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The Michigan Environmental Council is a coalition of more than 70 member groups around the state. We have reviewed the reports on aquaculture and have closely followed the aquaculture debate in Michigan since it was brought to our attention earlier this year. We thank the Quality of Life agencies for taking a cautious approach in their evaluation of the prospect of putting cage aquaculture in our Great Lakes.

However, the organizations listed below believe that the work the science panel has done, as well as the other reports, clearly demonstrate net-pen commercial aquaculture in the Great Lakes is not worth the risk. Though we wish the science panel report had gone into greater detail on many of the risks that this type of operation would pose to our Great Lakes, it does capture our primary concerns. Most importantly, the report shows that there are no precautions that could significantly mitigate our three largest concerns.

### **Concerns with Net Pen Aquaculture as detailed by the Science Report**

**1. Disease:** The report supports our grave concern about disease outbreaks from these facilities. We have seen diseases like Bacterial Kidney Disease run rampant through the Great Lakes. The threat from disease coming from aquaculture is twofold. It includes both introduction of new diseases and mutation and amplification of diseases that are already here.

In 2007, a bay in Chile that was full of fish farms saw over 65% of the farmed fish die from Infectious Salmon anemia (ISA). Chile has been fighting this ISA outbreak for the last 8 years.

ISA occurs in many other places where salmonids are farmed, including Norway and Eastern Canada. There is also ongoing debate surrounding the possibility that ISA has infected British Columbian fish farms. ISA is devastating in that it can be asymptomatic but contagious for a long time, and can ultimately reach a 90% mortality rate.

This is a top-risk disease, and we have already seen many mutations occur. Though rainbow trout currently are not susceptible to ISA, they can be carriers of the virus and can spread it to other fish. This disease therefore would still put our salmon fishery at risk. The close confinement and sheer number of fish associated with net pen aquaculture also increases the chances of a mutation that would affect rainbow trout, since the more fish it infects, the more opportunities it has to mutate. Countries that do a lot of fish farming—even those with strong regulations—have issues with disease outbreaks.

In addition to ISA we already have Viral Hemorrhagic Septicemia (VHS) in Michigan's waters, and are actively trying to prevent its spread. Not only do fish farms pose a risk of introducing VHS to new areas, they could amplify and further mutate the strain, putting our wild stock at greater risk.

Though the panel report calls for procedures and monitoring to ensure no disease gets through, practice around the globe has demonstrated that no procedure will be foolproof. Once present, the risk of a disease being amplified or mutating in these densely packed cages is simply too high. If we have a VHS or ISA outbreak in the Great Lakes, our wild salmon population could be decimated, and our other salmonids would be put at risk. The disturbances up and down the food web could be devastating to the entire lake ecology that is still reeling from the dreissenid mussel invasion.

The panel states that prevention is of the utmost importance, and we agree. The best way to prevent these diseases from spreading from a fish farm is to not allow the farms in our Great Lakes waters where there is no way to contain the pathogen.

- 2. Nutrients:** The report also supports another of our longstanding concerns: There is simply no way to treat or contain the nutrients released from a net pen system in the form of fish waste and excess food. We are beyond the point where we can just use the Great Lakes to dilute our pollutants. At this point, adding more nutrients to the lake system increases the risk of nuisance and toxic algal blooms. We already see outbreaks across the Great Lakes, not just in Lake Erie. Excess nutrients also increase the risk of anoxic "dead zones" in the lakes.

These nutrient-driven problems are already occurring. In 1998, authorities shut down a Great Lakes fish farm in Canadian waters after it caused both algal blooms and anoxic conditions. Years later these ecological effects were still ongoing. The science panel found that these nutrient contributions would be detrimental both to the environment and to business. The phosphorus loads from fish farms will contribute to the total maximum loads the lakes can handle, meaning that other industry may be forced out.

Proponents have commented that these nutrient additions may be good for the lake system as there are localized nutrient deficient zones. This simply is not the case. The nutrient deficient zones are driven by the dreissenid mussel invaders. Zebra and Quagga mussels pull the nutrients out of the water column and to the bottom, and outcompete other species. Adding more nutrients will only result in more mussels.

