "too big to fail"**

**As you can see, this is a huge commercial experiment with a host of unknowns about the parts of the project with the highest potential to produce environmental damage. This project will be 10X larger than any existing facility of its kind in the world.**

As a citizen of the Humboldt County Ecosystem, I consider our **dumping of our citizens' waste** into our rivers and our ocean as a **manageable, necessary evil** and I applaud our waste treatment professionals for taking good care of our rivers and ocean/bays as our county has grown (Arcata and



Fortuna, not so much Eureka). Nordic has a 30year lease with two 10year extensions, so they would be dumping here for the next half century. They would gross over 25 billion in that time period.

**Nordic's Fish Factory dumping their wastes into our ocean for their own profit is a completely unnecessary evil. Their promised benefits to our county pale in comparison.**

**Most of you remember the deal where we were told you didn't need healthy rivers for salmon. As long as you have dams and hatcheries, the ocean will raise the fish. Nordic would tell you that you don't need healthy rivers (just a little water) OR healthy oceans (just a place to dump the waste) and you can have all the "salmon" you can stand. Is this the future of fisheries?**

David Sopjes

Ferndale, CA

03Feb22

References:

**Infrastructure Needs and Reuse on the- Samoa Peninsula - Redwood Marine Terminal II** by SHN Engineering, February 2016, <\\Eureka\projects\2015\015147-redwood-marine-terminal-I\PUBS\Rpts\20160225-RMTII-InfrastructureReuseEval.doc>

CITY OF EUREKA - ELK RIVER WASTEWATER TREATMENT PLANT AND COLLECTIONS SYSTEM POTW - 2017 ANNUAL REPORT - <http://new.ci.eureka.ca.gov/civicax/filebank/blobdload.aspx?BlobID=13962>

Samoa Peninsula Land-based - Aquaculture Project - Project Description, Rev. 2, Prepared By GHD engineering in Nov 2020. <https://humboldt.gov.org/DocumentCenter/View/91249/16698-Project-Description-PDF>

Xingqiang,Song<sup>1,2</sup> Ying Liu<sup>3</sup> Johan Berg Pettersen<sup>1,4</sup> Miguel Brandão<sup>5</sup>, Xiaona Ma<sup>6</sup> Stian Røberg<sup>1</sup> Björn Frostell<sup>5</sup>, Life cycle assessment of recirculating aquaculture systems - A case of Atlantic salmon farming in China, *Journal of Industrial Ecology* 2019;23:1077–1086.

Song, X., Y. Liu, J. B. Pettersen, M. Brandão, X. Ma, S. Røberg, and B. Frostell. 2019. Life Cycle Assessment of recirculating aquaculture systems: A case of Atlantic salmon farming in China. *Journal of Industrial Ecology. Supplemental*

Sri-uam P, Donnuea S, Powtongsook S, Pavasant P. Integrated Multi-Trophic Recirculating Aquaculture System for Nile Tilapia (*Oreochromis niloticus*). *Sustainability*. 2016; 8(7):592. <https://doi.org/10.3390/su8070592>

Geletu Qing <sup>a</sup>, Zahra Anari <sup>a</sup>, Mojtaba Abolhassani <sup>a</sup>, Shelby L. Foster <sup>a</sup>, Marty Matlock <sup>b</sup>, Greg Thoma <sup>a</sup>, Lauren F. Greenlee ; Electrochemical ammonia removal and disinfection of aquaculture wastewater using batch and flow reactors incorporating PtRu/graphite anode and graphite cathode; *Aquacultural Engineering* 93 (2021) 102155

US EPA ; Why is it important to evaluate phosphorus? <https://www.epa.gov/national-aquatic-resource-surveys/indicators-phosphorus#:~:text=Too%20much%20phosphorus%20can%20cause,to%20human%20and%20animal%20health.>