

Synthesis Report Regarding Net-pen Aquaculture in the Great Lakes

March 9, 2016

Departments of:

Agriculture and Rural Development (MDARD)

Environmental Quality (MDEQ)

Natural Resources (MDNR)

Catalyst for the Conversation Regarding Commercial Net-pen Aquaculture in the Great Lakes

The Michigan Departments of Agriculture and Rural Development, Environmental Quality, and Natural Resources (Quality of Life (QOL) Departments) were approached in late 2014 with two proposals for establishing commercial aquaculture netpen operations in northern Lakes Huron and Michigan. While Ontario has established netpen operations in the North Channel and Georgian Bay in Lake Huron, there are no commercial net-pen aquaculture operations in Michigan's open waters of the Great Lakes. The issue was viewed as a serious and potentially contentious matter and constituted a new use for Michigan's bottomlands and Great Lakes waters.

Background on Process

To give this precedent-setting issue the level of attention and deliberate evaluation that was required, the directors requested that the QOL departments' Aquaculture Workgroup develop an ecosystem approach to evaluating the issue. An ecosystem management approach requires considerations of the scientifically based environmental and ecological aspects as well as the social and economic attributes of a proposed management action. In this process, social considerations included the legal authorities and public input. Under that paradigm, the Aquaculture Workgroup:

- 1) Elicited an independent volunteer Science Panel of experts to evaluate the environmental and ecological considerations. (Environmental and ecological factors)
- 2) Contracted with three entities to develop an understanding of the economic aspects commercial net-pen development -- product demand, processing, distribution, etc. (Economic factors)
- 3) Established an internal workgroup to develop a paper on the existing legal authorities regarding the establishment of netpens, such as permitting (water quality, bottomlands, fish health, and stocking) and recognition of the Great Lakes Consent Decree and tribal nation rights. (Social factors)
- 4) Conducted, after the above information was complete, a public forum to present the information and take public input regarding the social aspects (conflicts, fishing, etc.) and community benefits. (Social factors)

Land-based aquaculture facilities, such as flow through, closed, or recirculating, were beyond the scope of both the process used to address the issue of commercial net-pen aquaculture and this synthesis paper.

Synopsis of the Report Findings

Six reports were produced from this process and provided input for this synthesis.

Science-based review -

- 1) [Great Lakes Net-Pen Commercial Aquaculture: A Short Summary of the Science](#) -

Regulations-based review -

2) [A Regulatory Analysis of Proposed Commercial Net-Pen Aquaculture in the Great Lakes -](#)

Economics-based reviews

3) [Overview of Natural Resource Values Potentially at Risk from Consequences of Net-Pen Aquaculture](#)

4) [Expected Economic Impact of Cage Trout Aquaculture on Michigan's Great Lakes](#)

5) [Aquaculture Industry Report from IBIS World Industry Report 11251- Fish & Seafood Aquaculture in the US](#)

Stakeholder Input

6) Commercial Net-pen Aquaculture in the Great Lakes Public Input and Comment

Ecological and Environmental Issues

The Science Panel provided several recommendations and cautions if Michigan were to move forward with commercial net-pen aquaculture. At the outset the report states that if Michigan were to allow commercial netpens, it should be with great caution and use an agency managed, scientifically structured active adaptive management design to address and evaluate potential concerns as they arise. This view was affirmed by many who provided public input. The adaptive management process as envisioned by the Panel includes the following:

“The principles of adaptive management for natural resources include experimentation at the relevant management scale, intensive monitoring, and stakeholder involvement (Walters 1986). Thus, the ability to determine the existing ecosystem conditions, monitoring in locations both with and without a perturbation (in this case net-pen aquaculture), understanding the magnitude of change resulting from the perturbation, evaluating the effects of the perturbation (which would necessarily include a rigorous statistical analysis of the data), and then determining appropriate next steps in consultation with stakeholders, thus completing the adaptive management cycle. This cycle should be led and coordinated by a single group for greatest effectiveness; the QOL group may be best positioned to be this body.”

