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**From:** [David Sopjes](#)  
**To:** [Planning Clerk](#)  
**Subject:** Nordic Fish Factory PLN-2020-16698.  
**Date:** Wednesday, July 27, 2022 10:49:01 AM  
**Attachments:** [HumCo Planning Commission Statement on Nordic Fish Factory.pdf](#)  
[HumCo Planning Commission Statement.pdf](#)

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Good Day

I am commenting on the proposed permit for Nordic's fish factory PLN-2020-16698..

### Planning Commission Statement

28Jul22

My name is David Sopjes and I have lived in Humboldt County for 45 Years. I am a retired science teacher and I have a quiz for you. " Do you think that 5million salmon will produce more sewage waste or less sewage waste as the 45,000 citizens of Eureka?" The correct answer is that 5 million salmon will produce much more waste than 45,000 Eurekaans. They will produce 3.9X as much or the waste equivalent of 175,000 people based on Biological Oxygen Demand. High BOD creates anoxic dead zones in receiving waters. Our coastal waters already are at risk from upwelled anoxic waters during spring and summer, but this cumulative effect is not even addressed in the DEIR. This factory uses bacteria to convert its Ammonia to Nitrate potentially resulting in algal blooms in the receiving water. NOAA Fisheries pointed this out as a potentially significant impact, but were told by the paid industry spokesscientists that dilution is the solution.

When I first heard about this project, 3 years ago, I researched the peer reviewed literature about Recirculated Aquaculture Systems and became concerned about the massive potential for waste production from these factories. The ocean disposal pipe that Nordic is using is not regulated by safe concentration limits on pollutants. They are only required to remove a percentage of the pollutant based on what enters their waste treatment facilities. According to their NPDES permit for BOD, Nordic is required to remove 90% of the BOD that enters the facilities, they are allowed to dump 10% of their BOD. Also 10% of their Phosphorus and suspended solids and 15 % of their total nitrogen. This type of regulation favors the large polluter at the cost of the environment. Nordic has promised the public, in their Project Design Document, that they will only dump 1% of their BOD, Phosphorous, and suspended solids and 10% of their Nitrogen. However, when a monitoring program was put in place, as per DIER, Nordic said that regulators would have to prove that the factory was responsible for an observed environmental impact and that its effluent exceeded their Federal NPDES permitted amounts. It is incorrect for the planning commission staff to recommend this permit using Nordic's promised waste reduction numbers as justification. They should have used the NPDES required numbers, since 10% of their BOD is 10 X the pollutant compared 1% of BOD.

There has been much discussion of the Greenhouse Gas Emissions from this factory and how to mitigate them. That is important because they will use about a quarter of our available energy if we don't get wind turbines. The GHG from this factory would be about 80 million kilograms of GHG equivalent to 200 million passenger miles. There is no mention in their EIR of the GHG emissions from the settled sludge, made up of uneaten food and manure, produced by their waste treatment plant. They plan to truck it to Maryville and have Recology of California compost it and spread it on fields. This amounts to around 10 million kg of GHG, equivalent to 25 million passenger miles. This material will have a salinity 80% of salt water. I would never put salty compost on my fields. This would certainly represent a significant environmental impact in Maryville, but that is not considered in this project.

The EPA calls the business model for this factory a Confined Animal Feeding Operation. It is an organic carbon intensive process. Trucking in large amounts of organic carbon as carbohydrates, proteins and fats in the feed, trucking out product and sludge, and dumping an organic soup into the ocean. Based

on the production expected from this factory, this is equivalent to a CAFO with 9000 steers. The EPA says a large CAFO is 1000 steers.

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. I guess they really are the future of fisheries.

I am also attaching a report I produced citing the peer reviewed literature that applies to this factory.

David Sopjes  
3703 Grizzly Bluff Rd  
Ferndale, CA 95536

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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. I guess they really are the future of fisheries.

To whom it may concern

I am opposed to the permitting of the Nordic Fish Factory facility proposed for the Samoa Spit. My main concern is the size of the factory and the amount of waste that will be produced. Nordic and the County of Humboldt have not been transparent or completely honest with the citizens of Humboldt. This facility will produce the same amount of waste as a medium sized city (175,000 people based on BOD). Nordic and the County have never mentioned this to the public. They continue to state that the waste treatment standard is the highest in the industry, removing 90% of the total nitrogen and 99% of everything else. Nordic's effluent content table in their Project Description Rev2 contains a list of their production per day for each pollutant. It is possible to work backwards to determine the 100% amounts that are produced by the fish and presented for waste treatment. These 100% values indicate that the factory will be producing the waste equivalence of a medium sized city. I have completed the following analysis of Nordic's waste production numbers. I can't see how you can say that the waste equivalent of 175,000 people dumped in the ocean for the next 50 years will have "no significant adverse environmental effect"? Why don't you tell the citizens of Humboldt the whole truth?

