

Patrick Higgins

Humboldt Bay Harbor, Recreation and Conservation District, 5th Division Commissioner
4649 Aster Avenue
McKinleyville, California 95521

January 13, 2022

Mr. Cade McNamara, Planner II
Humboldt County Planning Commission
825 Fifth Street
Eureka, California 95521

Re: Comments on the Draft Environmental Impact Report (DEIR) for the Nordic Aquafarms California, LLC – Coastal Development Permit and Special Permit application (Case Number PLN-2020-16698)

Dear Mr. McNamara,

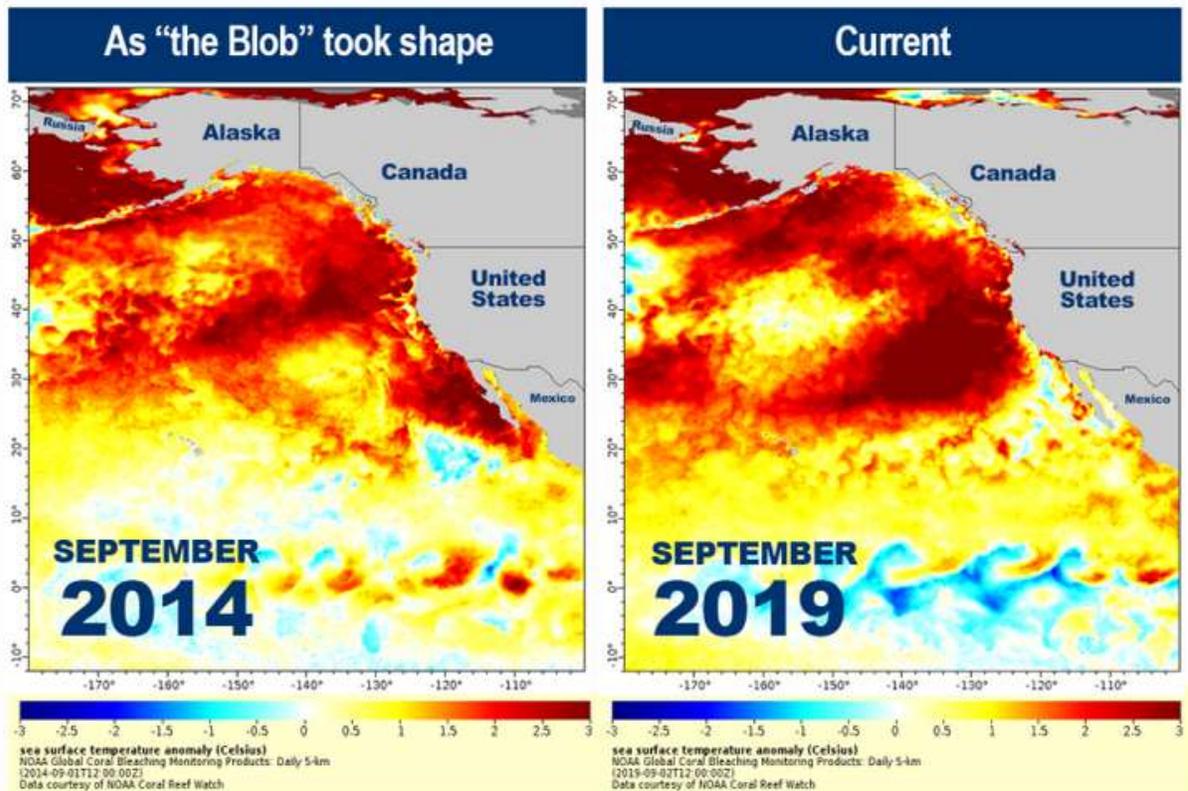
Although I am the 5th Division Commissioner for the Humboldt Bay Harbor, Recreation and Conservation District, my comments below on the Draft Environmental Impact Report (DEIR) for the Nordic Aquafarms are mine as an individual and not meant to represent the position of the Commission. I am a fisheries and watershed scientist and I am concerned about the potential for nutrient disposal from the facility to cause hazardous algae blooms (HABs) and I am hoping that Nordic Aquafarms will consider repurposing the nitrogen that will be pumped into the ocean through the District's outfall daily. My concerns were heightened by the comments of the National Marine Fisheries Service (NOAA 2021) to the North Coast Regional Water Quality Control Board regarding the National Pollution Discharge Elimination System (NPDES) permit. Much of the information on ocean conditions I provide for context is from annual *Ecosystem Status Reports of the California Current* (NOAA 2018, 2019, 2020).