Other provisions included:

- Development of a tool to determine the best locations for commercial netpens as this would be critical to ensuring their safe operation in the Great Lakes. The siting tool should address the technical, legal and social issues of locating netpens. The tool could be similar to the tool developed for siting wind turbines in Michigan waters of the Great Lakes.
- Development of a nutrient tracking modeling tool that would guide placement and understanding of the fate of nutrients contributed by net-pen operation given the inability to collect wastes.
- Use of only fish species that are present in the Great Lakes to avoid a new invasive species.
- Use of sterile/triploid fish to prevent fish escapes from altering the genetics of wild fish in the Great Lakes.
- Use of certified disease-free fish.

- Careful monitoring of netpens by industry to manage for disease, proper use of feed, water quality, ice damage to netpens and over-all integrity of pen systems in the Great Lakes.
- Significant added expertise and capacity from state agencies to properly monitor and manage commercial net-pen aquaculture in the Great Lakes.

During the stakeholder input process, several participants noted a lack of information pertaining to the ecological consequences of netpens in Ontario and in other locations around the world. This information was limited in the reports and inclusion of that additional information would further speak to the importance of implementing the actions noted above to protect the public's interest in the Great Lakes resource if the state were to allow commercial net-pen aquaculture, even in a limited fashion.

Legal Authorities in Michigan

Based on current Michigan law, commercial netpens cannot legally operate in the Michigan portion of the Great Lakes. The Aquaculture Development Act of 1996 (PA 199) states that aquaculture facilities may only be registered by MDARD if they are operating in privately controlled waters. The Great Lakes are not privately controlled waters. Therefore, current state law does not allow the State of Michigan to register a commercial net-pen aquaculture facility in the Great Lakes.

In other permitting actions:

- In order to site a new-pen, a permit would be required under Part 325 of the Natural Resources and Environmental Protection Act (NREPA) (Great Lakes Submerged Lands) would require a permit for placement of netpens in the Great Lakes, mooring buoys, bottom anchors and other materials.
 - Part 325 requires a permit for placement of net-pens mooring buoys, bottom anchors and other materials in the Great Lakes. In addition, Part 325 requires an agreement for the use and occupation of Great Lakes public trust waters and bottomlands by commercial net-pen aquaculture facilities.
 - A permit and conveyance application can be submitted for review by the DEQ at any time. Part 325 requires a 20-day public notice for both the permit application and the bottomlands conveyance application. In addition, a public hearing would be held to gather additional comments. The DEQ has 90 days from the date of a complete application to make a decision or 150 days if a public hearing is held.
 - Part 325 allows a person to appeal a decision by the DEQ through a contested case hearing. The decision from the contested case hearing can then be appealed through the courts.
 - The U.S. Army Corps of Engineers requires the same permit and would conduct its own review. Both agencies would have to give approval for any net-pen aquaculture to be sited in the Great Lakes.
- In order to operate and discharge, a National Pollutant Discharge Elimination System (NPDES) would be required from the DEQ under the federal Clean Water Act and Part 31 (Water Resources Protection) of NREPA.

- An application for an NPDES permit could be submitted at any time and the DEQ has a statutory timeline of 180 days to make a permitting decision. An NPDES permitting action requires an evaluation of both water quality and treatment technology considerations with the most stringent limitations or requirements applied to the operation. In addition, Antidegradation applies to any NPDES permit action that will result in a new or increased loading of pollutants to surface waters of the state.
- The NPDES permit process requires a 30-day public notice. The DEQ expects significant interest in any net-pen aquaculture application received and would hold a public hearing to take comments. Upon consideration of published comments, a decision to issue or deny the permit would be made. Any permitting decision can be appealed through a contested case hearing. The Director of the DEQ is the decision maker on the contested case; however, a challenge of the decision would move the proceedings to the Circuit Court followed by the Court of Appeals and ultimately the Michigan Supreme Court. We expect this would take 5-10 years given recent appeals of NPDES permits.
- A fish stocking permit would be required from the DNR under Part 487 (Sport Fishing) of NREPA. A fish stocking permit in treaty-ceded areas of the Great Lakes would require agreement of the tribal nations to that activity.
- The Great Lakes Fisheries Commission pointed to the agreement amongst states, tribes, and federal agencies called, “*A Joint Strategic Plan for Management of Great Lakes Fisheries,*” to which Michigan is a signatory. The document calls for consensus among management (state and tribal) jurisdictions about proposed management actions in the Great Lakes that may affect other jurisdictions. This governance structure was pointed to in several instances as one that should not be taken lightly in terms of other states, province, and tribal nation input.