### **Response to Nordic Project Design Rev2 (11/2020)**

#### **Calculation of Waste production ratios for the facility based on data supplied in Project Design Rev2**

The Project Design Document Rev 2 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)"

Figure 2-3 Wastewater Treatment Infrastructure diagram on page 31 indicates 99% removal of phosphorous.

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 (NH<sub>4</sub>) 0.07 KGD

Phosphorus (P) 5.8 KGD

Notes:

1. MGD = Millions of Gallons per Day
2. KGD = Kilograms per day"

If these values for effluent kg/d are based on the percentage waste reduction values stated previously in the Project Design document, then we should be able to use those reduction percentages to calculate the original (100%) amount of waste produced by the facility and presented to the waste treatment plant. By comparing the waste(kg) produced to the fish(ton) produced, we get the waste production ratio.

1) **Total Suspended Solids**- If 1% of the TSS=18kg/d, then 100% = 1800kg/d or( $\times 365$ ) =  $6.57 \times 10^5$ kg/yr. If they produce 25,000 tons of fish/yr, then that yields a **waste production ratio** of  $6.57 \times 10^5$ kg/yr: 25,000 ton/yr = **26.28kg TSS /ton of fish produced**

- SHN report for RMTII(SHN,2016) = 306.5 kg/ton so Nordic's system produces 8.57% of what SHN expected from a fin fish aqua culture system

- Eureka waste water treatment plant(inflow)(page 5-City of Eureka,2017) = 442lbs/d or 200.9kg/d July 2017 so Nordic is claiming they produce 8.9% of the TSS that the City of Eureka (45,000 people) produces

2) **BOD** – If 1% of BOD=162kg/d, then 100% = 16,200 kg/d .

-Eureka waste water treatment plant report for July 2017 shows a mean BOD(inflow) = 9185 lbs/d or 4,175kg/d (page 5). So Nordic's BOD waste production is 3.88X the City of Eureka (45,000 people) or **174,610 human waste equivalence**

3) **Total Nitrogen** – If 10% of TN = 673kg/d, then 100% = 6730kg/d or  $X(365) = 2.45645 \times 10^6$  kg/yr. If they produce 25,000 ton of fish/yr, the that yields a **waste production ratio** of  $2.45645 \times 10^6$  kg/yr: 25,000 tons/yr = **98.258 kg Nitrogen/ton of fish produced.**

- SHN report for RMTII(SHN,2016) = 55.8kg/ton

-Atlantic Salmon in China (Song et al, 2019) section9 Table S13 = 49.5 - 65.1 kg/ ton

-So Nordic's system produces 1.76X the Total Nitrogen waste as SHN expected

4) **Ammonium Nitrogen (NH4)** - .07kg/d. Based on the 12.5MGD volume, that is a concentration of 1.5ppb that is 100X less than the safe concentration of ammonium in the seawater they are raising the fish in, so this number is sketchy.

- Eureka waste water treatment plant reported a mean NH4 max discharge in the effluent in 2017 (annual report page 8) = 253.7 lbs/d = 115.3kg/d.

-Nordic is claiming that they are producing .07/115.3 or .06% mean Max NH4 effluent of the city of Eureka

5) **Phosphorous** –If 1% of the Phosphorous = 5.8 kg/d, then 100% = 580kg/d or  $X(365) = 211,700$ kg/yr. If they produce 25,000 ton/yr, then that yields a **waste production ratio** = 211,700kg/yr: 25,000ton/yr = **8.468kg/ton.**

- SHN report for RMTII(SHN,2016) total Phosphorous = 8.9kg/ton

- Atlantic Salmon in China (Song et al, 2019) section9 Table S13 =10.2kg/ton

- So Nordic's system produces 95% of the phosphorous expected by SHN at RMTII

## SUMMARY

Nordic claims its Total Suspended Solids waste production ratio is 12X better than what SHN expected and the China Atlantic Salmon study reported. Nordic claims its NH4 production per day is .06 % of the City of Eureka. I have little confidence in either of these numbers. The Phosphorous waste production ratio is about 95% of the SHN estimate so it is possible that they will achieve this ratio.

Nordic's system produces 1.76X the Total Nitrogen waste as SHN had expected. This number seems a little high since SHN's numbers are "more than 10 years old and do not apply here", as Harbor Commissioner Mr. Pat Higgins told me, and I expected Nordic to be more efficient than that. Nordic's BOD waste production is 3.88X the City of Eureka (45,000 people) or 174,610 human waste equivalence. This high BOD is due to the high organic carbon content of the factory's waste stream. That estimate is consistent with the estimates I have made using other waste production ratios.