The DEIR points out that the Nordic facility has many mechanisms to avoid nutrient pollution, but still plans to pump 1484 pounds of nitrogen daily into the ocean just offshore through the District's outfall. While this nitrogen is in a relatively inert form, it will mix into the environment and poses some risk of stimulating algae blooms, including HABs. Some additional green algae blooms could be aided, but there is also the potential to stimulate undesirable species that could have ripple impacts on the environment and the near-shore ocean ecosystem.

NMFS (2021) comments mentioned above state that “the perennial discharges of nutrients will support increases in the local population of algae species and likely contribute to increased frequency of future harmful algal blooms and corresponding toxins and depressed dissolved oxygen conditions.”

In my work on the Eel River, I have had cause to pay attention to ocean conditions because changes in the nearshore ocean off of northern California have triggered salmon decline. The 2015 warm water mass that transited the coast here, known as the Blob, caused major problems for cold-adapted fish species and also caused massive toxic algae blooms along the entire California coast. Unfortunately, warm conditions have persisted, as have noxious algae blooms.

NOAA annual California Current reports have noted that nearshore ocean waters failed to return to normal cold-water regimes, with a recurrence of high-water temperatures in 2019. In 2020 and 2021, we have had nearshore cooling and moderate upwelling, but the California Current is not being fed by cold water from the Arctic because the Gulf of Alaska has warmed and blocks the connection.



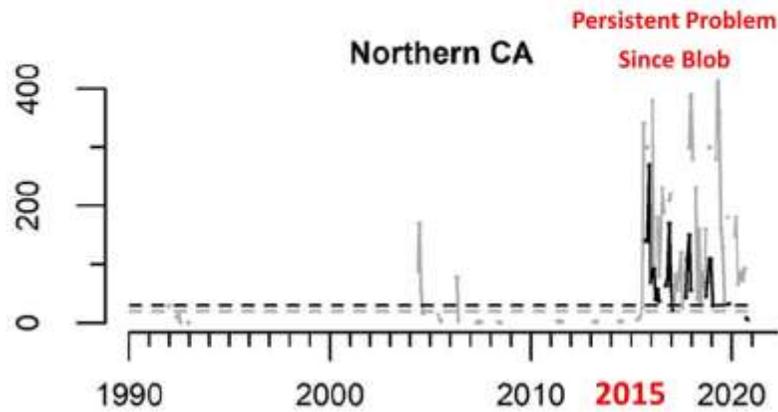
NOAA maps show “the Blob” setting up in 2014, but ocean warming recurring in 2019

In addition, the Pacific Decadal Oscillation Cycle that has driven ocean productivity and wet and dry conditions on land has broken down. It looks like persistent warming is likely, which elevates the risk of algae blooms.