Economic Assessments

The U.S. imports about 75 percent of the seafood it consumes. Worldwide, aquaculture provides 50 percent of the fish consumed. In addition, fish is recognized by the U.S. as a key dietary component for those pursuing healthier eating habits. These are opportunities for growth in domestic fish production. However, Michigan faces growth constraints including feed costs (no local producer of feed), insufficient in-State processing capacity, financing and experienced labor. These limitations exist, as noted by others, for both commercial net-pen aquaculture as well as land-based aquaculture enterprises.

The hypothetical best-case modeled results suggest that locating two one million pound commercial netpen aquaculture trout facilities in Michigan could lead to up to 17 direct jobs, an additional 27 jobs from indirect activities (e.g. fish processing) generating annual personal income of \$2.5 million. This volume of production would likely contribute \$10.3 million in total output provided fish processing is done in Michigan. Critics of this modeled outcome suggest the amounts used to generate these results may be an overestimate given the variability of commercial prices for trout in the market.

The over-all economic impact of recreational fishing in the Great Lakes for Michigan is estimated at about \$1 billion per year. Other noted uses include boating and swimming. As a matter of perception, the public input process noted that the tourism industry could be negatively affected because of the viewscape or belief that the water was degraded or not clean for recreational purposes. While some of the economic value for these other sectors would be at risk because of commercial net-pen aquaculture,

we were not able to determine what those actual effects would be. Therefore, we use the economic information to provide general guidance rather than a definitive economic cost-benefit outcome.

Several constituents noted that the economic reports were not as robust as they would have desired and the assessments themselves noted limitations on available data. The agencies worked with the best resources that could be acquired in the short time frame for assessment and recognize that a more robust cost-benefit analysis may have yielded a clearer outcome. However, the analysts providing information for those reports noted the difficulty in obtaining accurate data given the limited sources for the information and a more costly approach may not yield any further certainty.

Tribal Nation Input

Nine of the 12 federally recognized tribes participated in a consultation meeting that we held with them in November 2015. Their concerns and comments are recorded in detail in the public input document. The input the state received from the tribes, both verbally and written, expressed serious concern regarding commercial net-pen aquaculture in the Great Lakes because the activity may negatively affect the fishery and water quality. They also pointed out that they should be included in any process for pursuit of this activity.

Stakeholder Input

Nearly 1,700 written comments were received by the departments. More than 1,600 were in opposition while 11 letters provided support. Of those in opposition, 90% were an electronically submitted form letter through the Food and Water Watch organization. An additional 117 individual comments were received articulating ardent opposition to commercial aquaculture net-pens from individuals from Michigan, Illinois, and Indiana, tribal nation governments, nongovernmental environmental groups (Michigan United Conservation Clubs, National Wildlife Federation, Michigan Trout Unlimited, etc.), and one Great Lakes State Department of Natural Resources (Indiana). One letter was neutral, but strongly supported adhering to the collaborative governance process for fisheries management in the Great Lakes (Great Lakes Fishery Commission).

Those in opposition point to risks to water quality, the fishery (genetics, disease, escapes), and tourism and many of the issues identified by the Science Panel. Some that were opposed to commercial net-pen aquaculture were supportive of recirculating aquaculture and in some cases also supported flow through aquaculture.

Those in support state the provision of jobs, economic benefits to local economies, and provision of a desired product.