The state has worked hard for many years to address the nutrient loading issues in the lakes. Michigan has forced wastewater treatment plants to decrease their loads, has banned phosphorus use on residential lawns, and is working on ways to get more farms to address nutrient runoff. The total maximum loads in the Great Lake Water Quality agreements should not be looked at as a quota to reach, and more phosphorus should not be added to the lakes for the benefit of a few. It is patently unfair to allow some users to put more untreated phosphorus in the lakes, when we are asking others to spend millions of dollars a year to keep as much possible out.

- 3. Escapement:** The science panel also confirmed our worst fears about fish escapement. Though the farms may stock fish that are bred to be sterile, this is not a perfect breeding system, and these fish could interact with the wild breeding stock. The panel report found these fish “can survive multiple years, move 100s of kilometers, even into other lakes, and likely reproductively interact with extant populations.” These escapes will occur, as despite best efforts and best practices, documented large scale escapes have occurred around the world. These include a storm event in Scotland freeing 300,000 fish, and 40,000 fish escaping in British Columbia through simple worker error when employees accidentally cut the net during cleaning. These escapes risk the genetic diversity of our wild stock. This puts the ecology of the lake systems at risk. These fish could outcompete our wild stock, and do not have the same instincts or behaviors as the wild fish.

This problem could be made even worse if Michigan were ever to consider reversing its policy on genetically modified fish. The first genetically modified salmon was recently approved for consumption by the FDA, and though Michigan currently bans these fish, as the industry grows it becomes more and more likely that highly domesticated or genetically modified stocks could be pursued and our legal ability to prohibit them called into question.

The report opens by saying that if we do start to allow net pen aquaculture in the Great Lakes, it would have to be under the framework of adaptive management and a closely monitored pilot project to begin with. We disagree with this assessment. Adaptive management is not an appropriate approach in this situation, for two major reasons.

First, adaptive management is best used for decision making in situations in which only one or two variables are at play. Inherent in fish farms are numerous variables related to operation and siting. As a result, adaptive management cannot provide clear guidance for regulating aquaculture. The sheer amount of things that are in flux may make it impossible to determine what exactly is causing a problem and identify the best way forward.

Secondly, and more importantly, adaptive management works when the benefits greatly outweigh the risks, and when mistakes or unforeseen problems can be quickly and easily corrected. We have a science report that outlines all the potential hazards and risks with net pen aquaculture. In many cases those harms would be irreversible. The risks in the science report cannot be adequately mitigated to ensure no harm comes to the lakes, even with a comprehensive and robust regulatory scheme in place. Once a fish farm is put in, there is a high likelihood of irreversible harm.

To us, the most telling thing about the reports is the economics involved in Great Lakes net pens. The science panel report states that allowing these net pens in the lakes would make other forms of aquaculture—the forms that can be environmentally friendly and truly sustainable—at a competitive disadvantage. The economic reports also state that the first two net pens, each producing 1 million pounds of fish a year, would create only 44 total jobs statewide. That estimate is based on an assumed market price for fish that one of the state's other reports says is probably higher than realistic. These farms would put Michigan's 38,000-job, \$4.2 billion sport fishing industry at risk, for 44 jobs. To us, this is not a fair trade.

Instead of looking at net pens in the Great Lakes, the state's investment of time should be directed at developing regulatory certainty for land-based systems. The state should look at a general permit for recirculating aquaculture systems (RAS). These systems are truly the future of aquaculture. RAS is done on land, in tanks, where there is no risk of fish escapes or disease outbreaks in our wild fish. RAS operations recycle 99% of the water they use, and the nutrients produced can be an input for growing other crops instead of simply a waste byproduct.

Net pen aquaculture presents unacceptable risks and pushes the cost of waste treatment onto the public. Our children and grandchildren will bear the cost of this subsidy for private interests, possibly by losing the ability to use and enjoy the Great Lakes as we do today. We feel that net pen aquaculture is a step backward for the state, and for the aquaculture industry. Instead, we should look forward and support the sustainable RAS fish farms that can be built in an environmentally sound fashion.

Thank you,

A handwritten signature in cursive script that reads "Sean Hammond". The signature is written in black ink and is positioned to the left of a vertical line.

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