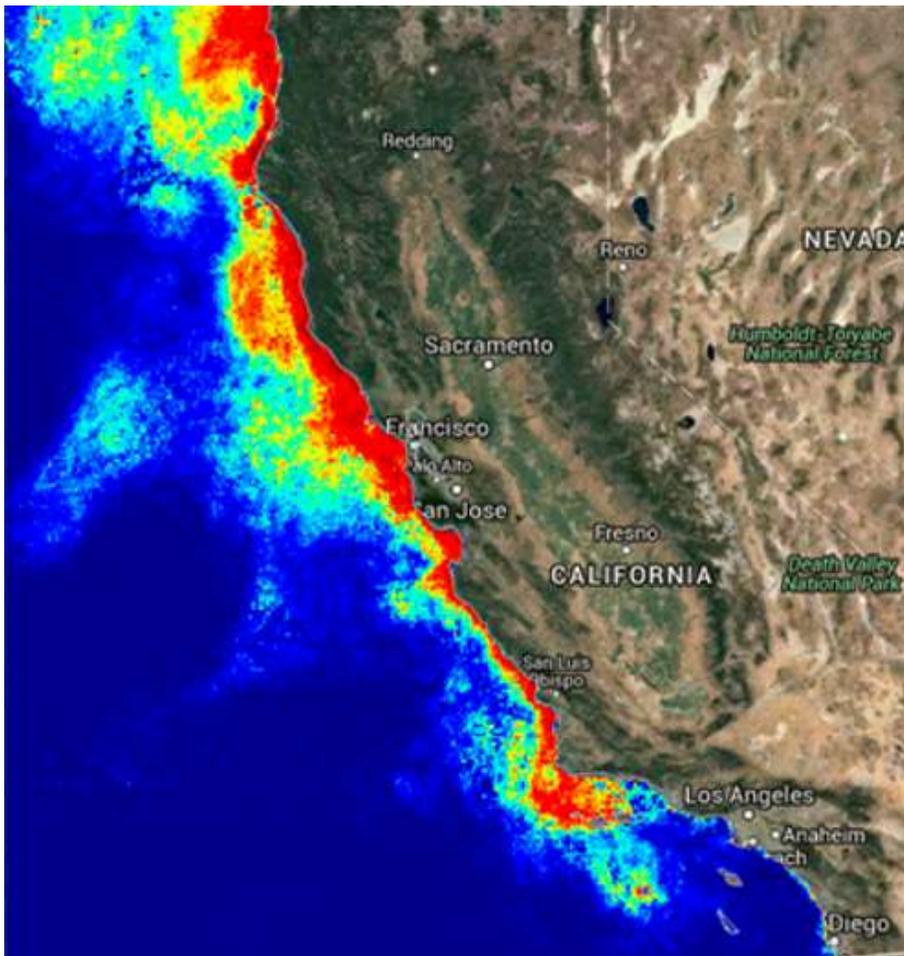
Hazardous algae blooms (HABs) have become more frequent and an example is the diatom *Pseudo-nitzschia australis*, which produces domoic acid that is responsible for well documented toxic events to marine mammals and birds and a cause of amnesiac shellfish poisoning in humans. Persistent blooms of this noxious species began producing high levels of domoic acid in 2015 and the blooms and the toxins have remained elevated in Oregon and northern California. While the crab fishery was only impacted for two seasons, all mussel and clam fisheries are closed as a result of persistent domoic acid. No clams from the legendary Clam Beach since August 2016. Toxic algae blooms are becoming more frequent and likely to occur even without further nearshore ocean enrichment. If we push the system past a “tipping point”, domoic acid problems could become more acute and persistent.

During the 2015 period of ocean warming HABs occurred along the entire California coast, and it is likely that this will occur periodically in the future.

Domoic Acid Levels off Northern California 1990-2022



NOAA (2020) chart from California Current Report. Red annotation added.



UC Santa Cruz forecasting model of harmful algal bloom conditions along the California coast shows the bloom of toxic *Pseudo-nitzschia* diatoms (red) covering the entire coastline north of Santa Barbara in August 2015.

I believe it is appropriate for Nordic Aquafarms to explore an Alternative where the nitrogen waste is repurposed for some beneficial or commercial use on land and the addition of nutrients to the ocean off of Humboldt Bay is avoided. In the event that the project goes forward as planned, I would support mandatory monitoring of the fate of nutrients released by the facility, as recommended by NMFS (2021), and a mandatory reduction in outfall nutrients, if a linkage to HABs is confirmed.

Sincerely,

A handwritten signature in black ink, appearing to read 'Patrick Higgins', with a stylized flourish extending to the right.

Patrick Higgins

References

NMFS. 2021. Re: Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Recommendations for the North Coast Regional Water Quality Control Board regarding NPDES Permit for Nordic Aquafarms California, LLC. Comment letter to Matt St. John, NCRWQCB Executive Officer from Jeffrey Jahn South Coast Branch Chief, NMFS, Arcata, CA

NOAA. 2019. Ecosystem Status Report of the California Current for 2019: A Summary of Ecosystem Indicators Compiled by the California Current Integrated Ecosystem Assessment Team (CCEIA). U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-149.