Other Considerations

Through the public input process, it was very clear that the state would be challenged to thoroughly evaluate the role of the Public Trust Doctrine in any implementation of commercial net-pen aquaculture in the public waters of the Great Lakes. The QOL Aquaculture Workgroup did not pursue a thorough legal analysis on this issue, but it would be advisable to further understand this aspect of objection.

Program Costs of Implementation

There are no traditional sources of funding to provide for the programming and oversight that commercial net-pen aquaculture would require. New funding would be required to provide for the public's expectation of oversight and protection of the Great Lakes. The following estimates are provided as an example program based on experience in addressing Great Lakes bottomland development (windpower), monitoring (DNR Fisheries Division Great Lakes Assessment Program), and staffing for program assistance, management, and coordination amongst the QOL agencies and with industry.

Initial Investment (2 Years to completion):

| | |
|---|------------------|
| Development of a Commercial Net-pen Aquaculture Siting Tool to include facilitation of an external multi-interest stakeholder group | \$350,000 |
| Development of a Commercial Net-pen Aquaculture nutrient input and tracking model | \$500,000 |
| Development of an Adaptive Management Design and Science Panel | \$50,000 |
| Start up costs total: | \$900,000 |

Ongoing Annual Costs to also include Annual Adaptive Management Science Panel Meeting

| | |
|--|--------------------|
| Monitoring program to assess water quality, fish health, genetics, invasive species, nutrients, benthos/zooplankton for control locations and far-field net-pen locations with a statistically robust design (could be contracted or assumed internally) | \$1,160,000 |
| MDARD Aquaculture Program (Registration, Inspection, Industry support) | \$1,000,000 |
| DEQ Permitting and Assistance | \$150,000 |
| Science Panel Meetings and Support (staff time, travel, meeting support) | \$25,000 |
| Ongoing annual costs: | \$2,335,000 |

Thus startup costs for this program would be approximately \$3.33 million with ongoing costs of approximately \$2.4 million annually to create a Great Lakes commercial net-pen aquaculture program that would serve the aquaculture industry while providing the people of Michigan with a scientifically based program to regulate and monitor (in addition to any permit- required facility monitoring at netpen locations) for the protection of the Great Lakes. It is possible that the monitoring requirements to fulfill the adaptive management approach could also be included with the self-monitoring requirements for the operator of the facility as specified in an issued NPDES permit.

Conclusions

The Michigan QOL agencies do not recommend pursuing of commercial net-pen aquaculture in the Great Lakes at this time for the following reasons:

- Given the ecological and environmental risks and uncertainties, as pointed out by the Science Panel and with further information provided through public input, commercial net-pen

aquaculture would pose significant risks to fishery management and other types of recreation and tourism. Furthermore, both collaborating management interests and tribal nation interests would likely not agree to Michigan moving forward and pose a significant challenge in any attempts to do so.

- The \$3.3 million to implement a commercial net-pen aquaculture program by the State to protect the public's interest in the Great Lakes and provide the stated expected service to the industry are not provided through any conventional funding models available to the QOL agencies. There would need to be a new funding stream identified for this industry effort to support initial costs as well as the \$2.33 million needed annually to monitor and maintain the program and protection of the state's resources. This level of public investment for an estimated return of \$10 million (under the modeled scenarios for two facilities) does not appear to be a prudent use of the state's resources at this time.
- Regulatory authority does not currently exist to issue registrations for commercial aquaculture in the Great Lakes.

It is important to note that MDEQ must make a Part 325 and NPDES permitting decision regardless of the ability to license an aquaculture facility. Any policy decision regarding aquaculture in the Great Lakes must be carefully constructed to prevent a preempting of DEQ's permitting processes which could result in unnecessary litigation; and to prevent stimulating permit applications. Decisions made in this process have a very high likelihood of legal challenge.

While not recommending the pursuit of commercial net-pen aquaculture in the public waters of the Great Lakes, the state can and will continue to work within existing authorities to assist the industry in development of well- designed flow through, closed and recirculating aquaculture facilities.