This Factory will produce settled solid waste as part of their waste treatment operation. This sludge is to be dried on site and then transported, by at least 4 tanker trucks per week, to a disposal facility in the central valley operated by Recology of California. The Nordic DEIR estimates this will be 4,000 tons per year at full

operation. The Life Cycle Analysis of a similar RAS Facility in China found that the sludge produced was approximately 50% of the Feed mass(Song,2019; Mongirdasa 2019). This would be 12,000 tons for the Nordic Factory. This material is composed of fish manure and uneaten food and will be composted and spread on fields. This practice is common for sludge generated by urban waste treatment facilities. There are two significant issues with this part of Nordic's waste treatment plan. First, this facility is raising salmon in salt water and the settled solids will have a salinity that is 80% of sea water. Where will all the salt end up and will salty compost be marketable? Second, this composting produces large amounts of greenhouse gases in the process. A typical ton of municipal sludge produces 750kg of greenhouse gas equivalent when composted and spread over fields(Hong-tao,2016). Nordic's sludge would produce at least 9 million kg of greenhouse gases each year. The sludge from this process contains much more organic carbon than typical municipal sludge and will produce much more GHG. The EPA says a typical passenger vehicle produces .404kg GHG per mile driven( US EPA). Nordic's GHG production from their sludge is the equivalent of up to 22 million passenger miles each year. This would be occurring for the next 50 years, at least. Does this project help California meet its zero carbon goals?

This is not surprising for a business model that is based on trucking in massive inputs of organic carbon(feed) that will be turned into 25,000 tons of organic living tissue (fish 90% water) while producing massive amounts of organic carbon waste to be dumped in the ocean or "composted" on land. This business model is commonly known as a "Confined Animal Feeding Operation" or CAFO. This factory's production would be the equivalent of a 9,000 steer CAFO ( fish have 5X the feed conversion ratio compared to 1000lb steers). The EPA considers a large CAFO to be 1000 steers (US EPA). Would this be approved if they were actually planning for a 9000 steer CAFO on the Samoa Peninsula?

Initially, Nordic wanted to avoid any monitoring of their waste dumping into the ocean. They claim to be removing 99% of the total suspended solids, BOD, and phosphorous and 90% of the total Nitrogen. They claim this is the best in the industry. When they were required to monitor their waste effluent in their DEIR, they said that regulators would have to prove that any problems with algal blooms are due to Nordic's operation and that their waste effluent is more than what their Federal NPDES permit allows. Their NPDES permit only requires 90% and 85% removal of these contaminants, respectively. They are allowed to dump 10X they amount they are claiming to dump They won't stop dumping, but they have changes to their feed and feeding schedules that they are willing to implement. They cannot stop dumping in the ocean without losing their entire operation. You can bet they will claim they are too big to fail compared to the damage they are doing to our tiny local fisheries and ecosystem. This will certainly involve a long, expensive court battle.

The Project Description Rev2 indicates that the Nordic Fish factory now requires 12.5 MGD. I expected this request for increased water usage because I did not think they would be able to clean their recirculated water without more effluent flow. I am certain it won't be the last request for more effluent water. In my analysis, I have focused both on the mass of waste produced by the factory as well as waste concentrations, which can change with changing effluent volumes. The actual volume of effluent will affect the concentrations of waste that oceanic organisms are initially exposed to, but it does not affect the total amount of waste produced by the Nordic Fish Factory, which depends on the total fish production level (25,000 ton/yr). The observed waste production ratios are not affected by any change in effluent volume. It is my prediction that they will be asking to be allowed more effluent when they begin operations and find they have trouble cleaning the recycled water well enough to keep their fish alive. The City of Eureka is considering connecting to the ocean outfall pipe in the future. Eureka's effluent combined with Nordic's effluent and winter rain water that enters the system, the ocean outfall pipe could easily reach 80% of it supposed capacity(40MGD), leaving little room for Samoa's and Manila's waste treatment systems to also use the ocean outfall pipe. As a citizen of the Humboldt County Ecosystem, I consider our dumping of our citizens' waste into our rivers and ocean as a manageable, necessary evil and I applaud our waste treatment professionals for taking good care of our rivers and oceans/bays as our county has grown (Arcata and Fortuna, not so much Eureka). Nordic's Fish Factory dumping their wastes into our ocean for their own profit is an 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. I guess they really are the future of fisheries.

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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-II\PUBS\Rpts\20160225-RMTII-InfrastructureReuseEval.doc>

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US EPA How much carbon dioxide is produced per kilowatt-hour of U.S. electricity generation?

<https://www.eia.gov/tools/faqs/faq.php?id=74&t=11>

US EPA Regulatory Definitions of Large CAFOs, Medium CAFO, and Small CAFOs

[https://www3.epa.gov/npdes/pubs/sector\\_table.pdf](https://www3.epa.gov/npdes/pubs/sector_table.pdf)

US EPA Greenhouse Gas Emissions from a Typical Passenger Vehicle

<https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#driving>

dr. Viktoras Mongirdasa , dr. Gražina Žibienė , Alvydas Žibas [https://www.researchgate.net/profile/Grazina-](https://www.researchgate.net/profile/Grazina-Zibiene-)

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